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 updated with our latest products.

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

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

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

Technical Support and Customer Service

Telephone: +49 24 21 969-332

E-mail: csc@mn-net.com

Homepage: *www.mn-net.com*

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

Your Water Analysis team

Timeline MACHEREY-NAGEL

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.

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

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.

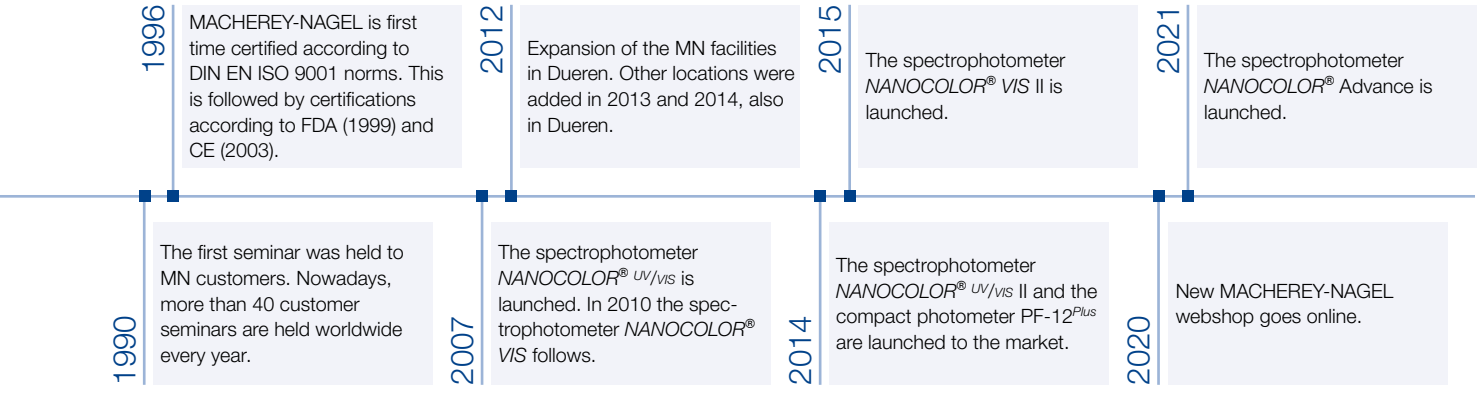
We are able to look back on decades of experience in the field of rapid tests and water analysis. In the 1950s we launched the first generation of rapid tests, in 1976 our first photometer. Over the years we have steadily refined and improved our products. This makes us one of the leading and most reliable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



Contents

Measuring ranges

0.001 mg/L | 0.01 mg/L | 0.1 mg/L | 1 mg/L

VISOCOLOR® alpha

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

VISOCOLOR® ECO

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

VISOCOLOR® HE

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

VISOCOLOR® Powder Pillows

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

NANOCOLOR® standard tests

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

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.

NANOCOLOR® *ECO* reagent kits

contain all reagents needed for the test performance and evaluation in round test tubes. They can also be transferred to 50 mm cells to achieve lower detection limits.

Application areas

Parameter	Aquaculture and fish farming	Soil analysis	Breweries	Chemical industry	Metal processing industry	Domestic waste water	Municipal waste water	Boiler feed water	Food industry
Alkalinity			■	■					
Aluminum			■		■				■
Ammonium	■	■	■	■	■	■	■		■
AOX				■	■	■	■		
BOD_5	■		■	■	■	■	■		■
Bromine									
Cadmium				■	■				■
Calcium	■	■	■	■	■			■	■
Carbonate hardness	■	■	■	■				■	■
Chlorine dioxide				■					■
Chloride		■	■	■	■			■	■
Chlorine		■	■	■	■			■	■
Chromium / Chromate				■	■			■	■
Cobalt				■	■				
COD	■		■	■	■	■	■	■	■
Color			■	■	■				■
Copper		■	■	■	■			■	■
Cyanide	■	■		■	■				■
Cyanuric acid									
DEHA				■				■	
Detergents			■	■	■				
Ethanol			■						■
Fluoride				■					■
Formaldehyde				■					
Hydrazine			■	■				■	
Hydrocarbons				■	■			■	
Iron	■	■	■	■	■			■	■
Lead				■	■				■
Magnesium	■	■	■	■				■	■
Manganese	■		■	■	■			■	■
Methanol			■	■					■
Molybdenum				■	■			■	
Nickel				■	■				
Nitrate	■	■	■	■	■	■	■	■	■
Nitrite	■	■	■	■	■	■	■		■
Organic acids				■		■	■		■
Organic complexing agents				■	■				
Oxygen	■		■	■				■	
Ozone				■					■
Peroxides			■	■	■				■
pH	■	■	■	■	■	■	■	■	■
Phenols				■	■				■

Application areas

Landfills	Leather industry	Sea water	Surface water	Paper industry	Pharmaceutical industry	Swimming pools	Textile industry	Drinking water	Cement and concrete production	Parameter
							■			Alkalinity
		■	■		■	■	■	■		Aluminum
■	■	■	■		■	■		■	■	Ammonium
■	■	■	■	■	■					AOX
■	■	■	■	■	■		■			BOD_5
						■				Bromine
■		■	■		■			■		Cadmium
	■	■	■	■			■	■	■	Calcium
		■	■	■		■	■	■	■	Carbonate hardness
					■	■		■		Chlorine dioxide
	■	■	■		■			■	■	Chloride
		■	■	■	■	■	■	■		Chlorine
■	■	■	■		■		■	■	■	Chromium / Chromate
		■	■							Cobalt
■	■	■	■	■	■		■			COD
	■	■	■		■	■	■	■		Color
■		■	■		■		■	■		Copper
■		■	■		■			■		Cyanide
						■				Cyanuric acid
										DEHA
	■	■	■		■					Detergents
					■					Ethanol
		■	■		■			■		Fluoride
										Formaldehyde
										Hydrazine
		■	■		■		■			Hydrocarbons
	■	■	■		■			■		Iron
■					■			■		Lead
	■	■	■	■			■	■	■	Magnesium
	■	■	■		■			■		Manganese
					■					Methanol
								■		Molybdenum
■		■	■		■		■	■		Nickel
	■	■	■		■			■	■	Nitrate
		■	■		■			■		Nitrite
				■						Organic acids
		■	■							Organic complexing agents
		■	■							Oxygen
				■		■		■		Ozone
	■	■	■	■	■	■	■	■		Peroxide
	■	■	■	■	■	■	■	■	■	pH
■		■	■		■					Phenols

Application areas

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

Application areas

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

NANOCOLOR® photometers

Water analysis made easy

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

Overview

Photometer	REF	Type	Wavelengths	Wavelength accuracy	Spectral bandwidth	Operation	Display	Data memory [1]	Platform [2]
NANOCOLOR® *VIS* II	919650	Spectro-photometer	320–1100 nm	± 1 nm	< 4 nm	Touch screen	HD LCD	5000	TT, ST, RK, PP
NANOCOLOR® *UV/VIS* II	919600	Spectro-photometer	190–1100 nm	± 1 nm	< 2 nm	Touch screen	HD LCD	5000	TT, ST, RK, PP
NANOCOLOR® Advance	919750	Spectro-photometer	340–800 nm	± 2 nm	< 4 nm	Touch screen	Backlit display	1000	TT, ST, RK, PP, CO
PF-12*Plus*	919250	Filter-photometer	7 (+ 1)	± 2 nm	10–12 nm	Plastic foil keyboard	Graphic display	1000	TT, CO, PP, RK
PF-3 COD	919342	LED filter-photometer	3	± 2 nm	10–12 nm	Plastic foil keyboard	Graphic display	50	TT
PF-3 Drinking Water	919343	LED filter-photometer	3	± 2 nm	10–12 nm	Plastic foil keyboard	Graphic display	50	TT, CO, PP
PF-3 Fish	919345	LED filter-photometer	3	± 2 nm	10–12 nm	Plastic foil keyboard	Graphic display	50	TT, CO, PP
PF-3 Pool	919340	LED filter-photometer	3	± 2 nm	10–12 nm	Plastic foil keyboard	Graphic display	50	TT, CO, PP
PF-3 Soil	919341	LED filter-photometer	3	± 2 nm	10–12 nm	Plastic foil keyboard	Graphic display	50	TT, CO, PP

[1] Number of measurements in data memory refers to measurement results of cuvette tests. For further information about data memory of the ir
[2] CO: Colorimetric tests - only *VISOCOLOR*® *ECO* / PP: *VISOCOLOR*® *Powder Pillows* / TT: *NANOCOLOR*® tube tests / ST: *NANOCOLOR*® star

Data transfer	Mobile	Reference detector technology	Waterproof / IP 67 / IP 68	NTU-check	Battery operation	Mains operation	Barcode recognition	Color measurement	USB (Host)	USB (Function)	Mini-USB	RS232	LAN	Photometer
■		■		■		■	■	■	■	■		■	■	
■		■		■		■	■	■	■	■		■	■	
■	■	■	■	■	■	■	■		■	■			■	
■	■		■	■	■	■			■					
■	■		■		■	■					■			
■	■		■		■	■					■			
■	■		■		■	■					■			
■	■		■		■	■					■			
■	■		■		■	■					■			

nstruments please see the respective manual.
ndard tests / RK: *NANOCOLOR*® *ECO* reagent kits

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 heating 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 4*	919300	24	2	24	–	10 min	40–160 °C	Touch screen
NANOCOLOR® *VARIO C2*	919350	12	1	12	–	10 min	40–160 °C	Touch screen
NANOCOLOR® *VARIO C2 M*	919350.1	10	1	8	2	10 min	40–160 °C	Touch screen
NANOCOLOR® *VARIO Mini*	919380	6	1	6	–	25 min	70–160 °C	Plastic foil keyboard
NANOCOLOR® *VARIO HC*	919330	12	1	12	–	10 min	40–160 °C	Touch screen

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

Analytical quality assurance

IQC (Internal quality control)

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

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

IQC

Multiple determinations

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

Products for quality assurance

Applicable for all *NANOCOLOR*® tests

IQC

Standard measurements

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

Products for quality assurance

NANOCONTROL single and multi standards

IQC

Plausibility checks by dilution and standard addition

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

Products for quality assurance

NANOCONTROL standard addition

IQC

Parallel measurements

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

Products for quality assurance

Applicable for all *NANOCOLOR*® tests

IQC

Inspection equipment monitoring (photometer / heating blocks)

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

Products for quality assurance

NANOCONTROL NANOCHECK 2.0

NANOCONTROL NANOTURB

NANOCOLOR® T-Set and USB T-Set

IQC

Personal information sheet / training

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

Products for quality assurance

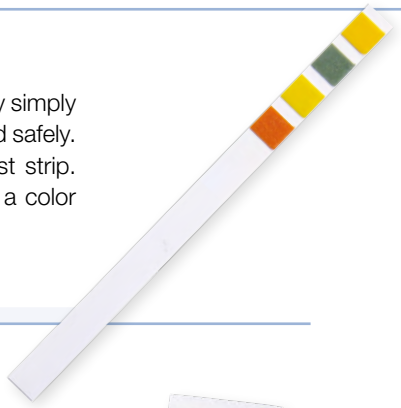
MN seminars (for free)

Platforms

pH

Products for pH determination

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



QT

Qualitative test papers

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

HT

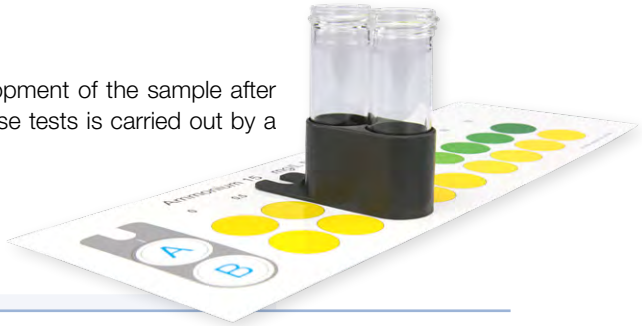
Semi-quantitative tests strips

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

CO

Colorimetric test kits

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



TI

Titrimetric test kits

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

PP

Powder Pillows

Powder Pillows are individually packaged reagents and contain the exactly needed amount for a determination. The evaluation of these tests is carried out photometrically in 16 or 24 mm test tubes.

TT

NANOCOLOR® tube tests

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

ST

NANOCOLOR® standard tests

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

MB

Microbiological tests

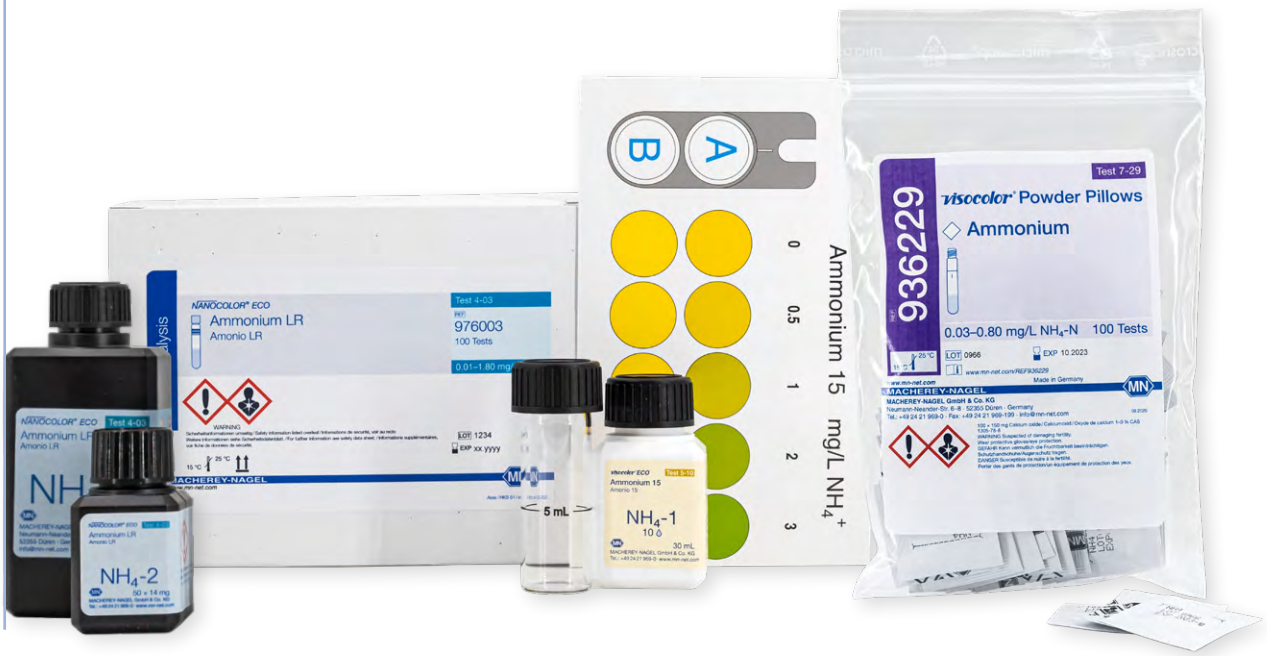
Microbiological tests are based on enzymatic reaction or metabolic processes of bacteria. The evaluation of these tests is carried out with an oxygen probe or with the help of a luminometer.

RK

NANOCOLOR® *ECO* reagent kits

NANOCOLOR® *ECO* reagent kits are photometric reagent sets containing all reagents necessary for the analysis. The tests are performed and evaluated directly in 16 mm or 24 mm test tubes. They can also be evaluated in 50 mm semi micro cells.

Parameters A–Z




B
A
Zink mg/l Zn2+
0
0.5
1
Quantofix
0
2 mg/L Zn2+
5
10
25
50
100
985096
NANOCOLOR®
Test 0-96
Zink 4
Zinc 4
20 Tests
0.10–4.00 mg/L Zn2+
DANGER
MACHEREY-NAGEL
NANOCOLOR
Zink 4
Zinc / Cinc
R3
Test 0-96
310609

Parameters A–Z

Acetic acid (CH_3COOH)

See Organic acids (page 40)

Acid binding capacity

See Alkalinity (page 23)

Acid capacity

See Alkalinity (page 23)

Acidity

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

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

Active oxygen

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

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

Air humidity (relative)

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

Product	Platform	Measuring range	Number of tests	REF
■ Moisture indicator	HT	20 · 30 · 40 · 50 · 60 · 70 · 80 % relative humidity	12	90801
■ Moisture indicator	QT	> 8 % relative humidity	1000	908805
■ Non-toxic moisture indicator without cobalt chloride	QT	> 8 % relative humidity	1000	908808

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 / PP: Powder Pillows
TT: *NANOCOLOR*® tube tests / ST: *NANOCOLOR*® standard tests / MB: Microbiological tests / RK: *NANOCOLOR*® *ECO* reagent kits

Alkalinity

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

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

Product	Platform	Measuring range	Number of tests	REF
QUANTOFIX® Carbonate hardness	HT	0 · 3.8 · 7.5 · 12.5 · 18.8 · 25.0 °e	100	91323
QUANTOFIX® LubriCheck	HT	0 · 15 · 50 · 75 · 130 · 200 mmol/L KOH	100	91336
Swimming pool test 3 in 1	HT	Free chlorine: 0 · 0.5 · 1 · 3 · 5 · 10 mg/L Cl_2 Alkalinity: 0 · 80 · 120 · 180 · 240 mg/L $CaCO_3$ pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.4	50	90752
Swimming pool test 5 in 1	HT	Total chlorine: 0 · 1 · 3 · 5 · 10 mg/L Cl_2 Free chlorine: 0 · 0.5 · 1 · 3 · 5 · 10 mg/L Cl_2 Alkalinity: 0 · 80 · 120 · 180 · 240 mg/L $CaCO_3$ Total hardness: 0 · 100 · 250 · 500 · 1000 mg/L $CaCO_3$ pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.4	50	90759
VISOCOLOR® alpha Carbonate hardness	TI	1 drop equals 1.25 °e	100	935016
VISOCOLOR® ECO Alkalinity TA [2)]	CO	5–250 mg/L $CaCO_3$	100	931204
VISOCOLOR® ECO Carbonate hardness	TI	1 drop equals 1.25 °e	100	931014
VISOCOLOR® HE Alkalinity AL 7	TI	0.2–7.2 mmol/L OH^-	200	915007
VISOCOLOR® HE Carbonate hardness C20	TI	0.2–7.2 mmol/L H^+	200	915003
NANOCOLOR® Carbonate hardness 15	TT	1.25–18.75 °e / 0.4–5.4 mmol/L H^+	20	985015

[2)] Only photometrically evaluable, with photometers PF-3 / PF-12*Plus* and / or *NANOCOLOR®* Advance.

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	90721
QUANTOFIX® Aluminum	HT	0 · 5 · 20 · 50 · 200 · 500 mg/L Al^{3+}	100	91307
VISOCOLOR® ECO Aluminum	CO	0 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 · 0.40 · 0.50 mg/L Al^{3+}	50	931006
NANOCOLOR® Aluminum 07	TT	0.02–0.70 mg/L Al^{3+}	19	985098
NANOCOLOR® Aluminum	ST	0.01–1.00 mg/L Al^{3+}	250	91802

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

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	90722
Ammonia test	HT	0 · 0.5 · 1 · 3 · 6 mg/L NH_4^+	25	90714
QUANTOFIX® Ammonium [3]	HT	0 · 10 · 25 · 50 · 100 · 200 · 400 mg/L NH_4^+	100	91315
VISOCOLOR® alpha Ammonium	CO	0 · 0.2 · 0.5 · 1 · 2 · 3 mg/L NH_4^+	50	935012
VISOCOLOR® ECO Ammonium 15 [1]	CO	0 · 0.5 · 1 · 2 · 3 · 5 · 7 · 10 · 15 mg/L NH_4^+	50	931010
VISOCOLOR® ECO Ammonium 3 [1]	CO	0 · 0.2 · 0.3 · 0.5 · 0.7 · 1 · 2 · 3 mg/L NH_4^+	50	931008
VISOCOLOR® HE Ammonium	CO	0.0 · 0.02 · 0.04 · 0.07 · 0.10 · 0.15 · 0.20 · 0.30 · 0.40 · 0.50 mg/L NH_4^+	110	920006
VISOCOLOR® Powder Pillows Ammonium [4]	PP	0.03–0.80 mg/L NH_4-N	100	936229
NANOCOLOR® Ammonium 2000	TT	300–1600 mg/L NH_4-N	20	985002
NANOCOLOR® Ammonium 200	TT	30–160 mg/L NH_4-N	20	985006
NANOCOLOR® Ammonium 100	TT	4–80 mg/L NH_4-N	20	985008
NANOCOLOR® Ammonium 50	TT	1–40 mg/L NH_4-N	20	985005
NANOCOLOR® Ammonium 10	TT	0.2–8.0 mg/L NH_4-N	20	985004
NANOCOLOR® Ammonium 3	TT	0.04–2.30 mg/L NH_4-N	20	985003
NANOCOLOR® Ammonium	ST	0.01–2.0 mg/L NH_4-N	100	91805
NANOCOLOR® ECO Ammonium	RK	0.010–1.80 mg/L NH_4-N	100	976003

[1] Also suitable for photometrical evaluation on photometers PF-3, PF-12^{Plus} and / or *NANOCOLOR®* Advance. 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.
[4] Only photometrically evaluable, with photometers *NANOCOLOR® VIS* II, *NANOCOLOR® UV/VIS* II, *NANOCOLOR®* Advance, PF-3 and / or PF-12^{Plus}.

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	90723

AOX (adsorbable organically bound halogens)

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

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

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

Aquarium parameters, multi test

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

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

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

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

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

Product	Platform	Measuring range	Number of tests	REF
■ Arsenic test paper	QT	> 0.5 µg As	200	90762
■ QUANTOFIX® Arsenic 50	HT	0 · 0.05 · 0.1 · 0.5 · 1.0 · 1.7· 3.0 mg/L $As^{3+/5+}$	100	91332
■ QUANTOFIX® Arsenic 10	HT	0 · 0.01 · 0.025 · 0.05 · 0.1 · 0.5 mg/L $As^{3+/5+}$	100	91334
■ QUANTOFIX® Arsenic Sensitive	HT	0 · 0.005 · 0.01 · 0.025 · 0.05 · 0.1 · 0.25 · 0.5 mg/L $As^{3+/5+}$	100	91345
■ QUANTOFIX® EZ Arsenic Sensitive PP	HT	0 · 0.005 · 0.01 · 0.025 · 0.05 · 0.1 · 0.25 · 0.5 mg/L $As^{3+/5+}$	100	91345.2

Ascorbic acid (vitamin C)

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

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

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

Biotoxicity / Bioluminescence

See Toxicity (page 47)

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

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	90733

Blood

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

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

BOD (biological oxygen demand)

Together with the chemical oxygen demand (COD) the biological oxygen demand (BOD) represents one of the most important sum parameters for the evaluation of waste water pollution. BOD is defined as the amount of oxygen per volume, which is used by the microorganisms for oxidative degradation of organic substances in a water sample. The 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	985825
■ *NANOCOLOR*® BOD_5	TT	2–3000 mg/L O_2	25–50	985822

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	90747

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	90603
■ *VISOCOLOR*® *ECO* Bromine [2)]	CO	0.10–13.00 mg/L Br_2	200	931211
■ with *NANOCOLOR*® Chlorine Tests	TT	See Chlorine (page 28)		

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

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

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	985014
NANOCOLOR® Cadmium	ST	0.002–0.50 mg/L Cd^{2+}	25	918131

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	91324
VISOCOLOR® *ECO* Calcium	TI	1 drop equals 5 mg/L Ca^{2+}	100	931012
VISOCOLOR® *HE* Calcium CA 20	TI	0.1–3.6 mmol/L Ca^{2+}	200	915010
NANOCOLOR® Hardness 20	TT	10–100 mg/L Ca^{2+}	20	985043
NANOCOLOR® Hardness Ca/Mg	TT	10–100 mg/L Ca^{2+}	20	985044

Carbonate hardness

See Hardness (page 34)

Carbonic acid (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	90608
QUANTOFIX® Chloride	HT	0 · 500 · 1000 · 1500 · 2000 · ≥ 3000 mg/L Cl^-	100	91321
VISOCOLOR® *ECO* Chloride [1)]	CO	1 · 2 · 4 · 7 · 12 · 20 · 40 · 60 mg/L Cl^-	90	931018
VISOCOLOR® *HE* Chloride CL 500	CO	5–500 mg/L Cl^-	300	915004
NANOCOLOR® Chloride 200	TT	5–200 mg/L Cl^-	20	985019
NANOCOLOR® Chloride 50	TT	0.5–50.0 mg/L Cl^-	20	985021
NANOCOLOR® Chloride	ST	0.2–125 mg/L Cl^-	250	91820

[1)] Also suitable for photometrical evaluation on photometers PF-3, PF-12^{Plus} and / or *NANOCOLOR*® Advance. 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 / PP: Powder Pillows
TT: *NANOCOLOR*® tube tests / ST: *NANOCOLOR*® standard tests / MB: Microbiological tests / RK: *NANOCOLOR*® *ECO* reagent kits

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 100200	90754 90755 90756 90758
■ Chlortesmo	QT	> 1 mg/L Cl_2	200	90603
■ Chlorine test	HT	10 · 50 · 100 · 200 mg/L Cl_2	Reel, 5 m length	90709
■ Swimming pool test 3 in 1	HT	Free chlorine: 0 · 0.5 · 1 · 3 · 5 · 10 mg/L Cl_2 Alkalinity: 0 · 80 · 120 · 180 · 240 mg/L $CaCO_3$ pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.4	50	90752
■ Swimming pool test 5 in 1	HT	Total chlorine: 0 · 1 · 3 · 5 · 10 mg/L Cl_2 Free chlorine: 0 · 0.5 · 1 · 3 · 5 · 10 mg/L Cl_2 Alkalinity: 0 · 80 · 120 · 180 · 240 mg/L $CaCO_3$ Total hardness: 0 · 100 · 250 · 500 · 1000 mg/L $CaCO_3$ pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.4	50	90759
■ QUANTOFIX® Chlorine	HT	0 · 1 · 3 · 10 · 30 · 100 mg/L Cl_2	100	91317
■ QUANTOFIX® Chlorine 500	HT	0 · 25 ·50 · 100 · 250 · 500 mg/L Cl_2	100	91354
■ QUANTOFIX® Chlorine Sensitive [3]	HT	0 · 0.1 · 0.5 · 1 · 3 · 10 mg/L Cl_2	100	91339
■ QUANTOFIX® Chlorine Sensitive 1	HT	0 · 0.05 · 0.1 · 0.2 · 0.4 · 0.8 · 1.2 mg/L Cl_2	50	91360
■ *VISOCOLOR® alpha* Chlorine	CO	0.25 · 0.5 · 1.0 · 1.5 · 2.0 mg/L Cl_2	150	935019
■ *VISOCOLOR® ECO* Swimming pool	CO	Free chlorine: < 0.1 · 0.1 · 0.2 · 0.3 · 0.4 · 0.6 · 0.9 · 1.2 · 2.0 mg/L Cl_2 pH: 6.9 · 7.2 · 7.4 · 7.6 · 7.8 · 8.2	150	931090
■ *VISOCOLOR® ECO* Chlorine 1, free + total [1]	CO	< 0.1 · 0.1 · 0.2 · 0.3 · 0.4 · 0.6 · 0.9 · 1.2 · 2.0 mg/L Cl_2	150	931035
■ *VISOCOLOR® ECO* Chlorine 2, free + total [1]	CO	< 0.1 · 0.1 · 0.2 · 0.3 · 0.4 · 0.6 · 0.9 · 1.2 · 2.0 mg/L Cl_2	150	931015
■ *VISOCOLOR® ECO* free Chlorine 2 [1]	CO	< 0.1 · 0.1 · 0.2 · 0.3 · 0.4 · 0.6 · 0.9 · 1.2 · 2.0 mg/L Cl_2	150	931016
■ *VISOCOLOR® ECO* Chlorine 6, free and total [2]	CO	0.05–6.00 mg/L Cl_2	200	931217
■ *VISOCOLOR® ECO* free Chlorine 6 [2]	CO	0.05–6.00 mg/L Cl_2	400	931219
■ *VISOCOLOR® HE* Chlorine, free + total	CO	0.0 · 0.02 · 0.04 · 0.06 · 0.10 · 0.15 · 0.20 · 0.30 · 0.40 · 0.60 mg/L Cl_2	160	920015
■ *VISOCOLOR® Powder Pillows* free Chlorine [4]	PP	0.03–6.00 mg/L Cl_2	100 1000	936220 936220.1
■ *VISOCOLOR® Powder Pillows* total Chlorine, Ozone [4]	PP	0.03–6.00 mg/L Cl_2 / 0.03–4.00 mg/LO_3	100 1000	936221 936221.1
■ *NANOCOLOR®* Chlorine / Ozone 2	TT	0.05–2.00 mg/L Cl_2	20	985017
■ *NANOCOLOR®* Chlorine	ST	0.02–10.0 mg/L Cl_2	250	91816

[1] Also suitable for photometrical evaluation on photometers PF-3, PF-12^{Plus} and / or *NANOCOLOR®* Advance. Measuring range can differ in photometrical evaluation.
[2] Only photometrically evaluable, with photometers PF-3, PF-12^{Plus} and / or *NANOCOLOR®* Advance.
[3] Also suitable for evaluation on QUANTOFIX® Relax. Measuring range on QUANTOFIX® Relax can differ from visual range.
[4] Only photometrically evaluable, with photometers *NANOCOLOR® VIS* II, *NANOCOLOR® UV/VIS* II, *NANOCOLOR®* Advance, PF-3 and / or 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 / PP: Powder Pillows
TT: *NANOCOLOR®* tube tests / ST: *NANOCOLOR®* standard tests / MB: Microbiological tests / RK: *NANOCOLOR® ECO* reagent kits

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
■ QUANTOFIX® Chlorine dioxide 15	HT	0 · 0.25 · 0.5 · 1 · 3 · 5 · 10 · 15 mg/L ClO_2	50	91355
■ QUANTOFIX® Chlorine dioxide 3000	HT	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 · 1500 · 2000 · 2500 · 3000 mg/L ClO_2	100	91357
■ *VISOCOLOR® ECO* Chlorine dioxide [1]	CO	< 0.2 · 0.2 · 0.4 · 0.6 · 0.8 · 1.1 · 1.7 · 2.3 · 3.8 mg/L ClO_2	150	931021
■ *NANOCOLOR®* Chlorine dioxide 5	TT	0.15–5.00 mg/L ClO_2	20	985018
■ *NANOCOLOR®* Chlorine dioxide	ST	0.04–4.00 mg/L ClO_2	50	918163

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

Chlorite (ClO_2^-)

See Chlorine dioxide (page 29)

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	90724
■ QUANTOFIX® Chromate	HT	0 · 3 · 10 · 30 · 100 mg/L CrO_4^{2-}	100	91301
■ *VISOCOLOR® ECO* Chromium(VI) [1]	CO	0.02 · 0.05 · 0.10 · 0.15 · 0.20 · 0.30 · 0.40 · 0.50 mg/L Cr(VI)	140	931020
■ *NANOCOLOR®* total Chromium 2	TT	0.005–2.00 mg/L Cr	20	985059
■ *NANOCOLOR®* Chromate 5	TT	0.01–4.0 mg/L CrO_4^{2-}	20	985024
■ *NANOCOLOR®* Chromate	ST	0.01–6.0 mg/L CrO_4^{2-}	250	91825

[1] Also suitable for photometrical evaluation on photometers PF-3, PF-12^{Plus} and / or *NANOCOLOR®* Advance. 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	90728
■ QUANTOFIX® Cobalt	HT	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L Co^{2+}	100	91303
■ *NANOCOLOR®* Cobalt	ST	0.002–0.70 mg/L Co^{2+}	250	91851

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

Parameters A–Z

COD (chemical oxygen demand)

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

Product		Platform	Measuring range	Number of tests	REF
NANOCOLOR® COD 60000		TT	5000–60000 mg/L O_2	20	985012
NANOCOLOR® COD 15000		TT	1000–15000 mg/L O_2	20	985028
NANOCOLOR® COD 10000		TT	1000–10000 mg/L O_2	20	985023
NANOCOLOR® COD 4000		TT	400–4000 mg/L O_2	20	985011
NANOCOLOR® COD 1500	ISO 15705	TT	100–1500 mg/L O_2	20	985029
NANOCOLOR® COD 1500 Hg-free		TT	100–1500 mg/L O_2	20	963029
NANOCOLOR® COD HR 1500	ISO 15705	TT	20–1500 mg/L O_2	20	985038
NANOCOLOR® COD 600	ISO 15705	TT	50–600 mg/L O_2	20	985030
NANOCOLOR® COD 300		TT	50–300 mg/L O_2	20	985033
NANOCOLOR® COD 160	ISO 15705	TT	15–160 mg/L O_2	20	985026
NANOCOLOR® COD 160 Hg–free		TT	15–160 mg/L O_2	20	963026
NANOCOLOR® COD LR 150	ISO 15705	TT	3–150 mg/L O_2	20	985036
NANOCOLOR® COD 60	ISO 15705	TT	5–60 mg/L O_2	20	985022
NANOCOLOR® COD 60 in salt water		TT	6–60 mg/L O_2	20	985020
NANOCOLOR® COD 40	ISO 15705	TT	2–40 mg/L O_2	20	985027

Coloring / Color

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

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

Complexing agents

See EDTA (page 32)

Cooking salt (NaCl)

See Chloride (page 27)

Cooling lubricants

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

Product	Platform	Measuring range	Number of tests	REF
QUANTOFIX® LubriCheck	HT	0 · 15 · 50 · 75 · 130 · 200 mmol/L KOH	100	91336
QUANTOFIX® Nitrite / pH	HT	Nitrite: 0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO_2^- pH: 6.0 · 6.4 · 6.7 · 7.0 · 7.3 · 7.6 · 7.9 · 8.2 · 8.4 · 8.6 · 8.8 · 9.0 · 9.3 · 9.6	100	91338

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

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	90729
Cuprotesmo	QT	> 5 mg/L $Cu^{+/2+}$ or > 0.05 µg Cu	40	90601
QUANTOFIX® Copper	HT	0 · 10 · 30 · 100 · 300 mg/L $Cu^{+/2+}$	100	91304
QUANTOFIX® Copper Sensitive 5	HT	0 · 0.1 · 0.5 · 1.0 · 2.0 · 5.0 mg/L $Cu^{+/2+}$	25	91358
VISOCOLOR® ECO Copper [1]	CO	0 · 0.1 · 0.2 · 0.3 · 0.5 · 0.7 · 1.0 · 1.5 mg/L Cu^{2+}	100	931037
VISOCOLOR® HE Copper	CO	0.0 · 0.04 · 0.07 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 · 0.40 · 0.50 mg/L Cu^{2+}	150	920050
NANOCOLOR® Copper 5	TT	0.10–7.00 mg/L Cu^{2+}	20	985053
NANOCOLOR® Copper	ST	0.01–10.0 mg/L Cu^{2+}	250	91853

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

Cyanide (CN^-)

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

Product	Platform	Measuring range	Number of tests	REF
Cyantesmo	QT	> 0.2 mg/L CN^- or HCN	Reel, 5 m length	90604
QUANTOFIX® Cyanide	HT	0 · 1 · 3 · 10 · 30 mg/L CN^-	100	91318
VISOCOLOR® ECO Cyanide [1]	CO	0 · 0.01 · 0.02 · 0.03 · 0.05 · 0.07 · 0.10 · 0.15 · 0.20 mg/L CN^-	100	931022
VISOCOLOR® HE Cyanide	CO	0.0 · 0.002 · 0.004 · 0.007 · 0.010 · 0.015 · 0.020 · 0.025 · 0.030 · 0.040 mg/L CN^-	50	920028
NANOCOLOR® easily liberated Cyanide 04	TT	0.01–0.40 mg/L CN^-	19	985025
NANOCOLOR® Cyanide 08	TT	0.005–0.80 mg/L CN^-	20	985031
NANOCOLOR® Cyanide	ST	0.001–0.50 mg/L CN^-	250	91830

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

Cyanuric acid

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

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

[1] Also suitable for photometrical evaluation on photometers PF-3, PF-12^{Plus} and / or *NANOCOLOR®* Advance. 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 / PP: Powder Pillows
TT: *NANOCOLOR®* tube tests / ST: *NANOCOLOR®* standard tests / MB: Microbiological tests / RK: *NANOCOLOR® ECO* reagent kits

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 [1)]	CO	0 · 0.01 · 0.03 · 0.05 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 mg/L DEHA	125	931024
■ *NANOCOLOR*® DEHA 1	TT	0.05–1.00 mg/L DEHA	20	985035

[1)] Also suitable for photometrical evaluation on photometers PF-12*Plus* and / or *NANOCOLOR*® Advance. Measuring range can differ in photometrical evaluation.

Detergents

See Surfactants (detergents) (page 46)

Disinfectants

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

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

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

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

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

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

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

Dithionite ($S_2O_4^{2-}$)

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

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

EDTA (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	91335
■ *NANOCOLOR*® org. Complexing agents 10	TT	0.5–15.0 mg/L I_{BIC} / 0.5–20.0 mg/L EDTA	10–19	985052

Ethanol (C_2H_5OH)

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

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

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

Fatty acids

See Organic acids (page 40)

Fluoride (F^-)

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

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

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

Formaldehyde (HCHO)

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

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

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

Glucose

Glucose is an important ingredient in many foods. Similar to total sugar (see page 47) it is a quality criterion for 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	91348

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

Glutaraldehyde

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

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

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

Parameters A–Z

Hardness

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

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

< 150 ppm (10.5 °e) = soft water
150–250 ppm (10.5 to 17.5 °e) = moderately hard water
> 250 ppm (17 °e) = hard water

Product	Platform	Measuring range	Number of tests	REF
QUANTOFIX® Carbonate hardness	HT	0 · 3.75 · 7.5 · 12.5 · 18.75 · 25 °e	100	91323
QUANTOFIX® Multistick for aquarium owners	HT	Total hardness: 0 · 6.25 · 12.5 · 18.75 · 25 · 31.25 °e Carbonate hardness: 0 · 3.75 · 7.5 · 12.5 · 18.75 · 25 °e pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.0 · 8.4	100	91326
QUANTOFIX® Multistick for aquarium owners	HT	Total hardness: 0 · 6.25 · 12.5 · 18.75 · 25 · 31.25 °e Carbonate hardness: 0 · 3.75 · 7.5 · 12.5 · 18.75 · 25 °e pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.0 · 8.4	25	91327
Swimming pool test 5 in 1	HT	Total chlorine: 0 · 1 · 3 · 5 · 10 mg/L Cl_2 Free chlorine: 0 · 0.5 · 1 · 3 · 5 · 10 mg/L Cl_2 Alkalinity: 0 · 80 · 120 · 180 · 240 mg/L $CaCO_3$ Total hardness: 0 · 100 · 250 · 500 · 1000 mg/L $CaCO_3$ pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.4	50	90759
AQUADUR®	HT	< 54 · > 90 · > 180 · > 270 · > 360 · > 450 ppm $CaCO_3$	100	91201
AQUADUR®	HT	< 54 · > 90 · > 180 · > 270 · > 360 · > 450 ppm $CaCO_3$	1000	91223
AQUADUR®	HT	< 54 · > 90 · > 180 · > 270 · > 360 · > 450 ppm $CaCO_3$	5000	91221
AQUADUR®	HT	< 54 · > 90 · > 180 · > 270 · > 360 · > 450 ppm $CaCO_3$	50 x 3 pieces	912902
AQUADUR®	HT	< 54 · >72 · > 126 · > 252 · > 378 ppm $CaCO_3$	100	91220
AQUADUR®	HT	< 54 · >72 · > 126 · > 252 · > 378 ppm $CaCO_3$	1000	91224
AQUADUR®	HT	< 54 · >72 · > 126 · > 252 · > 378 ppm $CaCO_3$	5000	91222
AQUADUR®	HT	< 54 · > 72 · > 151.2 · > 252 ppm $CaCO_3$	100	91239
AQUADUR®	HT	< 54 · >72 · > 151.2 · > 252 · > 378 ppm $CaCO_3$	1000	91240
AQUADUR® Sensitive	HT	0 · 5.4 · 10.8 · 18.8 ppm $CaCO_3$	50	91243
VISOCOLOR® alpha Carbonate hardness	TI	1 drop equals 1.25 °e	100	935016
VISOCOLOR® alpha Total hardness	TI	1 drop equals 1.25 °e	100	935042
VISOCOLOR® alpha Residual hardness	CO	0.00 · 0.05 · 0.10 · 0.19 · 0.38 °e	200	935080
VISOCOLOR® ECO Carbonate hardness	TI	1 drop equals 1.25 °e	100	931014
VISOCOLOR® ECO Total hardness	TI	1 drop equals 1.25 °e	110	931029
VISOCOLOR® HE Carbonate hardness C 20	TI	0.6–25 °e	200	915003
VISOCOLOR® HE Total hardness H 20 F	TI	0.6–25.0 °e	200	915005
VISOCOLOR® HE Total hardness H 2	TI	0.06–2.50 °e	200	915002
NANOCOLOR® Carbonate hardness 15	TT	1.25–18.75 °e	20	985015
NANOCOLOR® Hardness 20	TT	1.25–25.00 °e	20	985043
NANOCOLOR® Hardness Ca/Mg	TT	1.25–25.0 °e	20	985044
NANOCOLOR® Residual hardness 1	TT	0.03–1.25 °e	20	985084

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

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	931030
■ *NANOCOLOR®* Hydrazine	ST	0.002–1.50 mg/L N_2H_4	250	91844

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

Hydrocarbons

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

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

Hydrogen cyanide (HCN)

See Cyanide (page 31)

Hydrogen peroxide (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	90725
■ Iron test paper	QT	> 10 mg/L $Fe^{2+/3+}$	100	90726
■ QUANTOFIX® Total iron 1000	HT	0 · 5 · 20 · 50 · 100 · 250 · 500 · 1000 mg/L $Fe^{2+/3+}$	100	91330
■ QUANTOFIX® Total iron 100	HT	0 · 2 · 5 · 10 · 25 · 50 · 100 mg/L $Fe^{2+/3+}$	100	91344
■ QUANTOFIX® Iron Sensitive 1	HT	0 · 0.05 · 0.1 · 0.2 · 0.5 · 1.0 mg/L $Fe^{2+/3+}$	25	91359
■ *VISOCOLOR® ECO* Iron 1 [1]	CO	0 · 0.04 · 0.07 · 0.10 · 0.15 · 0.20 · 0.30 · 0.50 · 1.0 mg/L Fe	200	931025
■ *VISOCOLOR® ECO* Iron 2 [1]	CO	0 · 0.04 · 0.07 · 0.10 · 0.15 · 0.20 · 0.30 · 0.50 · 1.0 mg/L Fe	100	931026
■ *VISOCOLOR® HE* Iron	CO	0.0 · 0.01 · 0.02 · 0.03 · 0.04 · 0.05 · 0.07 · 0.10 · 0.15 · 0.20 mg/L Fe	300	920040
■ *VISOCOLOR® Powder Pillows* Iron [4]	PP	0.03–3.00 mg/L Fe	100	936227
■ *NANOCOLOR®* Iron 3	TT	0.02–3.00 mg/L Fe	20	985037
■ *NANOCOLOR®* Iron	ST	0.01–15.0 mg/L Fe	250	91836
■ *NANOCOLOR®* Iron LR	ST	0.005–50.0 mg/L Fe	250	918128

[1] Also suitable for photometrical evaluation on photometers PF-3, PF-12^{Plus} and / or *NANOCOLOR®* Advance. Measuring range can differ in photometrical evaluation.
[4] Only photometrically evaluable, with photometers *NANOCOLOR® VIS* II, *NANOCOLOR® UV/VIS* II, *NANOCOLOR®* Advance, PF-3 and / or 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 / PP: Powder Pillows
TT: *NANOCOLOR®* tube tests / ST: *NANOCOLOR®* standard tests / MB: Microbiological tests / RK: *NANOCOLOR® ECO* reagent kits

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	90602
NANOCOLOR® Lead 5	TT	0.10–5.00 mg/L Pb^{2+}	20	985009
NANOCOLOR® Lead	ST	0.005–1.00 mg/L Pb^{2+}	50	918101

Luminous bacteria test

See Toxicity (page 47)

Magnesium (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	931029 931012
NANOCOLOR® Hardness 20	TT	1.25–25.0 °e	20	985043
NANOCOLOR® Hardness Ca/Mg	TT	1.25–25.0 °e / 5–50 mg/L Mg^{2+}	20	985044

Manganese (Mn)

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

Product	Platform	Measuring range	Number of tests	REF
VISOCOLOR® *ECO* Manganese [1)]	CO	0 · 0.1 · 0.2 · 0.3 · 0.5 · 0.7 · 0.9 · 1.2 · 1.5 mg/L Mn	70	931038
VISOCOLOR® *HE* Manganese	CO	0.0 · 0.03 · 0.06 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 · 0.40 · 0.50 mg/L Mn	100	920055
NANOCOLOR® Manganese 10	TT	0.1–10.0 mg/L Mn / 5–50 mg/L Mg^{2+}	20	985058
NANOCOLOR® Manganese	ST	0.01–10.0 mg/L Mn	250	91860
NANOCOLOR® Manganese LR	ST	0.005–3.00 mg/L Mn	250	918126

[1)] Also suitable for photometrical evaluation on photometers PF-3, PF-12^{Plus} and / or *NANOCOLOR*® Advance. 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 / PP: Powder Pillows
TT: *NANOCOLOR*® tube tests / ST: *NANOCOLOR*® standard tests / MB: Microbiological tests / RK: *NANOCOLOR*® *ECO* reagent kits

Mastitis

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

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

Methanol (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	985859

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	91325
■ *NANOCOLOR*® Molybdenum 40	TT	1.0–40.0 mg/L Mo(VI)	20	985056

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	90730
■ QUANTOFIX® Nickel	HT	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L Ni^{2+}	100	91305
■ *VISOCOLOR*® *ECO* Nickel [1)]	CO	0 · 0.1 · 0.2 · 0.3 · 0.5 · 0.7 · 0.9 · 1.2 · 1.5 mg/L Ni^{2+}	150	931040
■ *NANOCOLOR*® Nickel 4	TT	0.10–7.00 mg/L Ni^{2+}	20	985071
■ *NANOCOLOR*® Nickel	ST	0.01–10.0 mg/L Ni^{2+}	250	91862

[1)] Also suitable for photometrical evaluation on photometers PF-3, PF-12^{Plus} and / or *NANOCOLOR*® Advance. 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 / PP: Powder Pillows
TT: *NANOCOLOR*® tube tests / ST: *NANOCOLOR*® standard tests / MB: Microbiological tests / RK: *NANOCOLOR*® *ECO* reagent kits

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	90611
QUANTOFIX® Nitrate 100 [3]	HT	0 · 5 · 10 · 25 · 50 · 75 · 100 mg/L NO_3^-	100	91351
QUANTOFIX® Nitrate / Nitrite [3]	HT	Nitrate: 0 · 10 · 25 · 50 · 100 · 250 · 500 mg/L NO_3^- Nitrite: 0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO_2^-	100	91313
VISOCOLOR® alpha Nitrate	CO	2 · 8 · 15 · 30 · 50 mg/L NO_3^-	100	935065
VISOCOLOR® ECO Nitrate [1]	CO	0 · 1 · 3 · 5 · 10 · 20 · 30 · 50 · 70 · 90 · 120 mg/L NO_3^-	110	931041
VISOCOLOR® Powder Pillows Nitrate [4]	PP	1.0–50 mg/L NO_3-N	100	936226
NANOCOLOR® Nitrate 250	TT	4–60 mg/L NO_3-N	20	985066
NANOCOLOR® Nitrate 50	TT	0.3–22.0 mg/L NO_3-N	20	985064
NANOCOLOR® Nitrate 8	TT	0.30–8.00 mg/L NO_3-N	20	985065
NANOCOLOR® Nitrate	ST	0.1–30.0 mg/L NO_3-N	100	91865
NANOCOLOR® Nitrate Z	ST	0.02–1.0 mg/L NO_3-N	500	91863

[1] Also suitable for photometrical evaluation on photometers PF-3, PF-12^{Plus} and / or *NANOCOLOR®* Advance. Measuring range can differ in photometrical evaluation.
[3] Also suitable for evaluation on QUANTOFIX® Relax. Measuring range on the QUANTOFIX® Relax can differ from visual range.
[4] Only photometrically evaluable, with photometers *NANOCOLOR® VIS* II, *NANOCOLOR® UV/VIS* II, *NANOCOLOR®* Advance, PF-3 and / or 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 / PP: Powder Pillows
TT: *NANOCOLOR®* tube tests / ST: *NANOCOLOR®* standard tests / MB: Microbiological tests / RK: *NANOCOLOR® ECO* reagent kits

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 100200	90754 90755 90756 90758
Nitratesmo	QT	> 10 mg/L NO_3^- or > 5 mg/L NO_2^-	Reel, 5 m length	90611
QUANTOFIX® Nitrite 3000	HT	0 · 0.1 · 0.3 · 0.6 · 1 · 2 · 3 g/L NO_2^-	100	91322
QUANTOFIX® Nitrite [3]	HT	0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO_2^-	100	91311
QUANTOFIX® Nitrate / Nitrite [3]	HT	Nitrate: 0 · 10 · 25 · 50 · 100 · 250 · 500 mg/L NO_3^- Nitrite: 0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO_2^-	100	91313
QUANTOFIX® Nitrite / pH	HT	Nitrite: 0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO_2^- pH: 6.0 · 6.4 · 6.7 · 7.0 · 7.3 · 7.6 · 7.9 · 8.2 · 8.4 · 8.6 · 8.8 · 9.0 · 9.3 · 9.6	100	91338
VISOCOLOR® alpha Nitrite	CO	0.05 · 0.10 · 0.25 · 0.5 · 1.0 mg/L NO_2^-	200	935066
VISOCOLOR® ECO Nitrite [1]	CO	0 · 0.02 · 0.03 · 0.05 · 0.07 · 0.1 · 0.2 · 0.3 · 0.5 mg/L NO_2^-	120	931044
VISOCOLOR® HE Nitrite	CO	0.0 · 0.005 · 0.010 · 0.015 · 0.02 · 0.03 · 0.04 · 0.06 · 0.08 · 0.10 mg/L NO_2^-	150	920063
VISOCOLOR® Powder Pillows Nitrite [4]	PP	0.01–0.30 mg/L NO_2-N	100	936230
NANOCOLOR® Nitrite 4	TT	0.1–4.0 mg/L NO_2-N	20	985069
NANOCOLOR® Nitrite 2	TT	0.003–0.460 mg/L NO_2-N	20	985068
NANOCOLOR® Nitrite	ST	0.002–0.30 mg/L NO_2-N	250	91867

[1] Also suitable for photometrical evaluation on photometers PF-3, PF-12^{Plus} and / or *NANOCOLOR®* Advance. 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.
[4] Only photometrically evaluable, with photometers *NANOCOLOR® VIS* II, *NANOCOLOR® UV/VIS* II, *NANOCOLOR®* Advance, PF-3 and / or PF-12^{Plus}.

Nitrification inhibition

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

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

Nitrogen (total, kjeldahl, N)

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

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

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

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	985050

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	91349
■ *VISOCOLOR*® *ECO* Oxygen [1)]	CO	0 · 1 · 2 · 3 · 4 · 6 · 8 · 10 mg/L O_2	50	931088
■ *VISOCOLOR*® *HE* Oxygen SA 10	TI	0.2–10.0 mg/L O_2	100	915009
■ *NANOCOLOR*® Oxygen 12	TT	0.5–12.0 mg/L O_2	22	985082

[1)] Also suitable for photometrical evaluation on photometers PF-3, PF-12^{Plus} and / or *NANOCOLOR*® Advance. 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 100200	90754 90755 90756 90758
■ Ozone test (measurement in air)	HT	< 90 · 90–150 · 150–210 · > 210 µg/m^3 O_3 (ozone content in air)	12	90736
■ *VISOCOLOR*® *Powder Pillows* total Chlorine, Ozone [4)]	PP	0.03–6.00 mg/L Cl_2 / 0.03–4.00 mg/L O_3	100 1000	936221 936221.1
■ *NANOCOLOR*® Chlorine / Ozone 2	TT	0.05–2.00 mg/L O_3	20	985017
■ *NANOCOLOR*® Ozone	ST	0.01–1.50 mg/L O_3	200	91885

[4)] Only photometrically evaluable, with photometers *NANOCOLOR*® *VIS* II, *NANOCOLOR*® *UV/VIS* II, *NANOCOLOR*® Advance, PF-3 and / or 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 / PP: Powder Pillows
TT: *NANOCOLOR*® tube tests / ST: *NANOCOLOR*® standard tests / MB: Microbiological tests / RK: *NANOCOLOR*® *ECO* reagent kits

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	91342
■ QUANTOFIX® Peracetic acid 500 [3]	HT	0 · 50 · 100 · 200 · 300 · 400 · 500 mg/L peracetic acid	100	91341
■ QUANTOFIX® Peracetic acid 50 [3]	HT	0 · 5 · 10 · 20 · 30 · 50 mg/L peracetic acid	100	91340

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

Peroxidase

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

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

Peroxide (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	91333
■ QUANTOFIX® Peroxide 100 [3]	HT	0 · 1 · 3 · 10 · 30 · 100 mg/L H_2O_2	100	91312
■ QUANTOFIX® Peroxide 25 [3]	HT	0 · 0.5 · 2 · 5 · 10 · 25 mg/L H_2O_2	100	91319
■ *NANOCOLOR*® Peroxide 2	TT	0.03–2.00 mg/L H_2O_2	10–19	985871

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

Phenol

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

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

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

Parameters A–Z

Phosphatase

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

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

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

Phosphate (phosphorous, PO_4^{3-})

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

Product	Platform	Measuring range	Number of tests	REF
■ QUANTOFIX® Phosphate [3]	HT	0 · 3 · 10 · 25 · 50 · 100 mg/L PO_4^{3-}	100	91320
■ QUANTOFIX® Phosphate 10	HT	0 · 0.5 · 2.0 · 5.0 · 10.0 mg/L PO_4^{3-}	100	91356
■ *VISOCOLOR® alpha* Phosphate	CO	2 · 5 · 10 · 15 · 20 mg/L PO_4^{3-}	70	935079
■ *VISOCOLOR® ECO* Phosphate [1]	CO	0 · 0.2 · 0.3 · 0.5 · 0.7 · 1 · 2 · 3 · 5 mg/L PO_4-P	80	931084
■ *VISOCOLOR® HE* Phosphate	CO	0.0 · 0.05 · 0.10 · 0.15 · 0.20 · 0.3 · 0.4 · 0.6 · 0.8 · 1.0 mg/L P	300	920082
■ *VISOCOLOR® HE* Phosphate (DEV)	CO	0.0 · 0.01 · 0.02 · 0.03 · 0.05 · 0.07 · 0.10 · 0.15 · 0.20 · 0.25 mg/L P	100	920080
■ *VISOCOLOR® Powder Pillows* Phosphate [4]	PP	0.02–4.5 mg/L PO_4^{3-}	100	936228
■ *NANOCOLOR®* ortho- and total Phosphate 50	TT	10.0–50.0 mg/L P	19	985079
■ *NANOCOLOR®* ortho- and total Phosphate 45	TT	5.0–50.0 mg/L P	20	985055
■ *NANOCOLOR®* ortho- and total Phosphate 15	TT	0.30–15.00 mg/L P	20	985080
■ *NANOCOLOR®* ortho- and total Phosphate 5	TT	0.20–5.00 mg/L P	20	985081
■ *NANOCOLOR®* ortho- and total Phosphate 1	TT	0.05–1.50 mg/L P	20	985076
■ *NANOCOLOR®* ortho- and total Phosphate LR 1	TT	0.05–0.50 mg/L P	20	985095
■ *NANOCOLOR®* ortho-Phosphate	ST	0.2–17 mg/L PO_4-P	500	91878
■ *NANOCOLOR®* ortho-Phosphate	ST	0.04–6.5 mg/L PO_4-P	500	91877

[1] Also suitable for photometrical evaluation on photometers PF-3, PF-12^{Plus} and / or *NANOCOLOR®* Advance. 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.
[4] Only photometrically evaluable, with photometers *NANOCOLOR® VIS* II, *NANOCOLOR® UV/VIS* II, *NANOCOLOR®* Advance, PF-3 and / or 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 / PP: Powder Pillows
TT: *NANOCOLOR®* tube tests / ST: *NANOCOLOR®* standard tests / MB: Microbiological tests / RK: *NANOCOLOR® ECO* reagent kits

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 50)	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	935075
■ *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	931066
■ *VISOCOLOR® ECO* pH 6.0–8.2	CO	pH: 6.1–8.4	150	931270
■ *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	920074
■ *VISOCOLOR® Powder Pillows* pH [4]	PP	pH: 6.2–8.2	100	936222
■ *NANOCOLOR®* pH 6.5–8.2	TT	pH: 6.5–8.2	100	91872

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

POC (polyoxycarboxylic acids)

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

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

Potassium (K^+)

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

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

[1] Also suitable for photometrical evaluation on photometers PF-3, PF-12^{Plus} and / or *NANOCOLOR®* Advance. 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 / PP: Powder Pillows
TT: *NANOCOLOR®* tube tests / ST: *NANOCOLOR®* standard tests / MB: Microbiological tests / RK: *NANOCOLOR® ECO* reagent kits

Parameters A–Z

Proteins

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

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

Quaternary ammonium compounds (QUATs)

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

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

Residual hardness

See hardness (page 34)

SAC (Spectral Absorbance Coefficient)

The Spectral Absorbance Coefficient (SAC), is a total parameter for the measurement of the dissolved organic substances. The SAC measurements are carried out in the photometer with preprogrammed special methods. No separate test kits are needed for these measurements. The spectral absorbance coefficient is typically measured at 254 nm and 436 nm.

Product	Platform	Measuring range	Number of tests	REF
■ SAC	ST	0.1–150.0 ^{1}/m	–	–

Silica / Silicon (Si)

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

Product	Platform	Measuring range	Number of tests	REF
■ *VISOCOLOR® ECO* Silica [1]	CO	0 · 0.2 · 0.4 · 0.6 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 mg/L SiO_2	80	931033
■ *VISOCOLOR® ECO* Silica HR 200 [2]	CO	10–200 mg/L SiO_2	100	931234
■ *VISOCOLOR® HE* Silicon	CO	0.0 · 0.01 · 0.02 · 0.03 · 0.05 · 0.07 · 0.10 · 0.15 · 0.20 · 0.30 mg/L Si	120	920087
■ *VISOCOLOR® Powder Pillows* Silica LR [4] [5]	PP	0.02–2.10 mg/L SiO_2	100	936224
■ *VISOCOLOR® Powder Pillows* Silica HR [4]	PP	2–210 mg/L SiO_2	100	936225
■ *NANOCOLOR®* Silica	ST	0.01–10.0 mg/L Si	250	91848

[1] Also suitable for photometrical evaluation on photometers PF-3, PF-12^{Plus} and / or *NANOCOLOR®* Advance. Measuring range can differ in photometrical evaluation.
[2] Only photometrically evaluable, with photometers PF-3 and / or PF-12^{Plus}.
[4] Only photometrically evaluable, with photometers *NANOCOLOR® VIS* II, *NANOCOLOR® UV/VIS* II, *NANOCOLOR®* Advance, PF-3 and / or PF-12^{Plus}.
[5] Measuring range for photometric evaluation on *NANOCOLOR® VIS* II. Range on other photometers can be different.

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

Silver (Ag^+)

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

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

Sludge activity / TTC

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

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

Sperm

See Phosphatase (page 42)

Starch

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

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

Sulfate (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	91329
VISOCOLOR® *ECO* Sulfate	CO	25 · 30 · 35 · 40 · 50 · 60 · 70 · 80 · 100 · 120 · 150 · 200 mg/L SO_4^{2-}	100	931092
VISOCOLOR® *Powder Pillows* Sulfate [4]	PP	15–200 mg/L SO_4^{2-}	100	936223
NANOCOLOR® Sulfate 1000	TT	200–1000 mg/L SO_4^{2-}	20	985087
NANOCOLOR® Sulfate LR 200	TT	20–200 mg/L SO_4^{2-}	20	985062
NANOCOLOR® Sulfate MR 400	TT	40–400 mg/L SO_4^{2-}	20	985060
NANOCOLOR® Sulfate HR 1000	TT	200–1000 mg/L SO_4^{2-}	20	985063

[4] Only photometrically evaluable, with photometers *NANOCOLOR*® *VIS* II, *NANOCOLOR*® *UV/VIS* II, *NANOCOLOR*® Advance, PF-3 and / or 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 / PP: Powder Pillows
TT: *NANOCOLOR*® tube tests / ST: *NANOCOLOR*® standard tests / MB: Microbiological tests / RK: *NANOCOLOR*® *ECO* reagent kits

Parameters A–Z

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	90744 90745 90746
Sulfide test paper	QT	> 5 mg/L H_2S or S^{2-}	Reel, 5 m length	90761
VISOCOLOR® ECO Sulfide [1]	CO	0.1 · 0.2 · 0.3 · 0.4 · 0.5 · 0.6 · 0.7 · 0.8 mg/L S^{2-}	90	931094
NANOCOLOR® Sulfide 3	TT	0.05–3.00 mg/L S^{2-}	20	985073
NANOCOLOR® Sulfide	ST	0.01–3.0 mg/L S^{2-}	250	91888

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

Sulfite (SO_3^{2-})

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

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

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

Surfactants (detergents)

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

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

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

Thiocyanate (SCN^-)

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

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

Tin (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	91309
■ *NANOCOLOR*® Tin 3	TT	0.10–3.00 mg/L Sn	18	985097

TOC (total organic carbon)

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

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

Total hardness

See Hardness (page 34)

Total sugar

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

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

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

Toxicity

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

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

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

Parameters A–Z

TSS (Total Suspended Solids)

The photometric determination of total suspended solids provides a quick and easy method that does not require any filtration nor any heating or gravimetric processes. The USEPA, Standard Methods and DIN EN norms (DIN EN 872) specify the filtration / gravimetric method to determine total suspended solids. Therefore, the photometric method is especially used during in-process analysis.

Product	Platform	Measuring range	Number of tests	REF
■ TSS	TT	30 – 750 mg/L at 860 nm with Spectrophotometer 70 – 750 mg/L at 690 nm with *NANOCOLOR*® 500 D, 400 D, 350 D and PF-12	–	–

TTC / Sludge activity

See Sludge activity / TTC (page 45)

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
■ Waterfinder test paper	QT	Traces of water in non-polar solvents	Reel, 7 m length	90630
■ Watesmo	QT	Traces of water in non-polar solvents	Reel, 5 m length	90609
■ Wator	QT	Traces of water in butter	50	90610

Water hardness

See Hardness (page 34)

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

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	91310
■ *VISOCOLOR® ECO* Zinc [1)]	CO	0 · 0.5 · 1 · 2 · 3 mg/L Zn^{2+}	120	931098
■ *NANOCOLOR®* Zinc 4	TT	0.10–4.00 mg/L Zn^{2+}	20	985096
■ *NANOCOLOR®* Zinc 6	TT	0.20–6.00 mg/L Zn^{2+}	20	985042
■ *NANOCOLOR®* Zinc	ST	0.02–3.0 mg/L Zn^{2+}	250	91895

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

Zirconium (Zr^{4+})

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

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

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

Test papers and test strips

pH tests

Semi-quantitative test strips

Qualitative test papers


Quantofix
0
0
10
1 mg/L
25
5
50
10
100
20
250
40
500
80
LOT
313538
MN
Since 1911
MACHEREY-NAGEL
www.mn-net.com
REF 921 10
pH-Fix 0–14
100 farbfixierte Indikatorstäbch
100 color-fixed indicator strips
100 indicateurs à couleurs fixé
100ml
80
60
40
20
BORO 3.3 MADE IN GERMANY

pH-Fix

Unmatched pH test strips

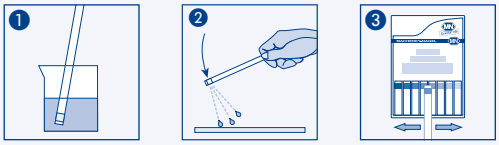
For many years untrained users as well as analytical professionals appreciate the experience of easy pH testing with pH-Fix. In contrast to common indicator papers, the indicator dyes in pH-Fix test strips are chemically bound to the test pads. This patented technology prevents bleeding of the dyes and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



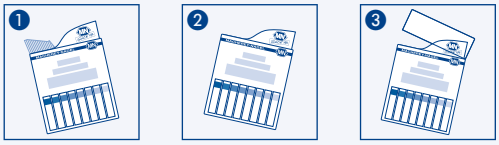
Dip in | Shake off | Read result

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 (for details see table on page 54). They meet the special demands of health care professionals and ensure safe results for medical pH testing.

Automatic evaluation with the QUANTOFIX® Relax

The strip reader QUANTOFIX® Relax (see page 154) allows the easy and reliable documentation of pH testing. The system provides objective and quantitative results. It allows printing and storing of test data including time and sample ID. Test strips covering the complete pH range can be evaluated using the QUANTOFIX® Relax (for details see table on page 54).

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

Easy
- No calibration
- No maintenance
- No accessories

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

Good to know

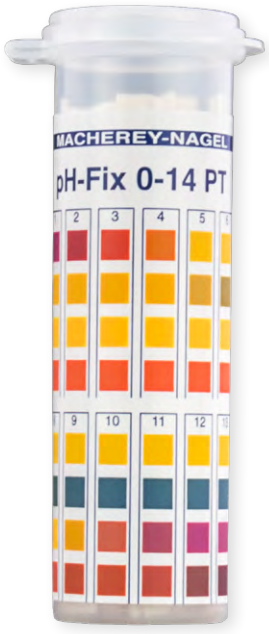
Many pH-Fix test strips can be also evaluated on the strip reader QUANTOFIX® Relax (see page 154).

pH-Fix

Ordering information

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

CE / gastric juice: According to IVD directive 98/79/EG approved for pH determination in gastric juice, 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.
[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 / gastric juice	CE / vaginal secretion	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	90401	1 · 2 · 3 · 4 · 5 · 6 · 7 · 8 · 9 · 10 · 11 · 12	200	3 years
pH 0–1.8	90411	0 · 0.3 · 0.6 · 0.8 · 1.0 · 1.2 · 1.5 · 1.8	200	3 years
pH 1.0–2.8	90412	1.0 · 1.3 · 1.6 · 1.8 · 2.0 · 2.2 · 2.5 · 2.8	200	3 years
pH 1.8–3.8	90413	1.8 · 2.1 · 2.4 · 2.7 · 3.0 · 3.2 · 3.5 · 3.8	200	3 years
pH 2.8–4.6	90414	2.8 · 3.1 · 3.4 · 3.6 · 3.8 · 4.0 · 4.3 · 4.6	200	3 years
pH 3.8–5.5	90415	3.8 · 4.0 · 4.2 · 4.4 · 4.6 · 4.9 · 5.2 · 5.5	200	3 years
pH 4.0–9.0	90424	4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0	200	3 years
pH 5.2–6.8	90416	5.2 · 5.5 · 5.7 · 5.9 · 6.1 · 6.3 · 6.5 · 6.8	200	3 years
pH 6.0–8.1	90417	6.0 · 6.3 · 6.6 · 6.9 · 7.2 · 7.5 · 7.8 · 8.1	200	3 years
pH 7.2–8.8	90419	7.2 · 7.4 · 7.6 · 7.8 · 8.0 · 8.2 · 8.5 · 8.8	200	3 years
pH 8.0–9.7	90420	8.0 · 8.2 · 8.4 · 8.6 · 8.8 · 9.1 · 9.4 · 9.7	200	3 years
pH 9.5–12.0	90421	9.5 · 10.0 · 10.5 · 11.0 · 11.5 · 12.0	200	3 years
pH 10.5–13.0	90422	10.5 · 11.0 · 11.5 · 12.0 · 12.5 · 13.0	200	3 years
pH 12.0–14.0	90423	12.0 · 12.5 · 13.0 · 13.5 · 14.0	200	3 years

pH indicator papers - standard for many applications

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

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

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

Good to know

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

Ordering information

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

refill: Refill pack

Duotest and Tritest

pH papers with multiple indicator zones

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

Duotest – two indicator zones for higher accuracy

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

Tritest – three indicator zones for highest precision

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

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

Ordering information

Duotest

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

refill: Refill pack

Tritest

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

refill: Refill pack

pH papers without color chart and indicator solutions

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

Simplest acid / base determination

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

pH determinations in weakly buffered solutions

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

Ordering information

pH papers without color scale

Test	REF	REF refill	Color change / pH	Presentation	Shelf life	GHS
Brilliant yellow paper	90701	–	yellow → red / 6.7–7.9	Box of 200 strips 20 x 70 mm	2 years	
Congo paper MN 816 N	90702	90703	red → blue / 5.0–3.0	Reel of 5 m length and 7 mm width	2 years	■
Congo paper MN 616 T	90704	–	red → blue / 5.0–3.0	Box of 200 strips 20 x 70 mm	2 years	■
Congo paper MN 260 HE	90705	–	red → blue / 5.0–3.0	Box of 200 strips 20 x 70 mm	2 years	■
Litmus paper blue	91106	91116	blue → red / 8.0–5.0	Reel of 5 m length and 7 mm width	3 years	
Litmus paper blue	91126	–	blue → red / 8.0–5.0	Booklet of 100 strips 10 x 70 mm	3 years	
Litmus paper neutral	91107	91117	red → violet-blue / 5.0–8.0	Reel of 5 m length and 7 mm width	3 years	
Litmus paper neutral	91127	–	red → violet-blue / 5.0–8.0	Booklet of 100 strips 10 x 70 mm	3 years	
Litmus paper red	91108	91118	red → blue / 5.0–8.0	Reel of 5 m length and 7 mm width	3 years	
Litmus paper red	91128	–	red → blue / 5.0–8.0	Booklet of 100 strips 10 x 70 mm	3 years	
Nitrazine yellow paper	90711	–	yellow → blue-violet / 6.0–7.0	Box of 200 strips 20 x 70 mm	2 years	
Phenolphthalein paper	90712	90713	white → red / 8.3–10.0	Reel of 5 m length and 7 mm width	2 years	

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

UNISOL

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

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

QUANTOFIX®

Semi-quantitative test strips

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

Easy analysis directly at the point of interest

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

Complete mini-lab

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

Quantitative, documented results with QUANTOFIX® Relax

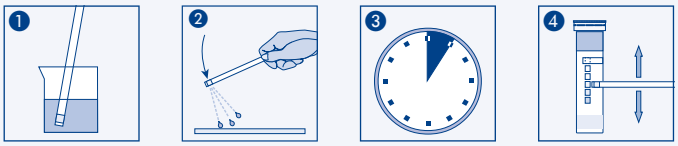
The strip reader QUANTOFIX® Relax (see page 154) provides objective and quantitative results for many important parameters (see page 62). Measurement data including time, date and sample ID are printed, stored and can be transmitted to an information system. This allows the rapid and reliable documentation of test results, which proved to be especially useful for QC departments.

Good to know

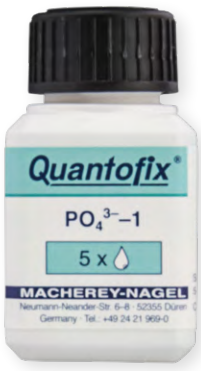
Many customers receive our QUANTOFIX® test strips as OEM product.

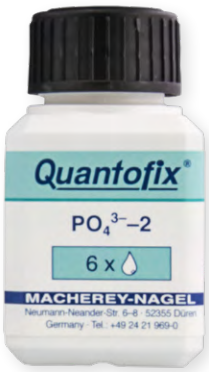
How it's done

Application of QUANTOFIX® test strips



Dip in | Shake off | Wait | Read off





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

Easy
- No calibration
- No maintenance
- No accessories

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

Good to know

Many QUANTOFIX® test strips can be also evaluated on the strip reader QUANTOFIX® Relax (see page 154).

Ordering information

Test	REF	Measuring range (visual)	Measuring range (instrumental) [1]	Number of tests
Active oxygen	91349	0 · 4 · 8 · 15 · 25 mg/L KMPS	–	100
Aluminum	91307	0 · 5 · 20 · 50 · 200 · 500 mg/L Al^{3+}	–	100
Ammonium	91315	0 · 10 · 25 · 50 · 100 · 200 · 400 mg/L NH_4^+	10–350 mg/L NH_4^+	100
Arsenic 10	91334	0 · 0.01 · 0.025 · 0.05 · 0.1 · 0.5 mg/L $As^{3+/5+}$	–	100
Arsenic 50	91332	0 · 0.05 · 0.1 · 0.5 · 1.0 · 1.7 · 3.0 mg/L $As^{3+/5+}$	–	100
Arsenic Sensitive	91345	0 · 0.005 · 0.01 · 0.025 · 0.05 · 0.1 · 0.25 · 0.5 mg/L $As^{3+/5+}$	–	100
EZ Arsenic Sensitive PP	91345.2	0 · 0.005 · 0.010 · 0.025 · 0.05 · 0.10 · 0.25 · 0.50 mg/L $As^{3+/5+}$	–	100
Ascorbic acid	91314	0 · 50 · 100 · 200 · 300 · 500 · 700 · 1000 · 2000 mg/L vitamin C	25–1000 mg/L vitamin C	100
Calcium	91324	0 · 10 · 25 · 50 · 100 mg/L Ca^{2+}	–	60
Carbonate hardness	91323	0 · 3.8 · 7.5 · 12.5 · 18.8 · 25.0 °e	–	100
Chloride	91321	0 · 500 · 1000 · 1500 · 2000 · ≥ 3000 mg/L Cl^-	–	100
Chlorine	91317	0 · 1 · 3 · 10 · 30 · 100 mg/L Cl_2 (free)	–	100
Chlorine 500	91354	0 · 25 · 50 · 100 · 250 · 500 mg/L Cl_2	–	100
Chlorine dioxide 15	91355	0 · 0.25 · 0.5 · 1 · 3 · 5 · 10 · 15 mg/L ClO_2	–	50
Chlorine dioxide 3000	91357	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 · 1500 · 2000 · 2500 · 3000 mg/L ClO_2	–	100
Chlorine Sensitive	91339	0 · 0.1 · 0.5 · 1 · 3 · 10 mg/L Cl_2 (total)	0.1–10 mg/L Cl_2	100
Chlorine Sensitive 1	91360	0 · 0.05 · 0.1 · 0.2 · 0.4 · 0.8 · 1.2 mg/L Cl_2 (free)	–	50
Chromate	91301	0 · 3 · 10 · 30 · 100 mg/L CrO_4^{2-}	–	100
Cobalt	91303	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L Co^{2+}	–	100
Copper	91304	0 · 10 · 30 · 100 · 300 mg/L $Cu^{+/2+}$	–	100
Copper Sensitive 5	91358	0 · 0.1 · 0.5 · 1.0 · 2.0 · 5.0 mg/L $Cu^{+/2+}$	–	25
Cyanide	91318	0 · 1 · 3 · 10 · 30 mg/L CN^-	–	100
EDTA	91335	0 · 100 · 200 · 300 · 400 mg/L EDTA	–	100
Formaldehyde	91328	0 · 10 · 20 · 40 · 60 · 100 · 200 mg/L HCHO	10–200mg/L HCHO	100
Glucose	91348	0 · 50 · 100 · 250 · 500 · 1000 · 2000 mg/L glucose	50–2000 mg/L glucose	100
Glutaraldehyde	91343	0 · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 % glutaraldehyde	–	100
Iron Sensitive 1	91359	0 · 0.05 · 0.1 · 0.2 · 0.5 · 1.0 mg/L $Fe^{2+/3+}$	–	25
LubriCheck	91336	0 · 15 · 50 · 75 · 130 · 200 mmol/L KOH	–	100
Molybdenum	91325	0 · 5 · 20 · 50 · 100 · 250 mg/L Mo^{6+}	–	100
Nickel	91305	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L Ni^{2+}	–	100
Nitrate 100	91351	Nitrate: 0 · 5 · 10 · 25 · 50 · 75 · 100 mg/L NO_3^- Nitrite: 0 · 0.5 · 2 · 5 · 10 · 25 · 50 mg/L NO_2^-	Nitrate: 3–100 mg/L NO_3^- Nitrite: 0.5–50 mg/L NO_2^-	100
Nitrate / Nitrite	91313	Nitrate: 0 · 10 · 25 · 50 · 100 · 250 · 500 mg/L NO_3^- Nitrite: 0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO_2^-	Nitrate: 10–500 mg/L NO_3^- Nitrite: 0.5–80 mg/L NO_2^-	100
Nitrite	91311	0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO_2^-	0.5–80 mg/L NO_2^-	100
Nitrite 3000	91322	0 · 0.1 · 0.3 · 0.6 · 1 · 2 · 3 g/L NO_2^-	–	100
Nitrite / pH	91338	Nitrite: 0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO_2^- pH: 6.0 · 6.4 · 6.7 · 7.0 · 7.3 · 7.6 · 7.9 · 8.2 · 8.4 · 8.6 · 8.8 · 9.0 · 9.3 · 9.6	–	100
Peracetic acid 50	91340	0 · 5 · 10 · 20 · 30 · 50 mg/L peracetic acid	5–50 mg/L peracetic acid	100
Peracetic acid 500	91341	0 · 50 · 100 · 200 · 300 · 400 · 500 mg/L peracetic acid	50–500 mg/L peracetic acid	100

[1] Measuring range for instrumental evaluation with Quantofix Relax. [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	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	Modified Gutzeit test	white → yellow-brown		■	■	EZ Arsenic Sensitive PP
2.5 years	Phosphomolybdenum blue	yellow → green-blue	■			Ascorbic acid
2.5 years	Glyoxal-bis(2-hydroxyaniline)	yellow → red		■	■	Calcium
2.5 years	Mixed indicator	bright green → blue				Carbonate hardness
2.5 years (2–8 °C)	Silver chromate	brown → yellow				Chloride
2.5 years	Redox reaction	white → red-violet		■	■	Chlorine
2.5 years	Redox reaction	white → blue-green to orange-brown				Chlorine 500
2 year	Redox reaction	colorless → pink				Chlorine dioxide 15
2.5 years	Redox reaction	yellow → dark green (field 1), colorless → brown-black (field 2)				Chlorine dioxide 3000
2.5 years	Redox reaction	yellow → violet	■			Chlorine Sensitive
2.5 years	Redox reaction / hole	white → blue-green				Chlorine Sensitive 1
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	Biquinoline / hole	white → red-violet				Copper Sensitive 5
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	Triazine / hole	white → blue				Iron Sensitive 1
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

QUANTOFIX®

Test	REF	Measuring range (visual)	Measuring range (instrumental) [1]	Number of tests
Peracetic acid 2000	91342	0 · 500 · 1000 · 1500 · 2000 mg/L peracetic acid	500–2000 mg/L peracetic acid	100
Peroxide 25	91319	0 · 0.5 · 2 · 5 · 10 · 25 mg/L H_2O_2	0.5–25 mg/L H_2O_2	100
Peroxide 100	91312	0 · 1 · 3 · 10 · 30 · 100 mg/L H_2O_2	1–100 mg/L H_2O_2	100
Peroxide 1000	91333	0 · 50 · 150 · 300 · 500 · 800 · 1000 mg/L H_2O_2	50–1000 mg/L H_2O_2	100
Phosphate	91320	0 · 3 · 10 · 25 · 50 · 100 mg/L PO_4^{3-}	3–80 mg/L PO_4^{3-}	100
Phosphate 10	91356	0 · 0.5 · 2.0 · 5.0 · 10.0 mg/L PO_4^{3-}	–	50
Potassium	91316	0 · 200 · 400 · 700 · 1000 · 1500 mg/L K^+	–	100
QUAT	91337	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L benzalkonium chloride	–	100
Silver	91350	0 · 1 · 2 · 3 · 5 · 7 · 10 g/L Ag^+	–	100
Sulfate	91329	< 200 · > 400 · > 800 · > 1200 · > 1600 mg/L SO_4^{2-}	–	100
Sulfite	91306	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L SO_3^{2-}	10–500 mg/L SO_3^{2-}	100
Tin	91309	0 · 10 · 25 · 50 · 100 · 250 · 500 mg/L Sn^{2+}	–	100
Total acid	91353	0 · 2 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 g/L citric acid	2–5 g/L citric acid	100
Total iron 100	91344	0 · 2 · 5 · 10 · 25 · 50 · 100 mg/L $Fe^{2+/3+}$	–	100
Total iron 1000	91330	0 · 5 · 20 · 50 · 100 · 250 · 500 · 1000 mg/L $Fe^{2+/3+}$	–	100
Total sugar	91352	0 · 55 · 100 · 250 · 400 · 600 · 800 mg/L fructose / glucose	55–700 mg/L fructose / glucose	100
Zinc	91310	0 · 2 · 5 · 10 · 25 · 50 · 100 mg/L Zn^{2+}	–	100
Nitrate test sets	913918	0 · 10 · 25 · 50 · 100 · 250 · 500 mg/L NO_3^- without nitrite chart, but with nitrite test field	–	150 [1]
Multistick for aquarium owners	91326 91327	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] Measuring range for instrumental evaluation with Quantofix Relax. [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	GHS	Test
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	Phosphomolybdenum blue	yelllow-green → green-blue				Phosphate 10
2.5 years	Dipikrylamine	yellow → orange		■		Potassium
2.5 years	Mixed indicator	yellow → blue-green				QUAT
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
2 years (2–8 °C)	Enzymatic	yellow → ocher	■	■		Total sugar
2.5 years	Dithizone	orange → red		■	■	Zinc
9 months	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	90741	0 · 0.5 · 1 · 2 · 3 · 5 · 7 · 10 g/L Ag^+ pH 4 · 5 · 6 · 7 · 8	Box of 100 test strips 6 x 95 mm
Ammonia test	90714	0 · 0.5 · 1 · 3 · 6 mg/L NH_4^+	Box of 25 test strips 7 x 60 mm
AQUADUR® 4–14, box	91239	< 54 · > 72 · > 151.2 · > 252 ppm $CaCO_3$	Box of 100 test strips 6 x 95 mm
AQUADUR® 4–21, box	91220	< 54 · > 72 · > 126 · > 252 · > 378 ppm $CaCO_3$	Box of 100 test strips 6 x 95 mm
AQUADUR® 4–21, bulk	91222	< 54 · > 72 · > 126 · > 252 · > 378 ppm $CaCO_3$	Pack of 5000 test strips without scale
AQUADUR® 4–21, individually sealed	91224	< 54 · > 72 · > 126 · > 252 · > 378 ppm $CaCO_3$	1000 test strips, individually sealed with scale
AQUADUR® 4–21, individually sealed	91240	< 54 · > 72 · > 151.2 · > 252 · > 378 ppm $CaCO_3$	1000 test strips, individually sealed with scale
AQUADUR® 5–25, box	91201	< 54 · > 90 · > 180 · > 270 · > 360 · > 450 ppm $CaCO_3$	Box of 100 test strips 6 x 95 mm
AQUADUR® 5–25, bulk	91221	< 54 · > 90 · > 180 · > 270 · > 360 · > 450 ppm $CaCO_3$	Pack of 5000 test strips without scale
AQUADUR® 5–25, individually sealed	91223	< 54 · > 90 · > 180 · > 270 · > 360 · > 450 ppm $CaCO_3$	1000 test strips, individually sealed with scale
AQUADUR® 5–25, test sets	912902	< 54 · > 90 · > 180 · > 270 · > 360 · > 450 ppm $CaCO_3$	Sets of 3 individually sealed test strips, pack of 50 sets
AQUADUR® Sensitive, box	91243	0 · 5.4 · 10.8 · 18.8 ppm $CaCO_3$	Box of 50 test strips 6 x 95 mm
Chlorine test	90709	10 · 50 · 100 · 200 mg/L Cl_2 (total)	Reel of 5 m length and 10 mm width
Cyanuric acid test (swimming pools)	90710	0 · 50 · 100 · 150 · 300 mg/L Cya	Box of 25 test strips 6 x 95 mm
Fluoride test	90734	0 · 2 · 5 · 10 · 20 · 50 · 100 mg/L F^-	Box of 30 test discs with reagents
Iodiquat (QUATs)	–	According to customer request	Reel of 5 m length and 10 mm width
Moisture indicator	90801	20 · 30 · 40 · 50 · 60 · 70 · 80 % rel. humidity	Pack of 12 adhesive labels 50 x 100 mm
Moisture indicator	908805	8 % rel. humidity	Pack of 1000 pcs 60 x 35 mm
Moisture indicator	908808	8 % rel. humidity	Pack of 1000 pcs 60 x 35 mm
Ozone test (air)	90736	< 90 · 90–150 · 150–210 · > 210 µg/m^3 O_3	Box of 12 test strips 10 x 95 mm
Saltesmo (halide ions)	90608	0 · 0.25 · 0.5 · 1 · 2 · 3 · 4 · 5 g/L NaCl	Box of 30 test discs
Swimming pool test 3 in 1	90752	Free Chlorine: 0 · 0.5 · 1 · 3 · 5 · 10 mg/L Cl_2 Alkalinity: 0 · 80 · 120 · 180 · 240 mg/L $CaCO_3$ pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.4	Box of 50 test strips 6 x 95 mm
Swimming pool test 5 in 1	90759	like 90752, in addition: total chlorine: 0 · 1 · 3 · 5 · 10 mg/L Cl_2 total hardness: 0 · 100 · 250 · 500 · 1000 mg/L $CaCO_3$	Box of 50 test strips 6 x 95 mm

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

Test papers without color chart

Simple test papers for qualitative determinations

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

Test papers for criminal investigations

Peroxtesmo KM is sensitive to peroxidase and detects blood traces.

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

Test papers for milk analysis

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

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

Test papers for oil and oil tanks

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

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

Ordering information

Test	REF	Determination of	Presentation
Aluminum test paper	90721	Aluminum ions (Al^{3+})	Box of 100 strips 20 x 70 mm
Ammonium test paper	90722	Ammonia, ammonium ions (NH_3, NH_4^+)	Box of 200 strips 20 x 70 mm
Antimony test paper	90723	Antimony ions (Sb^{3+})	Box of 200 strips 20 x 70 mm
Arsenic test paper	90762	Arsenic, arsine (As, AsH_3)	Box of 200 strips 20 x 70 mm
Bismuth test paper	90733	Bismuth ions (Bi^{3+})	Box of 200 strips 20 x 70 mm
Chlortesmo	90603	Chlorine, free halogens	Box of 200 strips 20 x 70 mm
Chromium test paper	90724	Chromium, chromate (Cr(VI) CrO_4^{2-})	Box of 200 strips 20 x 70 mm
Cobalt test paper	90728	Cobalt ions (Co^{2+})	Box of 100 strips 20 x 70 mm
Copper test paper	90729	Copper(II) ions (Cu^{2+})	Box of 200 strips 20 x 70 mm
Cuprotesmo	90601	Copper ions (Cu, Cu^+, Cu^{2+})	Box of 40 sheets 40 x 25 mm
Cyantesmo	90604	Cyanide, hydrocyanic acid (CN^-, HCN)	Reel of 5 m length and 10 mm width
Dipyridyl paper	90725	Iron(II) ions (Fe^{2+})	Box of 200 strips 20 x 70 mm
Fluoride test paper	90750	Fluoride, hydrofluoric acid (F^-, HF)	Box of 200 strips 20 x 70 mm
Indanthrene yellow paper	90751	Vat dyes, end-point of conversion	Box of 200 strips 20 x 70 mm
Indipro	90765	Protein residues	Box of 60 test strips 10 x 95 mm and additional reagents
Iron test paper	90726	Iron ions (Fe^{2+}, Fe^{3+})	Box of 100 strips 20 x 70 mm
Lead acetate paper	90744	Hydrogen sulfide, sulfide ions (H_2S, S^{2-})	Reel of 5 m length and 7 mm width
Lead acetate paper	90745	Hydrogen sulfide, sulfide ions (H_2S, S^{2-})	Refill pack with 3 reels
Lead acetate paper	90746	Hydrogen sulfide, sulfide ions (H_2S, S^{2-})	Booklet of 100 strips 10 x 70 mm
Mercury bromide paper	90762	Arsenic, arsine (As, AsH_3)	Box of 200 strips 20 x 70 mm
Nickel test paper	90730	Nickel(II) ions (Ni^{2+})	Box of 200 strips 20 x 70 mm
Nitratesmo	90611	Nitrate and nitrite (NO_3^-, NO_2^-)	Reel of 5 m length and 10 mm width
Oil test paper	90760	Oil in water and soil	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.

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
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	1.5 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
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

Test papers without color chart

Test	REF	Determination of	Presentation
Peroxtesmo KM	90605	Blood traces (peroxidase)	Box of 25 test papers 15 x 30 mm
Peroxtesmo KO	90606	Peroxidase in food	Box of 100 test papers 15 x 15 mm
Peroxtesmo MI	90627	Peroxidase in milk	Box of 100 test papers 15 x 15 mm
Phosphatesmo KM	90607	Sperm, acid phosphatase	Box of 25 test papers 15 x 30 mm
Phosphatesmo MI	90612	Alkaline phosphatase in milk	Box of 50 test strips 10 x 95 mm
Plumbtesmo	90602	Lead, lead ions (Pb, Pb^{2+})	Box of 40 sheets 40 x 25 mm
Potassium iodate starch paper	90753	Nitrous acid, sulfur dioxide	Reel of 5 m length and 7 mm width
Potassium iodide starch paper	90754	Nitrite ions, nitrous acid, ozone, chlorine (NO_2^-, HNO_2, O_3, Cl_2)	Reel of 5 m length and 7 mm width
Potassium iodide starch paper	90755	Nitrite ions, nitrous acid, ozone, chlorine (NO_2^-, HNO_2, O_3, Cl_2)	Refill pack with 3 reels
Potassium iodide starch paper	90756	Nitrite ions, nitrous acid, ozone, chlorine (NO_2^-, HNO_2, O_3, Cl_2)	Booklet of 100 strips 10 x 70 mm
Potassium iodide starch paper	90758	Nitrite ions, nitrous acid, ozone, chlorine (NO_2^-, HNO_2, O_3, Cl_2)	Box of 200 strips 20 x 70 mm
Potassium test paper	90727	Potassium ions (K^+)	Box of 200 strips 20 x 70 mm
Silver test paper	90732	Silver ions (Ag^+)	Box of 200 strips 20 x 70 mm
Sulfide test paper	90761	Hydrogen sulfide, sulfide ions (H_2S, S^{2-})	Reel of 5 m length and 7 mm width
Sulfite test paper	90763	Hydrogen sulfide, sulfite ions (SO_2, SO_3^{2-})	Box of 100 strips 20 x 70 mm
Tumeric paper	90747	Boric acid, borates (H_3BO_3, BO_3^{3-})	Box of 200 strips 20 x 70 mm
Udder test paper	90748	Mastitis	20 sheets 90 x 140 mm in PE bag
Waterfinder test paper	90630	Water in organic solutions	Reel of 7 m length and 14 mm width
Watesmo	90609	Water in organic solutions	Reel of 5 m length and 10 mm width
Wator	90610	Water distribution in butter	Box of 50 sheets 78 x 40 mm
Zirconium test paper	90721	Zirconium ions (Zr^{4+})	Box of 100 strips 20 x 70 mm

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
Blood traces	1.5 years		Peroxtesmo KM
Peroxidase traces	2.5 years	■	Peroxtesmo KO
3 % raw milk in UHT milk	1 year		Peroxtesmo MI
Sperm traces	1.5 years		Phosphatesmo KM
0.5 % raw milk in pasteurized milk / 300 U/L alkaline phosphatase in UHT milk	1 year (2–8 °C)		Phosphatesmo MI
5 mg/L Pb^{2+}	15 months		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®


0.3
0.20
0.4
0.6
0.8
1.0
Visocolor® HE
0.05-1.0 mg/l P

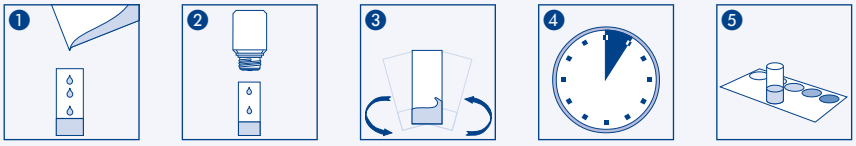
VISOCOLOR® alpha

Colorimetric and titrimetric test kits

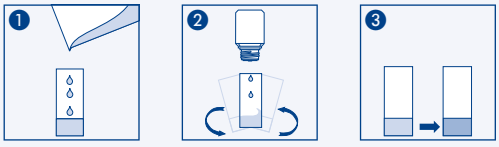
VISOCOLOR® alpha is the most simple version of colorimetric and titrimetric test kits. These tests are suitable for visual evaluation only and are very convenient in performance, because of the used multicomponent reagents. Therefore, the test kits are limited in precision and accuracy but represent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



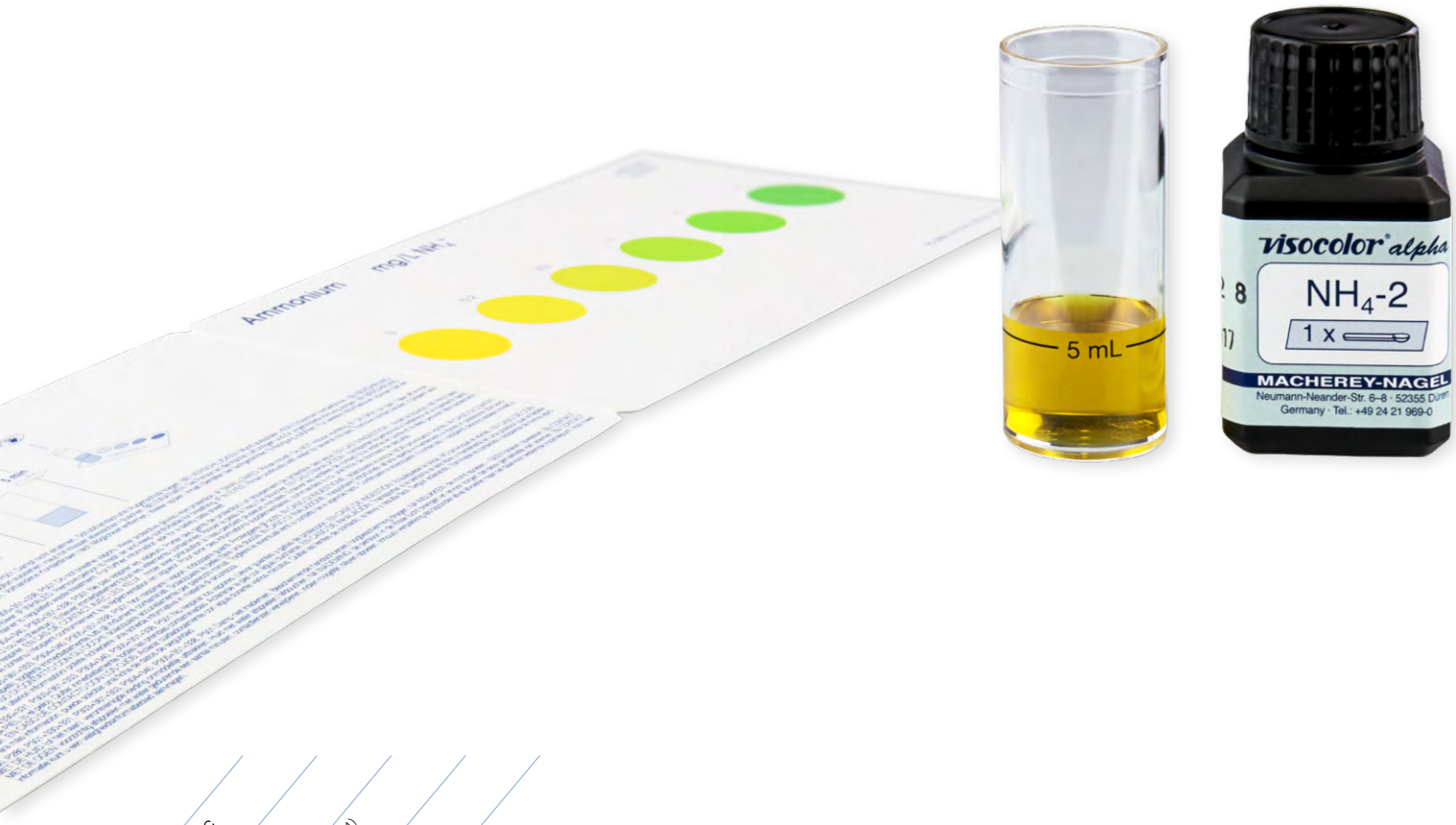
Titrimetric



Ordering information

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

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



Test	Colorimetric	Titrimetric	Sea water [1]	GHS
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 134) and PF-12^{Plus} (see page 132) and spectrophotometer *NANOCOLOR*® Advance (see page 128). This enables a quantitative evaluation of the test kit.

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

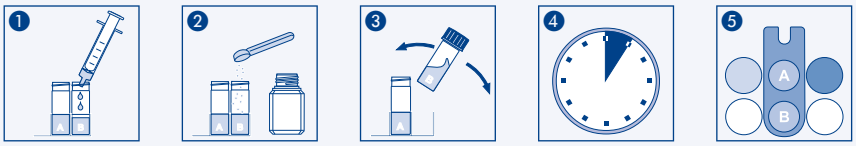
All *VISOCOLOR*® *ECO* test kits are delivered in a practical cardboard box with plastic inlay and easy to understand instruction manual. In addition, pictogram instructions are available for every test kit on the MACHEREY-NAGEL website.

Good to know

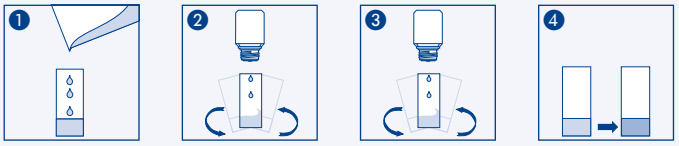
The easiest way to check your photometric chlorine measurement: *VISOCOLOR*® Color standards Chlorine (REF 914820)

How it's done

Colorimetric



Titrimetric



Ordering information

Test	REF	REF refill	Measuring range (visual)	Measuring range (photometric) [4]	Number of tests
■ Alkalinity TA	–	931204	–	0.4–17.5 °e / 5–250 mg/L $CaCO_3$	100
■ Aluminum	931006	931206	0 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 · 0.40 · 0.50 mg/L Al^{3+}	–	50
■ Ammonium 3	931008	931208	0 · 0.2 · 0.3 · 0.5 · 0.7 · 1 · 2 · 3 mg/L NH_4^+	0.1–2.5 mg/L NH_4^+	50
■ Ammonium 15	931010	931210	0 · 0.5 · 1 · 2 · 3 · 5 · 7 · 10 · 15 mg/L NH_4^+	0.5–8.0 mg/L NH_4^+	50
■ Bromine	–	931211	–	0.10–13.00 mg/L Br_2	200
■ Calcium	931012	–	1 drop equals 5 mg/L Ca^{2+}	–	100
■ Carbonate hardness	931014	–	1 drop equals 1.25 °e	–	100
■ Chloride	931018	931218	1 · 2 · 4 · 7 · 12 · 20 · 40 · 60 mg/L Cl^-	1–50 mg/L Cl^-	90
■ Chlorine + pH see Swimming pool					

[1] Please see the instruction leaflet.
[2] For evaluation with the PF-12 / PF-12^{Plus}, a special filter (450 nm) is required.
[3] Additionally required with first order: Oxygen sample bottle, REF 915498.
[4] Measuring range for photometric evaluation with the PF-12^{Plus}. Range on other photometers can be different.
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, sufficient for photometric determination.

Easy

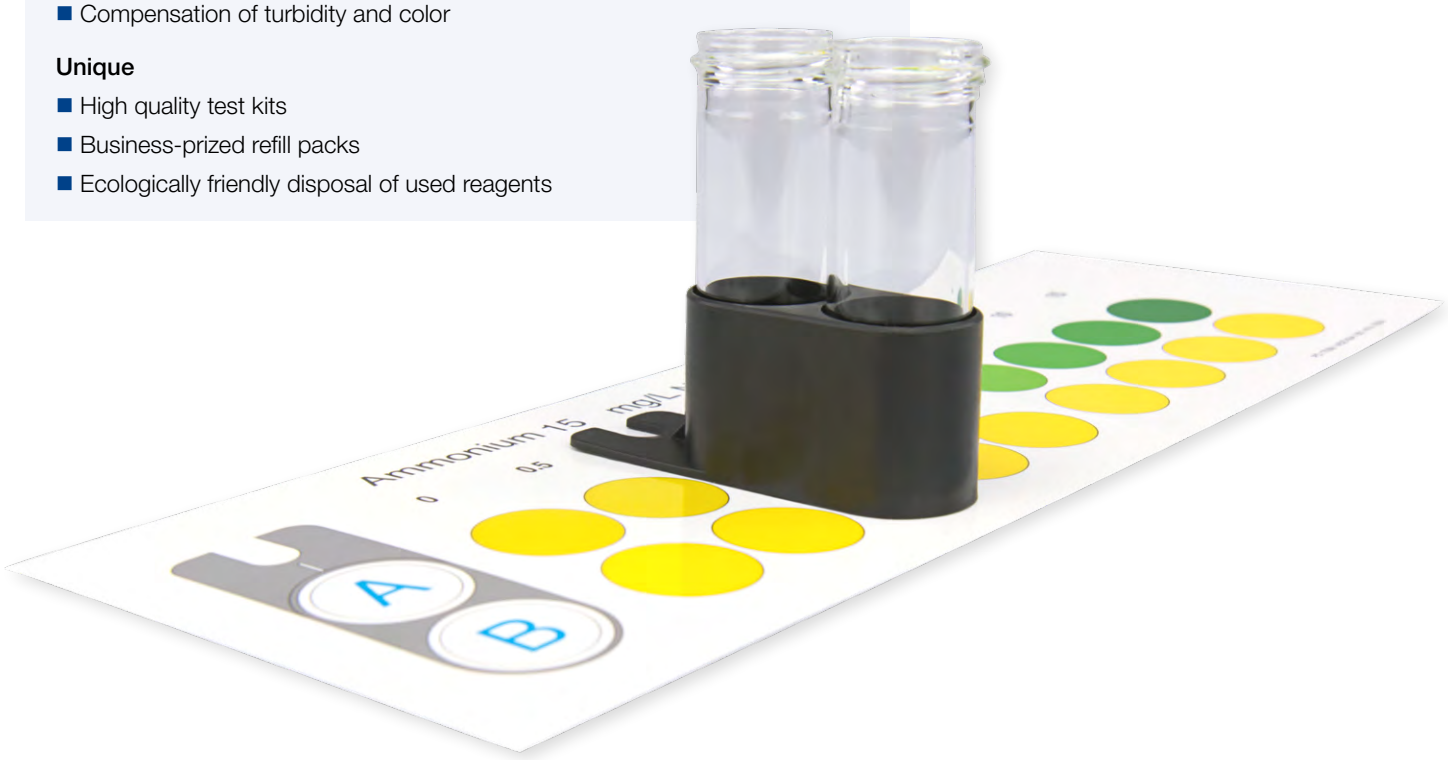
- Chemical analysis without further accessories
- No extensive training necessary
- Color-coded reagents with clear dosing instructions

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	Advance	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	931035	931235	< 0.1 · 0.1 · 0.2 · 0.3 · 0.4 · 0.6 · 0.9 · 1.2 · 2.0 mg/L Cl_2	0.05–2.00 mg/L Cl_2	150
free Chlorine 2	931016	931216	< 0.1 · 0.1 · 0.2 · 0.3 · 0.4 · 0.6 · 0.9 · 1.2 · 2.0 mg/L Cl_2	0.05–2.00 mg/L Cl_2	150
Chlorine 2, free + total	931015	931215	< 0.1 · 0.1 · 0.2 · 0.3 · 0.4 · 0.6 · 0.9 · 1.2 · 2.0 mg/L Cl_2	0.05–2.00 mg/L Cl_2	150
free Chlorine 6	–	931219	–	0.05–6.00 mg/L Cl_2	400
Chlorine 6, free + total	–	931217	–	0.05–6.00 mg/L Cl_2	200
Chlorine dioxide	931021	931221	< 0.2 · 0.2 · 0.4 · 0.6 · 0.8 · 1.1 · 1.7 · 2.3 · 3.8 mg/L ClO_2	0.20–3.80 mg/L ClO_2	150
Chromium(VI)	931020	931220	0.02 · 0.05 · 0.10 · 0.15 · 0.20 · 0.30 · 0.40 · 0.50 mg/L Cr(VI)	0.02–0.50 mg/L Cr(VI)	140
Copper	931037	931237	0 · 0.1 · 0.2 · 0.3 · 0.5 · 0.7 · 1.0 · 1.5 mg/L Cu^{2+}	0.1–5.0 mg/L Cu^{2+}	100
Cyanide	931022	931222	0 · 0.01 · 0.02 · 0.03 · 0.05 · 0.07 · 0.10 · 0.15 · 0.20 mg/L CN^-	0.01–0.20 mg/L CN^-	100
Cyanuric acid	931023	931223	10 · 15 · 20 · 30 · 40 · 60 · 80 · 100 mg/L Cya	10–100 mg/L Cya	100
DEHA	931024	931224	0 · 0.01 · 0.03 · 0.05 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 mg/L DEHA	–	125
Detergents, anionic	931050	931250	0.1 · 0.25 · 0.5 · 1.0 · 2.0 · 5.0 mg/L MBAS	–	50
Detergents, cationic	931051	931251	0 · 1 · 3 · 5 · 10 · 15 · 20 mg/L CTAB	–	50
Fluoride	–	931227	–	0.1–2.0 mg/L F^-	150
Hydrazine	931030	931230	0 · 0.05 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 · 0.40 mg/L N_2H_4	0.05–0.40 mg/L N_2H_4	130
Iron 1	931025	931225	0 · 0.04 · 0.07 · 0.10 · 0.15 · 0.20 · 0.30 · 0.50 · 1.0 mg/L Fe	0.04–2.00 mg/L Fe	200
Iron 2	931026	931226	0 · 0.04 · 0.07 · 0.10 · 0.15 · 0.20 · 0.30 · 0.50 · 1.0 mg/L Fe	0.04–2.00 mg/L Fe	100
Manganese	931038	931238	0 · 0.1 · 0.2 · 0.3 · 0.5 · 0.7 · 0.9 · 1.2 · 1.5 mg/L Mn	0.1–5.0 mg/L Mn	70
Nickel	931040	931240	0 · 0.1 · 0.2 · 0.3 · 0.5 · 0.7 · 0.9 · 1.2 · 1.5 mg/L Ni^{2+}	0.04–5.00 mg/L Ni^{2+}	150
Nitrate	931041	931241	0 · 1 · 3 · 5 · 10 · 20 · 30 · 50 · 70 · 90 · 120 mg/L NO_3^-	4–60 mg/L NO_3^-	110
Nitrite	931044	931244	0 · 0.02 · 0.03 · 0.05 · 0.07 · 0.1 · 0.2 · 0.3 · 0.5 · mg/L NO_2^-	0.02–0.50 mg/L NO_2^-	120
Oxygen [3]	931088	931288	0 · 1 · 2 · 3 · 4 · 6 · 8 · 10 mg/L O_2	1–8 mg/L O_2	50
pH 4.0–9.0	931066	931266	pH: 4.0 · 5.0 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0	–	450
pH 6.0–8.2	–	931270	–	pH 6.1–8.4	150
Phosphate	931084	931284	0 · 0.2 · 0.3 · 0.5 · 0.7 · 1 · 2 · 3 · 5 mg/L PO_4-P	0.2–5.0 mg/L PO_4-P	80
Potassium	931032	931232	2 · 3 · 4 · 6 · 8 · 10 · 15 mg/L K^+	2–25 mg/L K^+	60
Silica	931033	931233	0 · 0.2 · 0.4 · 0.6 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 mg/L SiO_2	0.2–3.0 mg/L SiO_2	80
Silica HR 200	–	931234	–	10–200 mg/L SiO_2 [2]	100
Sulfate	931092	931292	25 · 30 · 35 · 40 · 50 · 60 · 70 · 80 · 100 · 120 · 150 · 200 mg/L SO_4^{2-}	20–200 mg/L SO_4^{2-}	100
Sulfide	931094	931294	0.1 · 0.2 · 0.3 · 0.4 · 0.5 · 0.6 · 0.7 · 0.8 mg/L S^{2-}	0.05–0.80 mg/L S^{2-}	90
Sulfite	931095	–	1 drop equals 1 mg/L SO_3^{2-}	–	60
Swimming pool	931090	931290	Chlorine: < 0.1 · 0.1 · 0.2 · 0.3 · 0.4 · 0.6 · 0.9 · 1.2 · 2.0 mg/L Cl_2 pH: 6.9 · 7.2 · 7.4 · 7.6 · 7.8 · 8.2	–	150
Total hardness	931029	–	1 drop equals 1.25 °e	–	110
Zinc	931098	931298	0 · 0.5 · 1 · 2 · 3 mg/L Zn^{2+}	0.1–3.0 mg/L Zn^{2+}	120

[1] Please see the instruction leaflet.
[2] For evaluation with the PF-12 / PF-12^{Plus}, a special filter (450 nm) is required.
[3] Additionally required with first order: Oxygen sample bottle, REF 915498.
[4] Measuring range for photometric evaluation with the PF-12^{Plus}. Range on other photometers can be different.
GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.
refill: Refill pack, sufficient for photometric determination.

Shelf life	Method	Advance	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	Phosphormolybdenum 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.

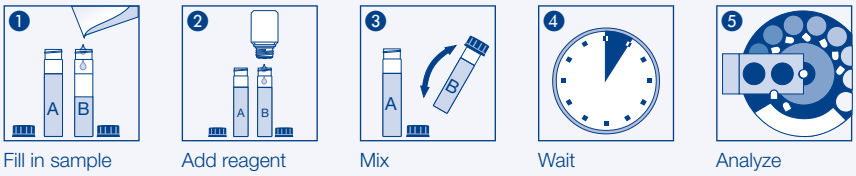
Ordering information

Test	REF	REF refill	Measuring range	Number of tests	Shelf life
Acidity AC 7 (base capacity)	915006	915206	0.2–7.2 mmol/L H^+ (1 syringe filling)	200	2 years
Alkalinity AL 7 (acid capacity)	915007	915207	0.2–7.2 mmol/L OH^- (1 syringe filling)	200	2 years
Ammonium	920006	920106	0.0 · 0.02 · 0.04 · 0.07 · 0.10 · 0.15 · 0.20 · 0.30 · 0.40 · 0.50 mg/L NH_4^+	110	1 year
Calcium CA 20	915010	915210	0.6–25.0 °e / 0.1–3.6 mmol/L Ca^{2+} (1 syringe filling)	200	2 years
Carbonate hardness C 20	915003	915203	0.6–25.0 °e / 0.2–7.2 mmol/L H^+ (1 syringe filling)	200	2 years
Chloride CL 500	915004	915204	5–500 mg/L Cl^- (1 syringe filling)	300	2 years
Chlorine, free + total	920015	920115	0.0 · 0.02 · 0.04 · 0.06 · 0.10 · 0.15 · 0.20 · 0.30 · 0.40 · 0.60 mg/L Cl_2	160	2 years
Copper	920050	920150	0.0 · 0.04 · 0.07 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 · 0.40 · 0.50 mg/L Cu^{2+}	150	2 years
Cyanide	920028	920128	0.0 · 0.002 · 0.004 · 0.007 · 0.010 · 0.015 · 0.020 · 0.025 · 0.030 · 0.040 mg/L CN^-	50	1 year
Iron	920040	920140	0.0 · 0.01 · 0.02 · 0.03 · 0.04 · 0.05 · 0.07 · 0.10 · 0.15 · 0.20 mg/L Fe	300	2 years
Manganese	920055	920155	0.0 · 0.03 · 0.06 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 · 0.40 · 0.50 mg/L Mn	100	1.5 years
Nitrite	920063	920163	0.0 · 0.005 · 0.010 · 0.015 · 0.02 · 0.03 · 0.04 · 0.06 · 0.08 · 0.10 mg/L NO_2^-	150	2 years
Oxygen SA 10	915009	915209	0.2–10.0 mg/L O_2 (1 syringe filling)	100	1.5 years
pH 4.0–10.0	920074	920174	pH 4.0 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 10.0	500	2 years
Phosphate	920082	920182	0.0 · 0.05 · 0.10 · 0.15 · 0.20 · 0.3 · 0.4 · 0.6 · 0.8 · 1.0 mg/L PO_4-P	300	2 years
Phosphate (DEV)	920080	920180	0.0 · 0.01 · 0.02 · 0.03 · 0.05 · 0.07 · 0.10 · 0.15 · 0.20 · 0.25 mg/L PO_4-P	100	2 years
Silica	920087	920187	0.0 · 0.01 · 0.02 · 0.03 · 0.05 · 0.07 · 0.10 · 0.15 · 0.20 · 0.30 mg/L Si	120	2 years
Sulfite SU 100	915008	915208	2–100 mg/L SO_3^{2-} (1 syringe filling)	100	3 years
Total hardness H 2	915002	915202	0.06–2.50 °e / 0.01–0.36 mmol/L Ca^{2+} (1 syringe filling)	200	1.5 years
Total hardness H 20 F	915005	915205	0.6–25.0 °e / 0.1–3.6 mmol/L Ca^{2+} (1 syringe filling)	200	1.5 years

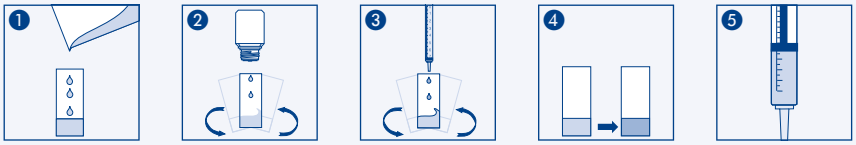
[1] Please see the instruction leaflet.
GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.
refill.: Refill pack

How it's done

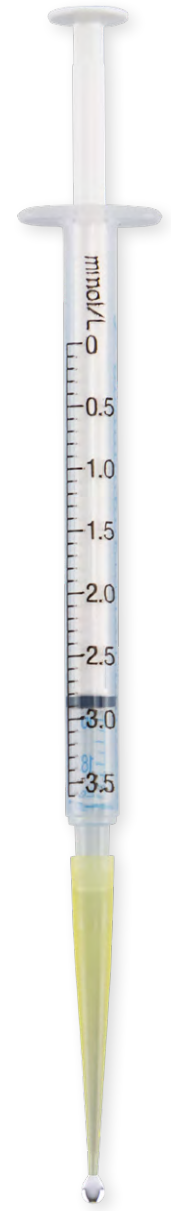
Colorimetric



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)
Silicomolybdenum blue	■		■	■	Silica
Iodometric titration		■	■	■	Sulfite SU 100
Complexometric titration		■		■	Total hardness H 2
Complexometric titration		■	■	■	Total hardness H 20 F



VISOCOLOR® *Powder Pillows*

Photometric reagent Powder Pillows

VISOCOLOR® *Powder Pillows* are photometric tests that combine easiest dosing of reagents with photometric precision. Each *VISOCOLOR*® powder pillow contains the exact amount of reagents needed for a determination. The individually packaged portions not only stand out due to their very long shelf life, but also avoid the use of hazardous substances wherever possible. Easy to understand test instructions with pictograms in 6 languages are available on MACHEREY-NAGEL homepage. *VISOCOLOR*® Powder Pillows can be evaluated on compact photometers PF-12^{Plus} (see page 132), PF-3 (see page 134) and spectrophotometers *NANOCOLOR*® Advance (see page 128) *NANOCOLOR*® *VIS* II and *NANOCOLOR*® $^{UV/VIS}$ II (see page 124).

How it's done

Application *VISOCOLOR*® *Powder Pillows*

Fill in sample | Add Powder Pillow | Mix | Wait | Analyze

Good to know

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

Ordering information

Test	REF	Number of tests	Measuring range	Shelf life	Method
Ammonium	936229	100	0.02-0.80 mg/L NH_4-N	3 years	Bethelot reaction
free Chlorine	936220 936220.1	100 1000	0.03–6.00 mg/L Cl_2	5 years	DPD
total Chlorine, Ozone	936221 936221.1	100 1000	0.03–6.00 mg/L Cl_2 / 0.03–4.00 mg/L O_3	5 years	DPD
Iron	936227	100	0.03 – 3.00 mg/L Fe	3 years	1,10–Phenanthroline
Nitrate	936226	100	1.0–50 mg/L NO_3-N	3 years	Azo dye
Nitrite	936230	100	0.01–0.30 mg/L NO_2-N	3 years	Diazotation
pH	936222	100	pH: 6.2–8.2	5 years	Mixed indicator
Phosphate	936228	100	0,02-4,50 mg/L PO_4-	3 years	Phosphormolybdenum blue
Silica LR [1]	936224	100	0.02–2.10 mg/L SiO_2	3 years	Silicomolybdenum blue
Silica HR [2]	936225	100	2–210 mg/L SiO_2	3 years	Molybdosilic acid
Sulfate	936223	100	15–200 mg/L SO_4^{2-}	5 years	Barium sulfate (turbidity)

[1] Measuring range for photometric evaluation on *NANOCOLOR*® *VIS* II. Range on other photometers can be different.
[2] For evaluation with the PF-12^{Plus}, a special filter (450 nm) is required.
GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

Easy

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

Safe

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

Unique

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

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

VISOCOLOR® accessories

The complete analysis from one source

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

Good to know

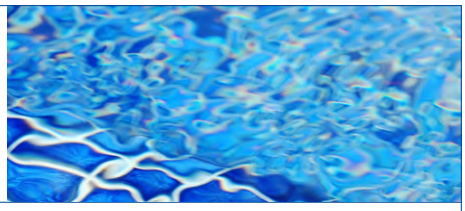
VISOCOLOR® Color standards Chlorine (REF 914820) simulate the reaction color of DPD-based *VISOCOLOR*® chlorine tests for simple photometer check.

Ordering information

Description	REF	Content	GHS
Inspection solutions			
■ *VISOCOLOR*® Color standards Chlorine for checking consistent instrument response of *NANOCOLOR*® *UV/VIS* II, *VIS* II, *NANOCOLOR*® Advance, PF-12*Plus* and PF-3	914820	4 solutions	
Accessories			
■ Measuring glasses for *VISOCOLOR*® *ECO* with screw caps	931151	10 pieces	
■ Slide comparator for *VISOCOLOR*® *ECO*	931152	2 pieces	
■ Color comparison chart for *VISOCOLOR*® *ECO* (REF end No. see test kit)	931 4..	1 piece	
■ Titration test tube with 5-mL-marking	915499	1 piece	
■ Sample bottle 30 mL for oxygen determination	915498	1 piece	
■ Sample beaker 25 mL	914498	1 piece	
■ Sample tube with 10-/20-mL-marking	914496	1 piece	
■ Measuring tube 25–200 mg/L Sulfate	914495	1 piece	
■ Measuring tube 2–15 mg/L Potassium	914444	1 piece	
■ Test tubes 16 mm OD	91680	20 pieces	
■ Test tubes 24 mm OD	936101	6 pieces	
■ Plastic spoon (measuring spoon) black, 85 mm	914663	10 pieces	
■ Plastic spoon (measuring spoon) orange, 85 mm	914664	10 pieces	
■ Plastic spoon (measuring spoon) black, 70 mm	914492	10 pieces	
■ *VISOCOLOR*® *ECO* test instructions for photometer PF-12*Plus*	931503	1 piece	
■ *VISOCOLOR*® *ECO* test instructions for photometer PF-12	931501	1 piece	
■ *VISOCOLOR*® *ECO* test instructions for photometer PF-3	934001	1 piece	
■ *VISOCOLOR*® *ECO* test instructions for visual determination	931502	1 piece	
■ Additive reagent Z-1 to eliminate copper ions prior determination of total hardness	931929	30 mL	■
■ Measuring tube for *VISOCOLOR*® *HE* with screw cap	920401	10 pieces	
■ Comparator block for *VISOCOLOR*® *HE*	920402	1 piece	
■ Color comparison disk for *VISOCOLOR*® *HE* (REF end No. see test kit)	9203..	1 piece	
■ Spare syringes for *VISOCOLOR*® *HE* (REF end No. see test kit)	9154..	2 pieces	
■ Thermometer -10 °C to +60 °C	914497	1 piece	

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

VISOCOLOR®
Color standards Chlorine



Simplest photometer control

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

Photometric tests

NANOCOLOR®


Test 6-03
Test 0-26
Test 0-37
Test 0-54
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 preprogrammed 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. 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.

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 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]		985098	0.02–0.70 mg/L Al^{3+}		19	1 year	Eriochrome® Cyanine R
■ Ammonium 3		985003	0.04–2.30 mg/L NH_4-N	0.05–3.00 mg/L NH_4^+	20	1 year	Indophenol
■ Ammonium 10		985004	0.2–8.0 mg/L NH_4-N	0.2–10.0 mg/L NH_4^+	20	1 year	Indophenol
■ Ammonium 50		985005	1–40 mg/L NH_4-N	1–50 mg/L NH_4^+	20	1 year	Indophenol
■ Ammonium 100		985008	4–80 mg/L NH_4-N	5–100 mg/L NH_4^+	20	1 year	Indophenol
■ Ammonium 200		985006	30–160 mg/L NH_4-N	40–200 mg/L NH_4^+	20	1 year	Indophenol
■ Ammonium 2000		985002	300–1600 mg/L NH_4-N	400–2000 mg/L NH_4^+	20	1 year	Indophenol
■ AOX 3		985007	0.1–3.0 mg/L AOX	0.01–0.30 mg/L AOX	20	1 year	Mercury(II)-thiocyanate / Iron(III)-nitrate
■ BOD_5 (in Winkler bottles)		985822	2–3000 mg/L O_2		25–50	2 years	Winkler
■ BOD_5-TT		985825	0.5–3000 mg/L O_2		22	2 years	Winkler
■ Cadmium 2		985014	0.05–2.00 mg/L Cd^{2+}		10–19	1 year	Cadion
■ Carbonate hardness 15		985015	1.25–18.75 °e	0.4–5.4 mmol/L H^+	20	1 year	Bromphenol blue
■ Chloride 50		985021	0.5–50.0 mg/L Cl^-		20	1 year	Mercury(II)-thiocyanate / Iron(III)-nitrate
■ Chloride 200		985019	5–200 mg/L Cl^-	0.10–1.00 g/L Cl^-	20	1 year	Mercury(II)-thiocyanate / Iron(III)-nitrate
■ Chlorine / Ozone 2		985017	0.05–2.50 mg/L Cl_2	0.05–2.00 mg/L O_3	20	1 year	DPD
■ Chlorine dioxide 5		985018	0.15–5.00 mg/L ClO_2		20	1 year	DPD
■ Chromate 5		985024	0.05–2.00 mg/L Cr(VI) 0.005–0.500 mg/L Cr(VI) [1]	0.1–4.0 mg/L CrO_4^{2-} 0.01–1.00 mg/L CrO_4^{2-} [1]	20	2 years	Carbazide
■ total Chromium 2		985059	0.05–2.00 mg/L Cr 0.005–0.500 mg/L Cr [1]		20	2 years	Carbazide
■ COD 40	ISO 15705	985027	2–40 mg/L O_2		20	1 year (2–8 °C)	Potassium dichromate
■ COD 60	ISO 15705	985022	5–60 mg/L O_2		20	1 year (2–8 °C)	Potassium dichromate
■ COD 60 in salt water		985020	6–60 mg/L O_2		20	1 year (2–8 °C)	Potassium dichromate
■ COD 160	ISO 15705	985026	15–160 mg/L O_2		20	1 year	Potassium dichromate
■ COD 160 Hg-free		963026	15–160 mg/L O_2		20	1 year (2–8 °C)	Potassium dichromate
■ COD 300		985033	50–300 mg/L O_2		20	1 year	Potassium dichromate
■ COD 600	ISO 15705	985030	50–600 mg/L O_2		20	1 year	Potassium dichromate
■ COD 1500	ISO 15705	985029	100–1500 mg/L O_2		20	1 year	Potassium dichromate
■ COD 1500 Hg-free		963029	100–1500 mg/L O_2		20	1 year	Potassium dichromate
■ COD 4000		985011	400–4000 mg/L O_2		20	1 year	Potassium dichromate
■ COD 10000		985023	1.00–10.00 g/L O_2		20	1 year	Potassium dichromate
■ COD 15000		985028	1.0–15.0 g/L O_2		20	1 year	Potassium dichromate
■ COD 60000		985012	5.0–60.0 g/L O_2		20	1 year	Potassium dichromate
■ COD LR 150	ISO 15705	985036	3–150 mg/L O_2		20	1 year	Potassium dichromate

On other photometers than the *NANOCOLOR*® *VIS* II measurement ranges and wavelengths can be different.
[1] A more sensitive measuring range is possible by using semi-micro cuvettes 50 mm (REF 91950).
[2] Decomposition only possible in microwave.
[3] Special filter can be necessary for filter photometers (Formaldehyde 10: 412 nm, Tin 3: 520 nm).
[4] Without barcode.
[5] Please see the instruction leaflet.
[6] This test can be performed without a *NANOCOLOR*® reagent set. Determination only with *NANOCOLOR*® spectrophotometers and the PF-12^{Plus}.
[7] Additionally required with first order: *NANOCOLOR*® TIC-Ex (REF 916993).
GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

Spectrophotometer	PF-12Plus	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 60 in salt water
■	■	■									■	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

NANOCOLOR® tube tests

Test	REF	Measuring range *NANOCOLOR*® *VIS* II		Number of tests	Shelf life	Method
COD HR 1500 ISO 15705	985038	20–1500 mg/L O_2		20	1 year	Potassium dichromate
org. Complexing agents 10	985052	0.5–15.0 mg/L I_{BiC}	0.5–20.0 mg/L EDTA	10–19	1 year	Bismut xylenol orange
Copper 5	985053	0.10–7.00 mg/L Cu^{2+}		20	2 years	Cuprizone
Easily liberated Cyanide 04	985025	0.01–0.40 mg/l CN^-		19	1 year	Barbituric acid derivative
Cyanide 08	985031	0.02–0.80 mg/L CN^- 0.005–0.100 mg/L CN^- [1]		20	1 year	Barbituric acid / Pyridine
DEHA 1 (Diethylhydroxylamine)	985035	0.05–1.00 mg/L DEHA		20	1 year	Redox reaction
Ethanol 1000	985838	0.10–1.00 g/L EtOH	0.013–0.130 Vol. % EtOH	23	2 years (< 0 °C)	Alcoholoxidase / Peroxidase
Fluoride 2	985040	0.1–2.0 mg/L F^-		20	1.5 years	Lanthanum-Alizarine complexone
Formaldehyde 8	985041	0.1–8.0 mg/L HCHO		20	2 years	Chromotropic acid
Formaldehyde 10 [3]	985046	0.20–10.00 mg/L HCHO 0.02–1.00 mg/L HCHO [1]		20	2 years	Acetylacetone
Hardness Ca / Mg	985044	1.25–25.00 °e 0.2–3.6 mmol/L	5–50 mg/L Mg^{2+} 10–100 mg/L Ca^{2+}	20	1.5 years	Phthalein purple
Hardness 20	985043	1.25–25.00 °e 0.2–3.6 mmol/L	5–50 mg/L Mg^{2+} 10–100 mg/L Ca^{2+}	20	1.5 years	Phthalein purple
HC 300 (Hydrocarbons)	985057	0.5–5.6 mg/L HC	30–300 mg/kg HC	20	1 year	Potassium dichromate
Iron 3	985037	0.10–3.00 mg/L Fe 0.02–1.00 mg/L Fe [1]		20	1 year	Diphenylpyridyltriazine
Lead 5	985009	0.10–5.00 mg/L Pb^{2+}		20	1 year	4-(2-Pyridyl-(2)-azo)-resorcine (PAR)
Manganese 10	985058	0.1–10.0 mg/L Mn 0.02–2.00 mg/L Mn [1]		20	1.5 years	Formaldoxime
Methanol 15	985859	0.2–15.0 mg/L MeOH		23	2 year (< 0 °C)	Alcoholoxidase / Peroxidase
Molybdenum 40	985056	1.0–40.0 mg/L Mo(VI)	1.6–65.0 mg/L MoO_4^{2-}	20	2 years	Thioglycolic acid
Nickel 4	985071	0.10–7.00 mg/L Ni^{2+} 0.02–1.00 mg/L Ni^{2+} [1]		20	2 years	Dimethylglyoxime
Nitrate 8	985065	0.30–8.00 mg/L NO_3-N	1.3–35.0 mg/L NO_3^-	20	2 years	2,6-Dimethylphenol
Nitrate 50	985064	0.3–22.0 mg/L NO_3-N	2–100 mg/L NO_3^-	20	2 years	2,6-Dimethylphenol
Nitrate 250	985066	4–60 mg/L NO_3-N	20–250 mg/L NO_3^-	20	2 years	2,6-Dimethylphenol
Nitrite 2	985068	0.003–0.460 mg/L NO_2-N	0.02–1.50 mg/L NO_2^-	20	1 year	Sulfanilic acid / 1-Naphthylamine
Nitrite 4	985069	0.1–4.0 mg/L NO_2-N	0.3–13.0 mg/L NO_2^-	20	1.5 years	Sulfanilic acid / 1-Naphthylamine
total Kjeldahl nitrogen TKN 16	985067	1.00–16.0 mg/L TKN		20	1.5 years	2,6-Dimethylphenol
total Nitrogen TN_b 22	985083	0.5–22.0 mg/L N		20	1 year	2,6-Dimethylphenol
total Nitrogen TN_b 60	985092	3–60 mg/L N		20	1 year	2,6-Dimethylphenol
total Nitrogen TN_b 220	985088	5–220 mg/L N		20	1 year	2,6-Dimethylphenol
Organic acids 3000	985050	30–3000 mg/L CH_3COOH	0.5–50.0 mmol/L CH_3COOH	20	1.5 years	Ethylenglycole / Iron(III)-Ions
Oxygen 12	985082	0.5–12.0 mg/L O_2		22	2 years	Winkler

On other photometers than the *NANOCOLOR*® *VIS* II measurement ranges and wavelengths can be different.
[1] A more sensitive measuring range is possible by using semi-micro cuvettes 50 mm (REF 91950).
[2] Decomposition only possible in microwave.
[3] Special filter can be necessary for filter photometers (Formaldehyde 10: 412 nm, Tin 3: 520 nm).
[4] Without barcode.
[5] Please see the instruction leaflet.
[6] This test can be performed without a *NANOCOLOR*® reagent set. Determination only with *NANOCOLOR*® spectrophotometers and the PF-12^{Plus}.
[7] Additionally required with first order: *NANOCOLOR*® TIC-Ex (REF 916993).
GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

Spectrophotometer	PF-12Plus	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
■	■	■									■	COD HR 1500
■	■									■		org. Complexing agents 10
■	■							■	■	■		Copper 5
■	■									■	■	Easily liberated Cyanide 04
■	■									■	■	Cyanide 08
■	■									■	■	DEHA 1 (Diethylhydroxylamine)
■	■											Ethanol 1000
■	■									■	■	Fluoride 2
■	■										■	Formaldehyde 8
■	■									■		Formaldehyde 10[3]
■	■									■		Hardness Ca / Mg
■	■									■		Hardness 20
■	■									■	■	HC 300 (Hydrocarbons)
■	■							■	■	■	■	Iron 3
■	■								■		■	Lead 5
■	■									■	■	Manganese 10
■	■											Methanol 15
■	■										■	Molybdenum 40
■	■							■	■	■	■	Nickel 4
■	■										■	Nitrate 8
■	■					■					■	Nitrate 50
■	■										■	Nitrate 250
■	■									■	■	Nitrite 2
■	■									■		Nitrite 4
■	■						■				■	total Kjeldahl nitrogen TKN 16
■	■						■				■	total Nitrogen TN_b 22
■	■						■				■	total Nitrogen TN_b 60
■	■						■				■	total Nitrogen TN_b 220
■	■									■	■	Organic acids 3000
■	■									■	■	Oxygen 12

NANOCOLOR® tube tests

Test	REF	Measuring range *NANOCOLOR*® *VIS* II		Number of tests	Shelf life	Method
■ Peroxide 2	985871	0.03–2.00 mg/L H_2O_2		10–19	1 year (2–8 °C)	Peroxidase
■ pH 6.5–8.2 [4]	91872	pH 6.5–8.2		100	1.5 years	Phenol red
■ Phenolic Index 5	985074	0.2–5.0 mg/L Phenol		20	1.5 years	4-Aminoantipyrine
■ ortho- and total Phosphate 1	985076	0.05–1.50 mg/L P 0.010–0.800 mg/L P [1]	0.2–5.0 mg/L PO_4^{3-} 0.03–2.50 mg/L PO_4^{3-} [1]	20	1 year	Phosphomolybdenum blue
■ ortho- and total Phosphate 5	985081	0.20–5.00 mg/L P	0.5–15.0 mg/L PO_4^{3-}	20	1 year	Phosphomolybdenum blue
■ ortho- and total Phosphate 15	985080	0.30–15.00 mg/L P	1.0–45.0 mg/L PO_4^{3-}	20	1 year	Phosphomolybdenum blue
■ ortho- and total Phosphate 45	985055	5.0–50.0 mg/L P	15–150 mg/L PO_4^{3-}	20	1 year	Phosphomolybdenum blue
■ ortho- and total Phosphate 50	985079	10.0–50.0 mg/L P	30–150 mg/L PO_4^{3-}	19	3 years	Vanadate molybdate
■ ortho- and total Phosphate LR 1	985095	0.05–0.50 mg/L P	0.2–1.5 mg/L PO_4^{3-}	20	1 year	Phosphomolybdenum blue
■ POC 200	985070	20–200 mg/L POC	2–40 mg/L KWI	20	1.5 years	Turbidity
■ Potassium 50	985045	2–50 mg/L K^+		20	2 years	Potassium tetraphenylborate (Turbidity)
■ Residual hardness 1	985084	0.03–1.25 °e	0.004–0.180 mmol/L	20	1 year	Phthalein purple
■ Silver 3	985049	0.20–3.00 mg/L Ag^+	0.08–0.50 mg/L Ag^+ [1]	20	1.5 years	Indicator
■ Starch 100	985085	5–100 mg/L starch		19	1 year	Iodine-starch reaction
■ Sulfate 1000	985087	200–1000 mg/L SO_4^{2-}		20	3 years	Barium sulfate (Turbidity)
■ Sulfate LR 200	985062	20–200 mg/L SO_4^{2-}		20	3 years	Barium sulfate (Turbidity)
■ Sulfate MR 400	985060	40–200 mg/L SO_4^{2-}		20	3 years	Barium sulfate (Turbidity)
■ Sulfate HR 1000	985063	200–1000 mg/L SO_4^{2-}		20	2 years	Barium sulfate (Turbidity)
■ Sulfide 3	985073	0.05–3.00 mg/L S^{2-}		20	3 years	Methylene blue
■ Sulfite 10	985089	0.2–10.0 mg/L SO_3^{2-}	0.05–2.40 mg/L SO_3^{2-} [1]	20	1 year	Thiobenzoic acid derivative
■ Sulfite 100	985090	5–100 mg/L SO_3^{2-}		19	1 year	Potassium iodate / -iodide
■ Anionic surfactants 4	985032	0.20–4.00 mg/L MBAS	0.20–3.500 mg/L SDS	20	2 years	Methylene blue
■ Cationic surfactants 4	985034	0.20–4.00 mg/L CTAB		20	2 years	Disulfin blue
■ Nonionic surfactants 15	985047	0.3–15.0 mg/L Triton® X-100		20	2 years	TBPE
■ Thiocyanate 50	985091	0.5–50.0 mg/L SCN^-		20	2 years	Iron(III)-thiocyanate
■ Tin 3 [3]	985097	0.10–3.00 mg/L Sn		18	1 year	9-Phenyl-3-fluoron
■ TOC 30 [7]	985075	2.0–30.0 mg/L C		20	1 year (2–8 °C)	Indicator
■ TOC 300 [7]	985078	20–300 mg/L C		20	1 year (2–8 °C)	Indicator
■ TTC / Sludge activity	985890	5–150 µg TPF	0.050–2.300 A	20	2 years (2–8 °C)	2,3,5-Triphenyltetrazoliumchloride (TTC)
■ Turbidity [6]	Test 9-06	0.1–1000 NTU		–	–	Turbidity
■ Zinc 4	985096	0.10–4.00 mg/L Zn^{2+}		20	1 year	Zincon
■ Zinc 6	985042	0.20–6.00 mg/L Zn^{2+}		20	1 year	4-(2-pyridylazo)resorcinol (PAR)
■ Zirconium 100	985001	5–100 mg/L Zr		20	3 years	Indicator

On other photometers than the *NANOCOLOR*® *VIS* II measurement ranges and wavelengths can be different.
[1] A more sensitive measuring range is possible by using semi-micro cuvettes 50 mm (REF 91950).
[2] Decomposition only possible in microwave.
[3] Special filter can be necessary for filter photometers (Formaldehyde 10: 412 nm, Tin 3: 520 nm).
[4] Without barcode.
[5] Please see the instruction leaflet.
[6] This test can be performed without a *NANOCOLOR*® reagent set. Determination only with *NANOCOLOR*® spectrophotometers and the PF-12*Plus*.
[7] Additionally required with first order: *NANOCOLOR*® TIC-Ex (REF 916993).
GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

Spectrophotometer	PF-12Plus	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
■	■									■		Peroxide 2
■	■		■		■					■		pH 6.5–8.2[4]
■	■									■	■	Phenolic index 5
■	■							■		■	■	ortho- and total Phosphate 1
■	■					■		■		■	■	ortho- and total Phosphate 5
■	■					■		■		■	■	ortho- and total Phosphate 15
■	■							■		■	■	ortho- and total Phosphate 45
■	■							■		■	■	ortho- and total Phosphate 50
■	■							■		■	■	ortho- and total Phosphate LR 1
■	■									■		POC 200
■	■					■				■	■	Potassium 50
■	■											Residual hardness 1
■	■							■				Silver 3
■	■									■	■	Starch 100
■	■										■	Sulfate 1000
■	■										■	Sulfate LR 200
■	■											Sulfate MR 400
												Sulfate HR 1000
■	■									■	■	Sulfide 3
■	■									■	■	Sulfite 10
■	■									■	■	Sulfite 100
■	■									■	■	Anionic surfactants 4
■	■									■	■	Cationic surfactants 4
■	■										■	Nonionic surfactants 15
■	■									■	■	Thiocyanate 50
■	■									■	■	Tin 3[3]
■	■										■	TOC 30
■	■										■	TOC 300
■	■										■	TTC / Sludge activity
■	■									■		Turbidity[6]
■	■							■	■	■	■	Zinc 4
■	■							■	■	■	■	Zinc 6
■	■							■	■	■		Zirconium 100

NANOCOLOR® robot tests

Fully automated water analysis

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

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

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

Good to know

If you are interested in automated water analysis, please do not hesitate to contact us.

Ordering information

Test	REF	Measuring range *NANOCOLOR*® *VIS* II [1]		Number of tests	Shelf life	Method
Ammonium 3	985603	0.04–2.30 mg/L NH_4-N	0.05–3.00 mg/L NH_4^+	20	1 year	Indophenol
Ammonium 50	985605	1–40 mg/L NH_4-N	1–50 mg/L NH_4^+	20	1 year	Indophenol
Chloride 50	985621	0.5–50.0 mg/L Cl^-		20	1 year	Mercury(II)-thiocyanate / Iron(III)-nitrate
Chloride 200	985619	5–200 mg/L Cl^-		20	1 year	Mercury(II)-thiocyanate / Iron(III)-nitrate
COD 60	985622	5–60 mg/L O_2		20	1 year (2–8 °C)	Potassium dichromate
COD 160	985626	10–160 mg/L O_2		20	1 year	Potassium dichromate
COD 600	985630	50–600 mg/L O_2		20	1 year	Potassium dichromate
COD 1500	985629	100–1500 mg/L O_2		20	1 year	Potassium dichromate
COD LR 150	985636	3–150 mg/L O_2		19	1 year	Potassium dichromate
COD HR 1500	985638	20–1500 mg/L O_2		19	1 year	Potassium dichromate
COD 15000	985628	1.0–15.0 g/L O_2		20	1 year	Potassium dichromate
Nitrate 8	985665	0.30–8.00 mg/L NO_3-N	1.3–35.0 mg/L NO_3^-	20	2 years	2,6-Dimethylphenol
Nitrate 50	985664	0.3–22.0 mg/L NO_3-N	2–100 mg/L NO_3^-	20	2 years	2,6-Dimethylphenol
Nitrite 2	985668	0.003–0.460 mg/L NO_2-N	0.02–1.50 mg/L NO_2^-	20	1 year	Sulfanilic acid / 1-Naphthtylamine
Nitrite 4	985669	0.1–4.0 mg/L NO_2-N	0.3–13.0 mg/L NO_2^-	20	1.5 years	Sulfanilic acid / 1-Naphthtylamine
total Nitrogen TN_b 22	985683	0.5–22.0 mg/L N		20	1 year	2,6-Dimethylphenol
total Nitrogen TN_b 220	985688	5–220 mg/L N		20	1 year	2,6-Dimethylphenol
Organic acids 3000	985650	30–3000 mg/L CH_3COOH	0.5–50.0 mmol/L CH_3COOH	20	1.5 years	Ethylenglycole / Iron(III)-Ions
Phenolic Index 5	985674	0.2–5.0 mg/L Phenol		20	1.5 years	4-Aminoantipyrine
total Phosphate 1	985676	0.05–1.50 mg/L P	0.2–5.0 mg/L PO_4^{3-}	20	1 year	Phosphomolybdenum blue
total Phosphate 5	985681	0.20–5.00 mg/L P	0.5–15.0 mg/L PO_4^{3-}	20	1 year	Phosphomolybdenum blue
total Phosphate 15	985680	0.30–15.00 mg/L P	1.0–45.0 mg/L PO_4^{3-}	20	1 year	Phosphomolybdenum blue
ortho Phosphate 1	985607	0.05–1.50 mg/L P	0.2–5.0 mg/L PO_4^{3-}	20	1 year	Phosphomolybdenum blue
ortho Phosphate 15	985657	0.30–15.00 mg/L P	1.0–45.0 mg/L PO_4^{3-}	20	1 year	Phosphomolybdenum blue
Sulfide 3	985673	0.05–3.00 mg/L S^{2-}		20	3 years	Methylene blue

[1] Evaluation only possible on the spectrophotometers *NANOCOLOR*® *VIS* II and *NANOCOLOR*® *VIS*.
[2] Please see the instruction leaflet.
GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

	Sea water [2]	GHS
	■	■
	■	■
		■
	■	■
		■
		■
		■
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		■
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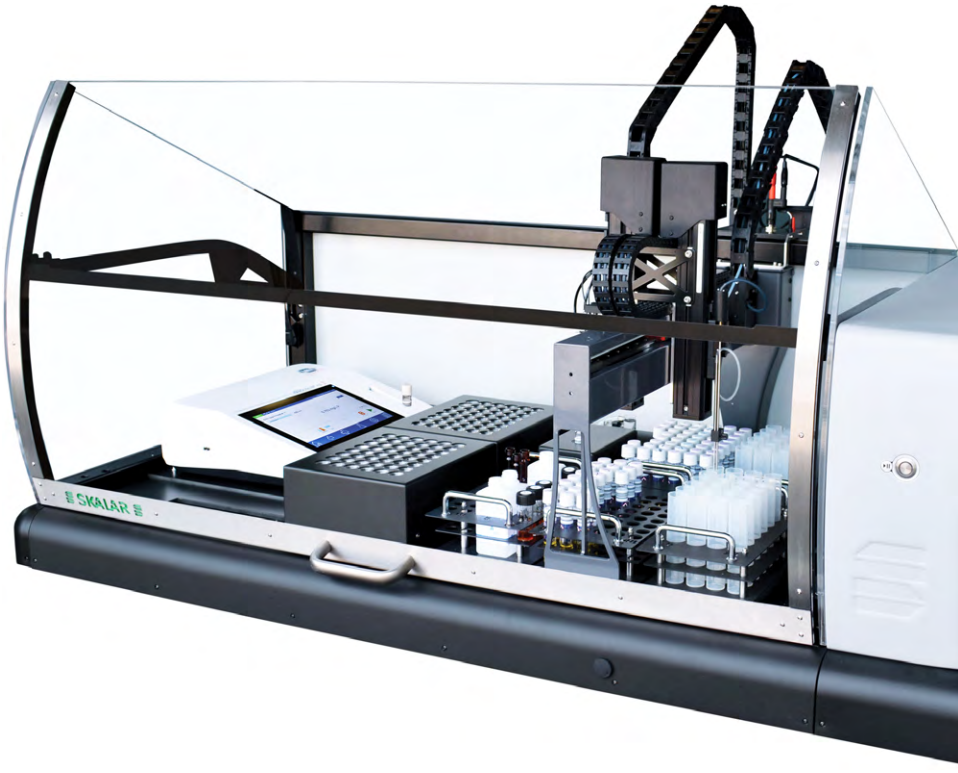


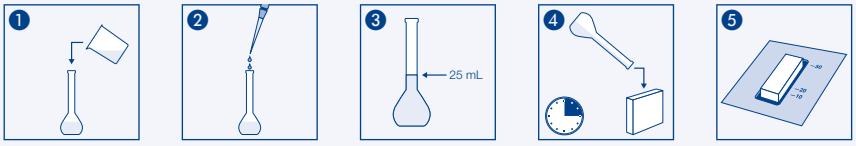
NANOCOLOR® standard tests

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.

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

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.


MN
WESTERN GERMANY
DIN
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20°C

NANOCOLOR® standard tests

Ordering information

Test	REF	Measuring range *NANOCOLOR*® *VIS* II		Number of tests [1]	Shelf life	Method
Aluminum [2]	91802	0.01–1.00 mg/L Al^{3+}		250	2 years	Eriochrome® Cyanine R
Ammonium	91805	0.01–2.0 mg/L NH_4-N	0.01–2.5 mg/L NH_4^+	100	1 year	Indophenol
Cadmium [3]	918131	0.002–0.50 mg/L Cd^{2+}		25	1.5 years	Dithizone
Chloride	91820	0.2–125 mg/L Cl^-		250	1 year	Mercury(II)-thiocyanate / iron(III)-nitrate
Chlorine	91816	0.02–10.0 mg/L Cl_2		250	3 years	DPD
Chlorine dioxide	918163	0.04–4.00 mg/L ClO_2		50	1.5 years	DPD
Chromate	91825	0.01–3.0 mg/L Cr(VI)	0.01–6.0 mg/L CrO_4^{2-}	250	2 years	Carbazide
Cobalt	91851	0.002–0.70 mg/L Co^{2+}		250	2 years	5-Cl-PADAB
Color (Hazen/DIN) [4]	Test 1-39	5–500 mg/L Pt (Hazen)	0.2–20.0 ^{1}/m	–	–	Hazen
Copper	91853	0.01–10.0 mg/L Cu^{2+}		250	2 years	Cuprizone
Cyanide	91830	0.001–0.50 mg/L CN^-		250	1 year	Barbituric acid / pyridine
Detergents, anionic	91832	0.02–5.0 mg/L MBAS		40	3 years	Methylene blue
Detergents, cationic	91834	0.05–5.0 mg/L CTAB		40	3 years	Bromphenol blue
Fluoride	918142	0.05–2.00 mg/L F^-		500	2 years	SPADNS
Hydrazine	91844	0.002–1.50 mg/L N_2H_4		250	1 year	4-(Dimethylamino)-benzaldehyde
Iron LR	918128	0.005–5.00 mg/L Fe		250	3 years	Triazine
Iron	91836	0.01–15.0 mg/L Fe		250	3 years	1,10-Phenanthroline
Lead [3]	918101	0.005–1.00 mg/L Pb^{2+}		50	1.5 years	Dithizone
Manganese LR	918126	0.005–3.00 mg/L Mn		250	1 year	TMB
Manganese	91860	0.01–10.0 mg/L Mn		250	3 years	Formaldoxime
Nickel	91862	0.01–10.0 mg/L Ni^{2+}		250	2 years	Dimethylglyoxime
Nitrate	91865	0.1–30.0 mg/L NO_3-N	0.5–140 mg/L NO_3^-	100	2 years	2,6-Dimethylphenol
Nitrate Z	91863	0.02–1.0 mg/L NO_3-N	0.1–5.0 mg/L NO_3^-	500	1.5 years	Sulfanilic acid / 1-Naphthylamine
Nitrite	91867	0.002–0.30 mg/L NO_2-N	0.005–1.00 mg/L NO_2^-	250	1.5 years	Sulfanilic acid / 1-Naphthylamine
Ozone	91885	0.01–1.50 mg/L O_3		200	1 year (2–8 °C)	Indigotrisulfonate
Phenol	91875	0.01–7.0 mg/L Phenol		500	3 years	4-Nitroaniline
ortho-Phosphate	91877	0.04–6.5 mg/L PO_4-P	0.1–20.0 mg/L PO_4^{3-}	500	3 years	Phospho molybdenum blue
ortho-Phosphate	91878	0.2–17 mg/L PO_4-P	0.5–50 mg/L PO_4^{3-}	500	3 years	Vanadate molybdate
SAC [4] [7]	Test 3-01	0.1-150.0 ^{1}/m		–	–	–
Silica	91848	0.01–10.0 mg/L Si 0.002–0.1 mg/L Si [5]	0.02–10.0 mg/L SiO_2 0.005–0.200 mg/L SiO_2 [5]	250	3 years	Silicomolybdenum blue
Sulfide	91888	0.01–3.0 mg/L S^{2-}		250	3 years	Methylene blue
Turbidity (Formazine/DIN) [4]	Test 1-92	1–100 TE/F (= FAU)	0.5–40.0 ^{1}/m	–	–	Turbidity
Zinc	91895	0.02–3.0 mg/L Zn^{2+}		250	3 years	Zincon

[1] Maximal number of tests. The number of tests depends on the used sample volume.
[2] Decomposition in micro wave is possible.
[3] Organic phase tetrachloro ethylene p.a. or tetrachloro methane is needed additionally.
[4] No *NANOCOLOR*® test is necessary for this determination.
[5] Highly sensitive measurement.
[6] Please see the instruction leaflet.
[7] This test can only be performed with *NANOCOLOR*® UV/VIS II.
GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

Spectrophotometer	Reduced sample volume	Simplified procedure	*NanOx* N	*NanOx* Metal	Sludge analysis	Crack set	Sea water [5]	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 LR
■	■	■		■		■	■	■	Iron
■					■	■		■	Lead [3]
■									Manganese LR
■	■	■						■	Manganese
■	■	■		■	■	■	■	■	Nickel
■			■					■	Nitrate
■	■							■	Nitrate Z
■	■	■					■	■	Nitrite
■							■	■	Ozone
■	■						■	■	Phenol
■	■	■					■	■	ortho-Phosphate
■	■	■					■	■	ortho-Phosphate
■									SAC [4] [7]
■	■	■					■	■	Silica
■	■						■	■	Sulfide
■							■		Turbidity (Formazine/DIN) [4]
■	■			■	■	■	■	■	Zinc

NANOCOLOR® *ECO*

Flexible reagent kits for photometric analysis

NANOCOLOR® *ECO* reagent kits are convenient and flexible test sets for photometric analysis. They impress with their simple test procedure at low determination costs. A set includes all reagents needed for 100 determinations. The tests are performed and measured in 16 mm (REF 91680) or 24 mm (REF 936101) round test tubes without the need of additional beakers or volumetric flasks. The sensitivity can be increased by transferring the solution into a 50 mm semi micro cell (REF 91950). The reagent kits from the *NANOCOLOR*® *ECO* line are based on reaction chemistry of recognized standard methods and norms. All together, *NANOCOLOR*® *ECO* reagent kits combine convenient test procedures with secure and reliable measuring results.

How it's done

Procedure of *NANOCOLOR*® *ECO* tests

Add sample to cuvette | Add reagents and mix | Measure after reaction time

Good to know

NANOCOLOR® *ECO* reagent kits include liquid or solid reagents which can be easily dosed with a pipette or tweezers.

Ordering information

Test	REF	Measuring range	Shelf life	Number of tests	Method
■ Ammonium LR	976003	0.040–1.80 mg/L NH_4-N (16 mm) 0.020–1.15 mg/L NH_4-N (24 mm) 0.010–0.500 mg/L NH_4-N (50 mm)	1.5 years	100	Indophenol – according to APHA 4500-NH3 F, ISO 7150-1, DIN 38406-E5 and EPA 350.1

[1] 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.

Easy

- Pictograms as step-by-step instruction
- Tests are performed directly in 16 mm or 24 mm test tubes
- No complex sample preparation in volumetric flask or beaker

Reliable

- Reaction chemistry based on internationally accepted standard methods
- Constant quality from batch to batch
- Method validation data available for each reagent kit

Flexible

- Measurement in 16 mm or 24 mm round tubes
- Increased sensitivity by transfer into 50 mm semi micro cell
- Convenient test procedure with high sensitivity

Spectrophotometers	PF-12^{Plus}	Sea Water [1]	GHS	Test
■	■	■	■	Ammonium LR

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.

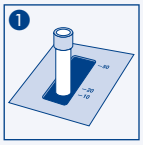
Find an overview on page 16.

Spiking solutions

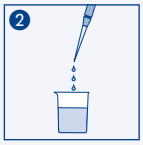
The concentration of a parameter in samples is increased by a defined value by spiking it with a standard addition using *NANOCONTROL* 100+ solutions. Possible interferences in the sample matrix can be detected under consideration of the recovery rates. This kind of plausibility test is especially recommended 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

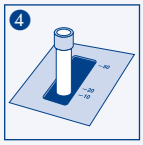


Determination of concentration of sample before spiking



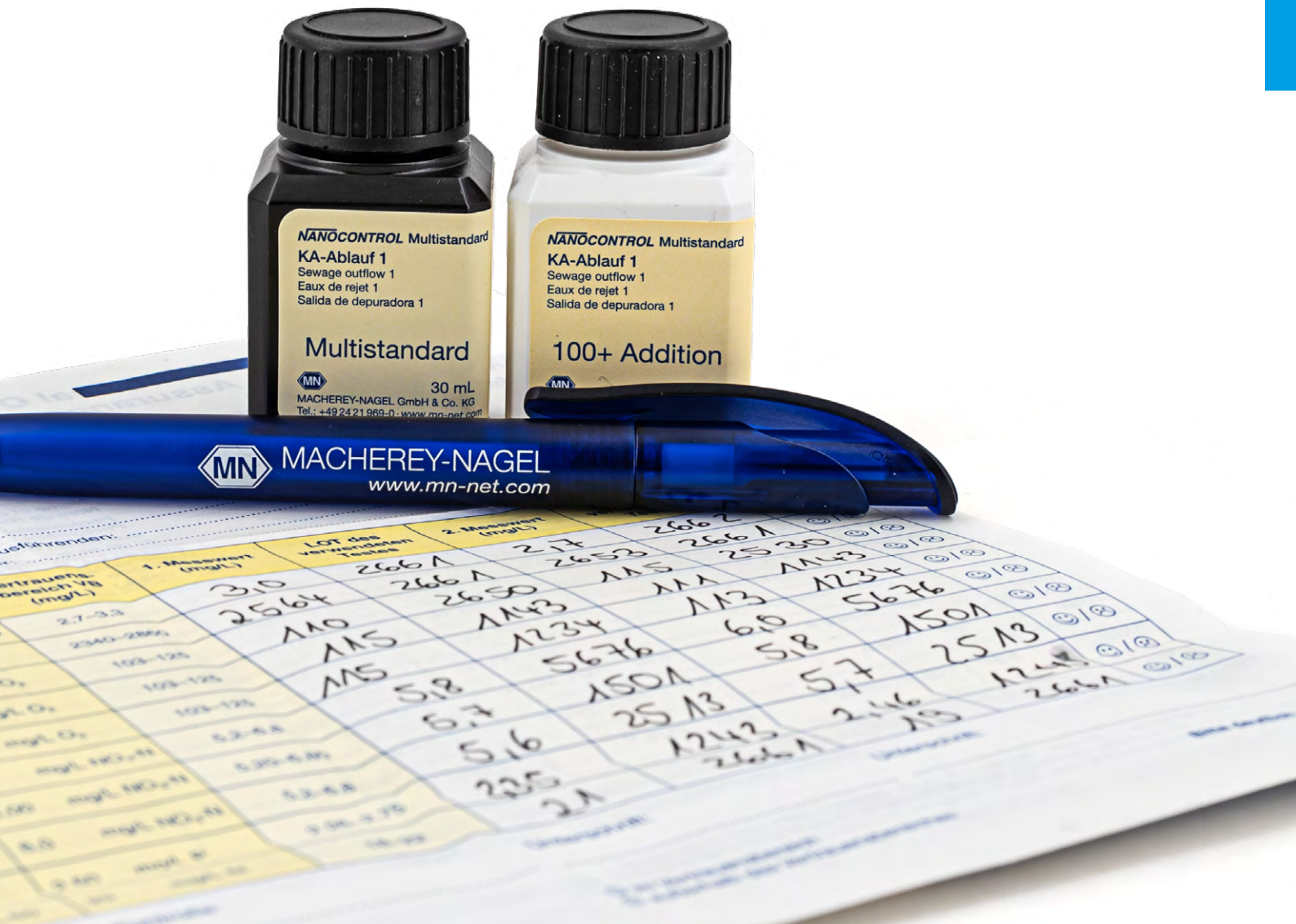
Fill 10 mL of sample into beaker (or cuvette)

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	92507	0-07	AOX 3	20	1.0 mg/L AOX	0.8–1.2 mg/L AOX
■ BOD_5	92582	8-22 / 8-25	BOD_5 / BOD_5-TT	10	210 mg/L O_2	170–250 mg/L O_2
■ Chlorine	92517	0-17 1-16	Chlorine / Ozone 2 Chlorine	30	0.80 mg/L Cl_2 1.00 mg/L Cl_2	0.70–0.90 mg/L Cl_2 0.90–1.10 mg/L Cl_2
■ Chromate	92524	0-24 0-59 1-25	Chromate 5 total Chromium 2 Chromate	15	2.0 mg/L CrO_4^{2-} 0.90 mg/L Cr 0.40 mg/L CrO_4^{2-}	1.8–2.2 mg/L CrO_4^{2-} 0.80–1.00 mg/L Cr 0.36–0.44 mg/L CrO_4^{2-}
■ COD 60	92522	0-27 / 0-22	COD 40 / COD 60	15	30 mg/L O_2	26–34 mg/L O_2
■ COD 160	92526	0-26 / 0-33 / 0-36	COD 160 / COD 300 / COD LR 150	15	100 mg/L O_2	90–110 mg/L O_2
■ COD 1500	92529	0-30 / 0-29 / 0-38	COD 600 / COD 1500 / COD HR 1500	15–30	400 mg/L O_2	360–440 mg/L O_2
■ COD 15000	92528	0-23 0-28	COD 10000 COD 15000	30–150	4.00 g/L O_2 4.0 g/L O_2	3.60–4.40 g/L O_2 3.6–4.4 g/L O_2
■ Nitrite	92568	0-68 0-69 1-67	Nitrite 2 Nitrite 4 Nitrite	15–150	0.30 mg/L NO_2-N 2.10 mg/L NO_2-N 0.060 mg/L NO_2-N	0.25–0.35 mg/L NO_2-N 1.9–2.3 mg/L NO_2-N 0.054–0.066 mg/L NO_2-N
■ ortho-Phosphate	92576	0-76 1-77	ortho- and total Phosphate 1 ortho-Phosphate	15	1.00 mg/L PO_4-P 0.2 mg/L PO_4-P	0.90–1.10 mg/L PO_4-P 0.18–0.22 mg/L PO_4-P
■ Sulfate	92562	0-62	Sulfate LR 200	15	120 mg/L SO_4^{2-}	110–130 mg/L SO_4^{2-}
■ Sulfite	92590	0-90	Sulfite 100	15	50 mg/L SO_3^{2-}	45–55 mg/L SO_3^{2-}
■ TOC 30	92575	0-75	TOC 30	15	10 mg/L C	8.5–11.5 mg/L C
■ TOC 300	92578	0-78	TOC 300	15	100 mg/L C	85–115 mg/L C
Multistandards						
■ Sewage outflow 1	925011	0-04 0-26 0-33 0-11 0-36 0-65 0-64 1-65 0-81 0-92	Ammonium 10 COD 160 COD 300 COD 4000 COD LR 150 Nitrate 8 Nitrate 50 Nitrate ortho- and total Phosphate 5 total Nitrogen TN_b 60	12–120	3.0 mg/L NH_4-N 114 mg/L O_2 114 mg/L O_2 2600 mg/L O_2 114 mg/L O_2 6.00 mg/L NO_3-N 6.0 mg/L NO_3-N 6.0 mg/L NO_3-N 2.50 mg/L P 20 mg/L N	2.7–3.3 mg/L NH_4-N 103–125 mg/L O_2 103–125 mg/L O_2 2340–2860 mg/L O_2 103-125 mg/L O_2 5.20–6.80 mg/L NO_3-N 5.2–6.8 mg/L NO_3-N 5.2–6.8 mg/L NO_3-N 2.25–2.75 mg/L P 18–22 mg/L N
■ Sewage outflow 2	925010	0-03 0-27 0-22 0-65 0-64 1-65 0-76 0-81 0-95 0-83 0-67	Ammonium 3 COD 40 COD 60 Nitrate 8 Nitrate 50 Nitrate total Phosphate 1 total Phosphate 5 total Phosphate LR total Nitrogen TN_b 22 TKN 16	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 0.25 mg/L P 12.0 mg/L N 9.00 mg/L TKN	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 0.22–0.28 mg/L P 10.0–14.0 mg/L N 6.6–11.4 TKN
■ Sewage inflow	925012	0-05 0-30 0-29 0-28 0-12 0-38 0-64 0-66 0-80 0-88	Ammonium 50 COD 600 COD 1500 COD 15000 COD 60000 COD HR 1500 Nitrate 50 Nitrate 250 total Phosphate 15 total Nitrogen TN_b 220	30–300	25.0 mg/L NH_4-N 400 mg/L O_2 400 mg/L O_2 10.0 g/L O_2 10.0 g/L O_2 400 mg/L O_2 15.0 mg/L NO_3-N 15 mg/L NO_3-N 8.00 mg/L P 75 mg/L N	22.0–28.0 mg/L NH_4-N 360–440 mg/L O_2 360–440 mg/L O_2 9.0–11.0 g/L O_2 9.0–11.0 g/L O_2 360–440 mg/L O_2 13.5–16.5 mg/L NO_3-N 13–17 mg/L NO_3-N 7.20–8.80 mg/L P 67–83 mg/L N

[1] Please see the instruction leaflet / evaluation sheet.
[2] Shelf life 6 weeks after first opening / see instruction leaflet.
GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

Addition	Shelf life [2]	GHS	Standard
			Single standards
1.0 mg/L AOX	1 year		AOX 3
–	1 year (2–8 °C)		BOD_5
–	1 year	■	Chlorine
0.5 mg/L CrO_4^{2-} 0.22 mg/L Cr 0.5 mg/L CrO_4^{2-}	1 year	■	Chromate
–	1 year (2–8 °C)		COD 60
–	1 year (2–8 °C)		COD 160
–	1 year (2–8 °C)		COD 1500
–	1 year (2–8 °C)		COD 15000
0.02 mg/L NO_2-N – 0.02 mg/L NO_2-N	1 year		Nitrite
0.10 mg/L PO_4-P 0.10 mg/L PO_4-P	1 year		ortho-Phosphate
–	1 year		Sulfate 200
–	1 year		Sulfite
–	1 year (2–8 °C)		TOC 30
–	1 year (2–8 °C)		TOC 300
			Multistandards
1.0 mg/L NH_4-N 25 mg/L O_2 25 mg/L O_2 – – 1.50 mg/L NO_3-N 1.5 mg/L NO_3-N 1.5 mg/L NO_3-N 0.25 mg/L P 10 mg/L N	6 months		Sewage outflow 1
0.30 mg/L NH_4-N 10 mg/L O_2 10 mg/L O_2 3.00 mg/L NO_3-N 3.0 mg/L NO_3-N 3.0 mg/L NO_3-N 0.30 mg/L P 0.30 mg/L P 0.10 mg/L P 3.3 mg/L N 0.30 mg/L TKN	6 months (2–8 °C)		Sewage outflow 2
10 mg/L NH_4-N 100 mg/L O_2 100 mg/L O_2 – – 100 mg/L O_2 6.0 mg/L NO_3-N 6 mg/L NO_3-N 1.00 mg/L P 20 mg/L N	1 year		Sewage inflow

NANOCONTROL

Standard	REF	Test number	Test	Number of tests	Concentration of standard [1]	Confidence interval
■ Metals 1	925015	0-14	Cadmium 2	15–60	1.00 mg/L Cd^{2+}	0.80–1.20 mg/L Cd^{2+}
		1-13	Cadmium		0.10 mg/L Cd^{2+}	0.08–0.12 mg/L Cd^{2+}
		0-21	Chloride 50		20 mg/L Cl^-	17–23 mg/L Cl^-
		0-19	Chloride 200		80 mg/L Cl^-	70–90 mg/L Cl^-
		0-24	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
		1-25	Chromate + *NanOx* Metal		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+}
		1-28	Iron LR		0.10 mg/L Fe^{3+}	0.08-0.12 mg/L Fe^{3+}
		0-40	Fluoride 2		1.0 mg/L F^-	0.8–1.2 mg/L F^-
		1-42	Fluoride		1.00 mg/L F^-	0.80–1.20 mg/L F^-
		0-62	Sulfate LR 200		80 mg/L SO_4^{2-}	70–90 mg/L SO_4^{2-}
		0-60	Sulfate MR 400		80 mg/L SO_4^{2-}	70–90 mg/L SO_4^{2-}
		0-96	Zinc 4		1.00 mg/L Zn^{2+}	0.80–1.20 mg/L Zn^{2+}
		1-95	Zinc		0.10 mg/L Zn^{2+}	0.08–0.12 mg/L Zn^{2+}
		0-42	Zinc 6		1.00 mg/L Zn^{2+}	0.80–1.20 mg/L Zn^{2+}
■ Metals 2	925016	0-09	Lead 5	15	2.50 mg/L Pb^{2+}	2.25–2.75 mg/L Pb^{2+}
		1-10	Lead		0.25 mg/L Pb^{2+}	0.22–0.28 mg/L Pb^{2+}
		0-45	Potassium 50		20 mg/L K^+	18–22 mg/L K^+
		0-53 / 0-54	Copper 5 / Copper 7		2.00 mg/L Cu^{2+}	1.80–2.20 mg/L Cu^{2+}
		1-53	Copper		0.60 mg/L Cu^{2+}	0.50–0.70 mg/L Cu^{2+}
		0-61 / 0-71	Nickel 7 / Nickel 4		2.00 mg/L Ni^{2+}	1.80–2.20 mg/L Ni^{2+}
		1-62	Nickel		0.60 mg/L Ni^{2+}	0.50–0.70 mg/L Ni^{2+}
■ Seepage	925013	0-08	Ammonium 100	15–300	40 mg/L NH_4-N	36–44 mg/L NH_4-N
		0-06	Ammonium 200		80 mg/L NH_4-N	72–88 mg/L NH_4-N
		0-23	COD 10000		4.00 g/L O_2	3.60–4.40 g/L O_2
		0-28	COD 15000		4.0 g/L O_2	3.6–4.4 g/L O_2
		0-66	Nitrate 250		30 mg/L NO_3-N	27–33 mg/L NO_3-N
		0-55	total Phosphate 45		25.0 mg/L P	22.0–28.0 mg/L P
		0-79	ortho-Phosphate 50		25.0 mg/L PO_4-P	22.0–28.0 mg/L PO_4-P
■ Drinking water	925018	0-98	Aluminum 07	15–30	0.50 mg/L Al^{3+}	0.44–0.56 mg/L Al^{3+}
		1-02	Aluminium		0.50 mg/L Al^{3+}	0.44–0.56 mg/L Al^{3+}
		1-05	Ammonium		0.20 mg/L NH_4-N	0.17–0.23 mg/L NH_4-N
		0-21	Chloride 50		20 mg/L Cl^-	17–23 mg/L Cl^-
		1-20	Chloride		20 mg/L Cl^-	17–23 mg/L Cl^-
		0-37	Iron 3		1.50 mg/L Fe^{3+}	1.30–1.70 mg/L Fe^{3+}
		1-36	Iron		1.50 mg/L Fe^{3+}	1.30–1.70 mg/L Fe^{3+}
		0-58	Manganese 10		1.5 mg/L Mn^{2+}	1.3–1.7 mg/L Mn^{2+}
		1-60	Manganese		1.50 mg/L Mn^{2+}	1.30–1.70 mg/L Mn^{2+}
		0-86	Sulfate 200		120 mg/L SO_4^{2-}	102–138 mg/L SO_4^{2-}
		0-62	Sulfate LR 200		120 mg/L SO_4^{2-}	102–138 mg/L SO_4^{2-}

[1] Please see the instruction leaflet / evaluation sheet.
[2] Shelf life 6 weeks after first opening / see instruction leaflet.
GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

Addition	Shelf life [2)]	GHS	Standard
– – 10 mg/L Cl^- 50 mg/L Cl^- 0.2 mg/L Cr 0.2 mg/L Cr 0.2 mg/L Cr 0.30 mg/L Fe^{3+} 0.30 mg/L Fe^{3+} 0.30 mg/L Fe^{3+} 0.5 mg/L F^- 0.50 mg/L F^- 50 mg/L SO_4^{2-} 50 mg/L SO_4^{2-} 0.40 mg/L Zn^{2+} 0.40 mg/L Zn^{2+} 0.40 mg/L Zn^{2+}	1 year		Metals 1
0.50 mg/L Pb^{2+} – 10 mg/L K^+ 0.70 mg/L Cu^{2+} 0.70 mg/L Cu^{2+} 0.70 mg/L Ni^{2+} 0.70 mg/L Ni^{2+}	1 year		Metals 2
30 mg/L NH_4-N 30 mg/L NH_4-N – – 10 mg/L NO_3-N 5.0 mg/L P 5.0 mg/L PO_4-P	1 year		Seepage
0.20 mg/L Al^{3+} 0.20 mg/L Al^{3+} 0.20 mg/L NH_4-N 5.0 mg/L Cl^- 5.0 mg/L Cl^- 0.20 mg/L Fe^{3+} 0.20 mg/L Fe^{3+} 1.0 mg/L Mn^{2+} 0.20 mg/L Mn^{2+} 50 mg/L SO_4^{2-} 50 mg/L SO_4^{2-}	1 year		Drinking water

NANOCOLOR® reagents for sample decomposition

Sample preparation for photometric analysis

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

NANOCOLOR® *NanOx* N – Oxidative digestion of samples containing nitrogen

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

NANOCOLOR® *NanOx* Metal – Oxidation of samples containing heavy metals

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

Good to know

For further accessories for digestions with *NANOCOLOR*® *NanOx* Metal in a heating block or a microwave see page 112.

NANOCOLOR® reagents for sample decomposition

NANOCOLOR® crack set

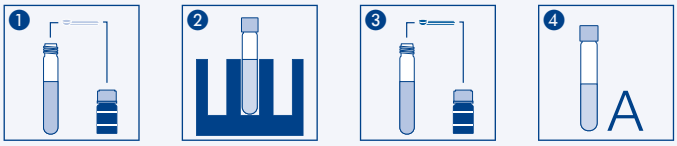
For a more powerful and complete digestion of resistant samples we recommend to use the *NANOCOLOR*® crack set. The included liquid reagents allow an oxidative sample preparation under acidic conditions (peroxodisulfate / sulfuric acid) and normal pressure at 100 °C in the heating block.

NANOCOLOR® sludge

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

How it's done

Decomposition in heating block with *NanOx* N



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

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NANOCOLOR® accessories

Everything from one hand

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

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

Ordering information

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

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Description	REF	Content	Number of tests	Shelf life	GHS
Piston pipette 2.0 mL	916917	1 piece			
Plastic tips transparent for piston pipettes 1.0–5.0 mL	916916	100 pieces			
Digital piston pipette 5–50 µL, adjustable, with tip ejector	91658	1 piece			
Digital piston pipette 50–200 µL, adjustable, with tip ejector	916914	1 piece			
Plastic tips transparent for piston pipettes 5–50 µL and 50–200 µL	916915	100 pieces			
Digital piston pipette 100–1000 µL, adjustable, with tip ejector	91677	1 piece			
Plastic tips transparent for piston pipettes 100–1000 µL	91676	100 pieces			
Digital piston pipette 1.0–5.0 mL, adjustable, with tip ejector	916909	1 piece			
Plastic tips transparent for piston pipettes 1.0–5.0 mL	916916	100 pieces			
Pipette stand for 6 piston pipettes	91679	1 piece			
Extraction					
100 mL separation funnel with NS glass tap and PE stopper for extraction methods	91664	2 pieces			
Stand with clamps and bosses for 4 separation funnels, height 70 cm	91695	1 piece			
AOX					
Supplement kit for AOX for the sensitive AOX range (0.01–0.30 mg/L AOX) and for higher COD values (required above 50 mg/L COD)	918072	2 x 4 g	20	1 year	■
Chloride detection kit AOX for samples with high chloride contents	918073	10 mL		1 year	■
Starter set for AOX, consists of tweezers, funnel, cartridge adaptor, beaker, glass rods, 1 L bottle and syringes	916111	1 set			
Pump set for AOX, consists of centrifugal pump, connecting tubes, graduated 1 L reservoir with tap and stand with clamps and bosses	916115	1 set			
NANOCOLOR® cartridge adapter for AOX pump-set	916113	1 piece			
BOD_5					
BOD_5 nutrient mixture (without *N*-allylthiourea [NATU])	918994	20 cuvettes	20–80	2 years	
BOD_5 nutrient mixture PLUS (with *N*-allylthiourea [NATU])	918995	20 cuvettes	20–80	2 years	
BOD_5 accessories set, consists of electric air pump, 10 L PE container, 2 aerating bricks, 1 L laboratory bottle, 4 Winkler bottles	916918	1 set			
BOD_5-TT accessories set, consists of electric air pump, 2 aerating bricks, 1 L PE container, 2 reaction vessels (40 mL)	916925	1 set			
Reaction vessels for BOD_5-TT	916926	10 pieces			
Oxygen bottles according to Winkler (250–300 mL)	916919	4 pieces			
Aerating bricks for BOD_5 determination	916920	4 pieces			
COD					
Chloride complexing agent for chloride concentration of 1000–7000 mg/L Cl^-	918911	100 mL	100	1.5 years	■
Cartridges for chloride elimination of up to 2000 mg/L chloride per cartridge	963911	10 pieces	10	1 year (2–8 °C)	■
COD- and TOC-free water	918993	50 mL		1 year	
Safety bottle for shaking COD tubes	91637	1 piece			
Hydrocarbons					
Extraction of HC from water	918571	1 box	20	1.5 years	■
Extraction of HC from soil	918572	1 box	20	1.5 years	■
Separation funnel 500 mL with PTFE tap and glass stopper	91608	2 pieces			
CHROMABOND® column 45 mL with 4 g aluminum oxide ALOX N for purification of water and soil extracts by solid phase extraction	730250	20 pieces	20	3 years	
Syringe adaptor for CHROMABOND® columns 45 mL	91603	2 pieces			
Plastic syringes 50 mL	91609	10 pieces			

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

NANOCOLOR® accessories

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

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

High quality filter papers
MN filter papers since 1911

German quality

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

Microbiological tests

BioFix®

Nitrification inhibition tests

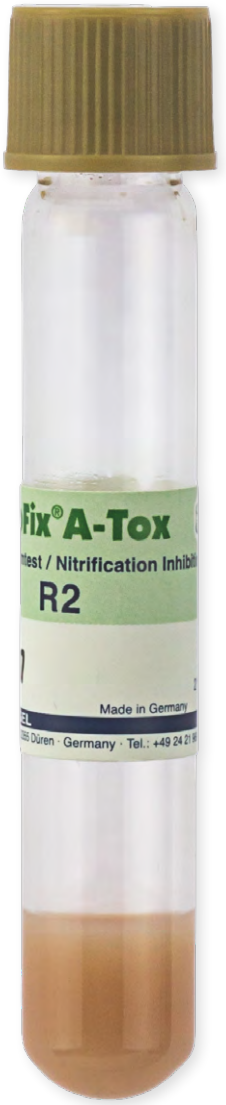
Easy control of nitrification

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.

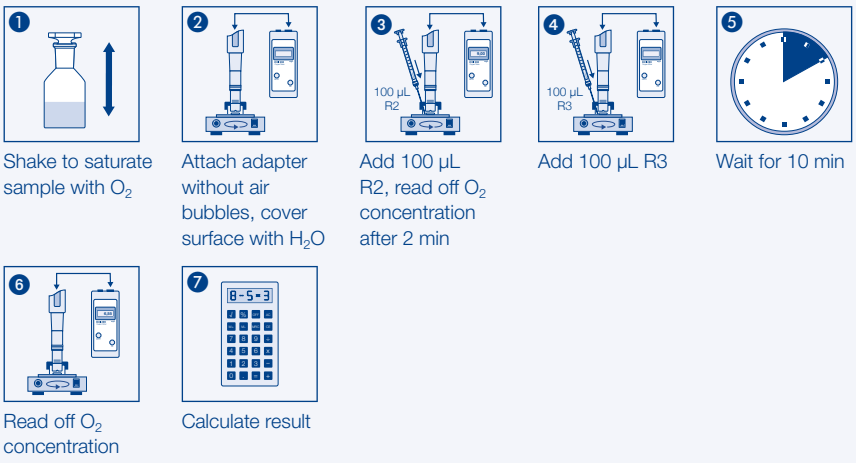
BioFix® nitrification inhibition tests allow the investigation of the first and second step of nitrification separately as well as undifferentiated. With BioFix® *A-Tox* one tests, whether the first step of the nitrification, the oxidation of ammonium, is inhibited by sample components. BioFix® *N-Tox* 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)	970001	10–19	1 year (2–8 °C)
BioFix® *N-Tox* for evaluation of the biological conversion of nitrite to nitrate (2nd step of nitrification)	970002	10–19	1 year (2–8 °C)
BioFix® nitrification inhibition test, reagent *A-Tox* R2, enriched nitrificants for oxidation of ammonia	970903	10 x 2 mL	1 year (2–8 °C)
BioFix® nitrification inhibition test, reagent *N-Tox* R2, enriched nitrificants for oxidation of nitrite	970902	10 x 2 mL	1 year (2–8 °C)

Accessories

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

Luminous bacteria toxicity tests

Tests for bio toxicity in accordance to ISO 11348

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

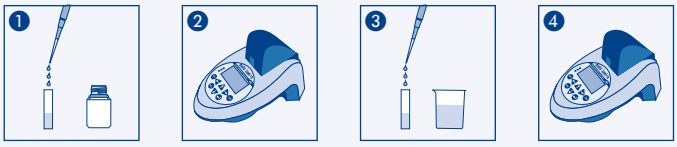
The tests are easy to use and the procedure is normed (ISO 11348). This guarantees safe and reliable results with low effort. BioFix® luminous bacteria tests are available in various, application specific packing sizes. The applications for these tests reach from the analysis of ground, surface, seepage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

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

The evaluation of the toxicity analysis is performed with the BioFix® Lumi-10 (see page 156), 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	945002	20	up to 2000	2 years		■
Lumi luminous bacteria, with reconstitution solution	945003	10	up to 1000	2 years		■
Lumi luminous bacteria, with medium	945006	20	up to 400	2 years		■
Lumi luminous bacteria, with medium	945007	10	up to 200	2 years		■
Lumi multi-shot, with reactivation and control solution	945022	10	up to 100	2 years		■
Lumi single-shot, with reactivation and control solution	945021	20	up to 40	2 years		■
Lumi luminous bacteria, with reactivation and NaCl solution	945023	10	up to 200	2 years	■	
Lumi luminous bacteria, with reactivation and NaCl solution	945024	20	up to 400	2 years	■	
Lumi luminous bacteria, with reactivation and NaCl solution	945025	10	up to 100	2 years	■	

All freeze/liquid-dried BioFix® luminous bacteria are also suited for luminometers of other manufacturers (e.g. LUMIStox, LUMISmini of HACH).
All luminous bacteria tests by MACHEREY-NAGEL need to be stored at -20 ± 2 °C.

Accessories

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

Photometers

Heating blocks

Reflectometer

Luminometer

Devices


NANOCOLOR® VIS II
Open Mode, 01.03.2018, 10:57
MN

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 actively warn the user in case of an interfering turbidity.

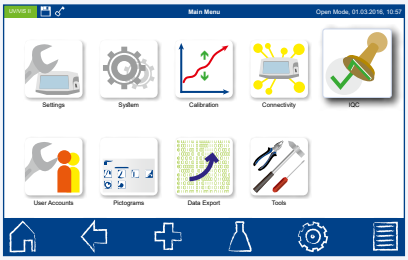
Good to know

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

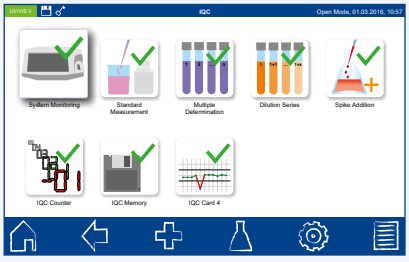
How it's done

In four steps to inspection equipment monitoring

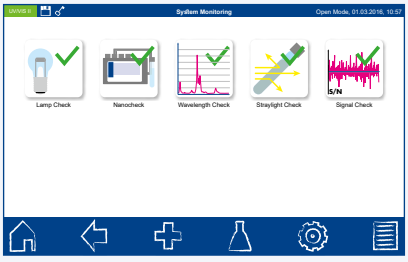
1. Call up main menu



2. Choose IQC-menu



3. Call up inspection equipment monitoring



4. Choose respective test

Good to know

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

Smart

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

Precise

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

Impressively versatile

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

Smart photometry

NANOCOLOR® *VIS* II and $^{UV}/_{VIS}$ II

The next audit will be a breeze

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

Striking interface options for smart connectivity

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

Ordering information

Description	REF
Spectrophotometer *NANOCOLOR*® *VIS* II incl. manual (quick start guide), touch pen, protective covering, power cable with country adapters, USB cable, USB stick, calibration cuvette, cleaning cloth and certificate in a cardboard box.	919650.1
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 in a cardboard box.	919600.1

Technical data

	NANOCOLOR® *VIS* II	*NANOCOLOR*® $^{UV}/_{VIS}$ II
Type	Spectrophotometer with reference detector technology (RDT)	
Light source	Halogen lamp	Halogen lamp (visible range) Deuterium lamp (UV range)
Optics	Monochromator Insensitive to external light for fast measurements without cuvette slot cover; Cuvette slot must be covered for color measurements and measurements in the UV-range	
Wavelength range	320 nm–1100 nm	190 nm–1100 nm
Wavelength accuracy	± 1 nm	
Wavelength resolution	0.1 nm	
Wavelength reproducibility	< 0.5 nm	
Wavelength calibration	Automatic	
Wavelength selection	Automatic, barcode, manual	
Scan speed	1 complete scan in less than 1 min	
Spectral bandwidth	< 4 nm	< 2 nm
Photometric range	± 3.0 A in wavelength range 340 nm–900 nm	± 3.0 A in wavelength range 200 nm–900 nm
Photometric accuracy	0.005 A at 0.0 A–0.5 A; 1 % at 0.5 A–2.0 A	
Photometric linearity	< 0.5 % at ≤ 2 A; ≤ 1 % at > 2 A	
Stray light	< 0.1 %	< 0.05 %
Measuring modes	More than 200 preprogrammed tests and special methods, 100 optionally programmable methods, absorbance, transmittance, factor, kinetics, 2-point calibration, scan, nephelometric turbidity measurement	
Compatible test kits	*NANOCOLOR*® tube tests (see page 88) and *NANOCOLOR*® standard tests (see page 98), *NANOCOLOR*® *ECO* tests (see page 102), *VISOCOLOR*® *Powder Pillow* tests (see page 82) *VIS* II: *NANOCOLOR*® robot tests (see page 96)	
Turbidity measurement	Nephelometric turbidity measurement at 860 nm, 0.1 NTU–1000 NTU Accuracy: < 1 NTU: +/- 0,1 NTU, 4 NTU: 3–5 NTU, 100 NTU: 90–110 NTU, 400 NTU: 360–440 NTU	
Internal quality control	With *NANOCONTROL* NANOCHECK 2.0 and integrated Holmium oxide filter	
Cuvette slot	Test tubes 16 mm OD Rectangular cuvettes 2 mm, 10 mm, 20 mm, 40 mm, 50 mm	
Data memory	16 GB Micro SDHC card, 5000 measured data sets, 100 scans or color measurements, GLP-conform	
Display	10.1″ LED backlit HD display, anti-reflective cover glass with projected capacitive touch screen (PCAP)	
Operation	Test selection via barcode technology, icon-based menu guidance, touch screen	
Languages	DE / EN / FR / ES / PT / PL / HU / NL / CZ / RO / IT	
Interfaces	LAN, 2 x USB (Host), 1 x USB (Function) and RS232	
Update	Free of charge via USB stick	
Operating range	10 °C–40 °C, up to 80 % relative humidity (non-condensing)	
Power supply	Input: 110 V–240 V, Output: 12 V 3A	110 V–240 V, ~50 / 60 Hz
Dimensions	360 mm x 400 mm x 110 mm	400 mm x 440 mm x 170 mm
Weight	4.0 kg	6.5 kg
Warranty	2 years	
CE	CE certified	

NANOCOLOR® Advance

Smart into the future

The spectrophotometer *NANOCOLOR*® Advance combines the most important features of our portable compact photometer PF-12*Plus* and our high-precision spectrophotometer *NANOCOLOR*® *VIS* II. It provides precise and reliable measurement results in the daily laboratory routine and can also be used mobile due to its rechargeable battery. With its wavelength spectrum of 340–800 nm it allows the measurement of all photometrically evaluable test kits from MACHEREY-NAGEL. The *NANOCOLOR*® Advance can therefore be used universally in the entire spectrum of water and wastewater analysis.

Leave nothing to chance

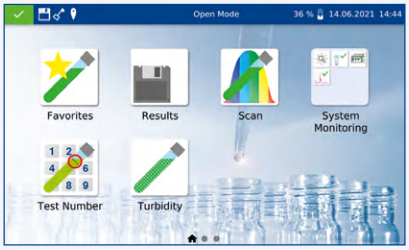
The *NANOCOLOR*® Advance offers the user an automatic detection of interfering turbidity (NTU-Check). With an additional 860 nm LED, the device determines the nephelometric turbidity during each measurement of a tube test and warns the user of incorrect results. This option helps to avoid measuring errors and sets the basis for reliable measuring results.

Experience flexibility

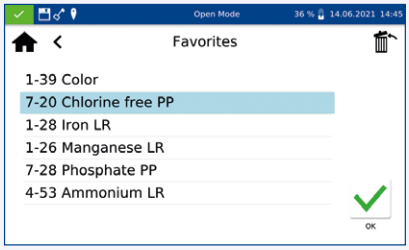
The *NANOCOLOR*® Advance is the first photometer from MACHEREY-NAGEL with a 24 mm cuvette slot and thus extends the options for all areas of water analysis. Besides the *NANOCOLOR*® tube tests and standard tests, the test kits from our *VISOCOLOR*® *ECO* and *VISOCOLOR*® *Powder Pillows* range can also be evaluated. The comprehensive and easy-to-understand menu for creating customer-specific methods makes the device an all-rounder in laboratory analysis and measurements on the road.

How it's done

For non-barcoded tubes your result is just four clicks away.

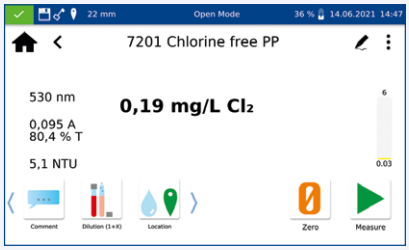


1. Call up Favorites



2. Choose method and press OK

3. Insert cuvette and press measure



4. Read result

Good to know

The *NANOCOLOR*® Advance has passed the vibration test according to Military Standard 810H only 514.8 CAT 4 and fulfills the requirements of protection class IP 67. This underlines the robustness of the device and confirms its suitability for mobile analysis.

Good to know

Universal cuvette slot

10, 20, 50 mm standard tests as well as 16 and 24 mm tube tests can be used with only two adapters.

Stable and with a large opening, the new 24 mm tube tests are ideally suited for the evaluation of our *VISOCOLOR*® *Powder Pillows* (see page 82)

Smart

- 2D barcode recognition for automatic method selection
- Touch screen and icon-based menu navigation for outstanding usability
- NTU check for detection of interfering turbidities

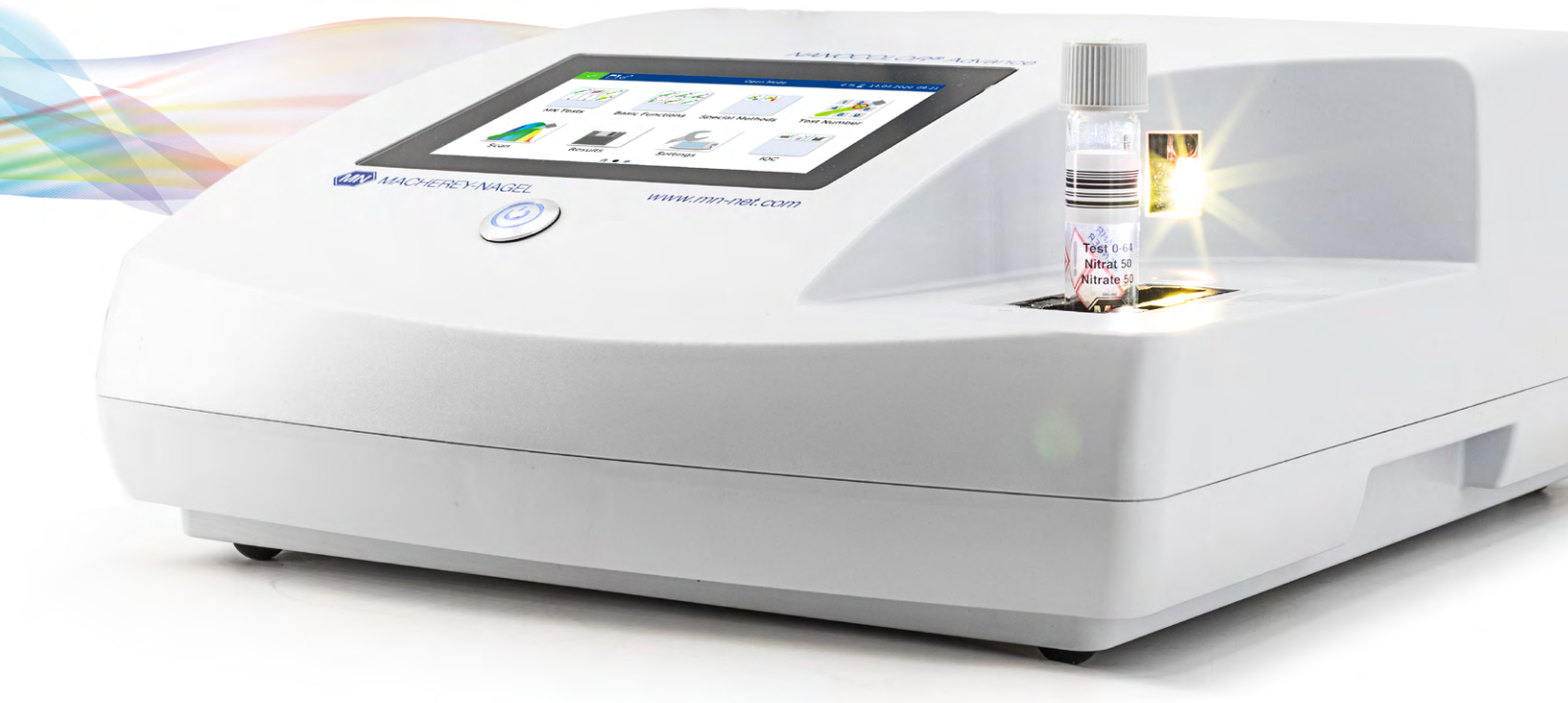
Mobile

- Water proof according to IP 67
- Robust design and built-in battery ensure a limitless flexibility
- Applicable in all fields of water and waste water analysis

Versatile

- High quality optics for perfect results in every environment
- Comprehensive options for a full internal quality control
- Compatible with all photometrically evaluable test kits from MACHEREY-NAGEL

Smart photometry



NANOCOLOR® Advance

Versatile in use

The *NANOCOLOR*® Advance allows a simple and reliable routine analysis by fully automatic cell recognition via the integrated 2D barcode scanner. The fast selection of the test method and the correct wavelength allows almost contactless operation.

The data export is done directly via the integrated interfaces. Be prepared for future requirements. You do not need any additional accessories for the data export. Connect USB stick - export data - open on computer.

Ordering information

Description	REF
Spectrophotometer *NANOCOLOR*® Advance incl. manual (quick start guide), protective cover, power supply unit with country specific adapters, USB stick, calibration cuvette, certificate and cleaning cloth in cardboard box	919750

Technical data

***NANOCOLOR*® Advance**	
Type	Spectrophotometer with Reference Detector Technology (RDT)
Light source	Halogen lamp
Optical system	Single beam photometer with grating monochromator
Wavelength range	340 nm–800 nm
Wavelength accuracy	± 2 nm
Wavelength resolution	1 nm
Wavelength reproducibility	± 0.1 nm
Wavelength calibration	Automatically
Wavelength selection	Automatically, Barcode, manually
Scan speed	1 complete Scan < 3 min
Spectral bandwidth:	< 4 nm
Photometric range	+/- 3.0 A in the range 340–800 nm
Photometric accuracy	0.003 A at 0.0–0.5 A; 1 % at 0.5–2.0 A
Photometric linearity	< 0.5 % at 0.5–2.0 A; ≤ 1 % at > 2 A with neutral glass filters at 546 nm
Scattered light:	< 0.5 %
Measurment modes	Over 200 preprogrammed tests and special methods; 100 fully programmable methods; absorbance; transmission; factor; kinetics; 2-point calibration; scan; nephelometric turbidity measurement
Compatible test kits	*NANOCOLOR*® tube tests (see page 88) *NANOCOLOR*® standard tests (see page 98) *NANOCOLOR*® *ECO* tests (see page 102) *VISOCOLOR*® *Powder Pillow* tests (see page 82) *VISOCOLOR*® *ECO* tests (see page 76)
Turbidity measurement	Nephelometric turbidity measurement (based on ISO 7027, 16 mm and 24 mm) 1–1000 NTU Accuracy: 1 NTU: 0–2 NTU 4 NTU: 3–5 NTU 100 NTU: 95–105 NTU 400 NTU: 380–420 NTU
Cuvette slot	Tube test 16 mm and 24 mm OD Standard test 10 mm, 20 mm, 40 mm and 50 mm
Data memory	1000 Measured values, 1000 IQC data, 100 scans; GLP-conform
Display	Backlit colored 5" display with touch screen
Operation	Barcode technology; icon-based display menu navigation; capacitive touch screen
Languages	DE / EN / FR / ES / NL / IT / HU / PL / CZ / PT-Br / TK / BG / RO / DK
External light	Insensitive; open cuvette slot
Interfaces	LAN (CAT 6; only use shielded cables with a maximum length of 20 m) 2 x USB (Host), 1 x USB (Function)
Internal quality control	With *NANOCONTROL* NANOCHECK 2.0 and integrated Holmium oxide filter
Protection class	IP 67
Update	Free of charge via USB stick
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 including mains power supply
Dimensions	325 x 280 x 130 mm (L x W x H)
Weight	3.8 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

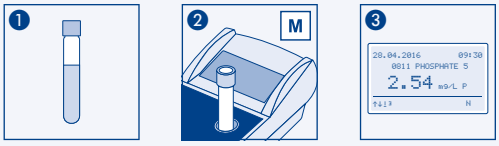
In addition to the preprogrammed methods, the PF-12^{Plus} offers the possibility to create up to 50 special methods for customized applications. Equations up to 4th degree and logarithmic functions can be programmed systematically.

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 164.

Good to know

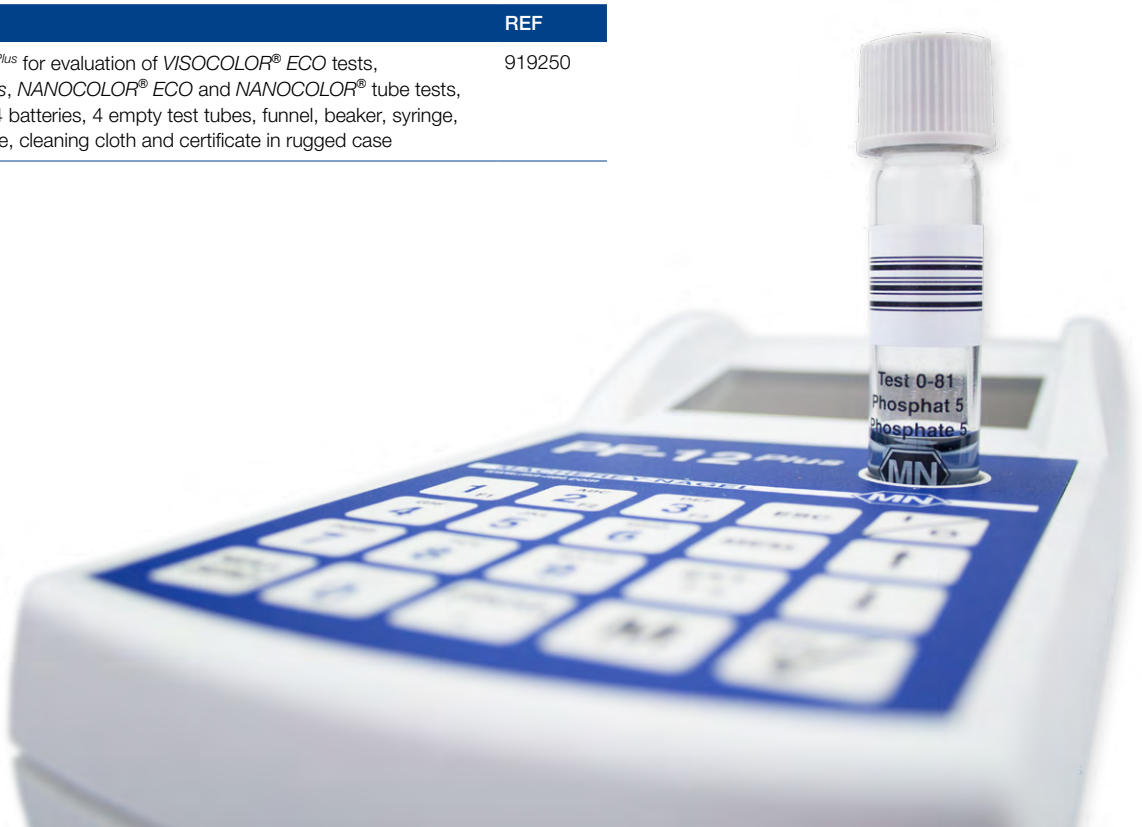
An overview of the *VISOCOLOR® ECO* tests, *VISOCOLOR® Powder Pillows*, *NANOCOLOR® ECO* and *NANOCOLOR®* tubes compatible with the PF-12^{Plus} is given on page 76, page 82, page102 and page 88.

Good to know

Turbidity – a source of error:
Turbidity is often underestimated since it is not always visually recognizable. During each measurement, the PF-12^{Plus} automatically measures the turbidity in the tube and warns the user in case of an interfering turbidity.

Ordering information

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



Safe

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

Mobile

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

Versatile

- Compatible with *NANOCOLOR*® and *VISOCOLOR*® test kits
- NTU-measurement and NTU-check for detection of interfering turbidities
- 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 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
Turbidity measurement	Nephelometric turbidity measurement (based on ISO 7027, 16 mm) 1–1000 NTU Accuracy: 1 NTU: 0–1 NTU, 4 NTU: 3–5 NTU, 100 NTU: 90–110 NTU, 400 NTU: 360–440 NT
Compatible test kits	*VISOCOLOR*® *ECO* tests (see page 76), *VISOCOLOR*® *Powder Pillow* tests (see page 82), *NANOCOLOR*® *ECO* tests (see page 102), *NANOCOLOR*® tube tests (see page 88)
Photometric range	± 3 A
Photometric accuracy	± 1 %
Stability	< 0.002 A/h
Cuvette slot	Tubes 16 mm OD
Data memory	1000 results, GLP conform
Display	Backlit graphic display, 128 x 64 pixels. All important data at a glance: Result with unit, date, time, sample number, sample location, dilution, measuring range control bar
Auto-off function	Inactive or automatic shutdown after 5 min, 10 min, 15 min, 20 min, 60 min
Quality control	With *NANOCONTROL* NANOCHECK 2.0
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-resistantaccording to MIL-STD 810C (test specification 514.2); Waterproof and dustproof according IP 68
Dimensions	215 mm x 100 mm x 65 mm
Weight	0.7 kg
Warranty	2 years
CE	CE certified

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* test kits, *VISOCOLOR® Powder Pillows* and high quality *NANOCOLOR®* tube tests from MACHEREY-NAGEL, the PF-3 is perfectly suited for mobile analysis directly at the place of sampling. Optionally, the device comes in a practical case with pre-equipped test kits, in a cardboard box or in an empty case for the individual combination with our *VISOCOLOR® ECO* test kits.

Small, strong, smart

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

Fast and reliable results

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

Be prepared

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

Good to know

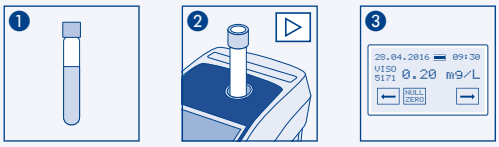
Manifold case solutions are available for the PF-3, which can be individually equipped with test kits. An overview of the available cases is given on page 164.

Good to know

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

How it’s done

Photometric determination with the PF-3



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* tests, *VISOCOLOR® Powder Pillows* 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, *VISOCOLOR® Powder Pillows* and *NANOCOLOR®* tube tests incl. manual, batteries and certificate	919340
Compact photometer PF-3 Soil (NH_4, K, NO_3, PO_4), in a cardboard box for evaluation of *VISOCOLOR® ECO* tests, *VISOCOLOR® Powder Pillows* and *NANOCOLOR®* tube tests incl. manual, batteries and certificate	919341
Compact photometer PF-3 COD (COD), in a cardboard box for evaluation of *NANOCOLOR®* tube tests incl. manual, batteries and certificate	919342
Compact photometer PF-3 Drinking Water (Cl_2, pH, F, Fe, ClO_2), in a cardboard box for evaluation of *VISOCOLOR® ECO* tests, *VISOCOLOR® Powder Pillows* and *NANOCOLOR®* tube tests incl. manual, batteries and certificate	919343
Compact photometer PF-3 Fish (NH_4, Cl_2, pH, Fe, SiO_2, PO_4, NO_3, NO_2, O_2, Cu), in a cardboard box for evaluation of *VISOCOLOR® ECO* tests, *VISOCOLOR® Powder Pillows* and *NANOCOLOR®* tube tests incl. manual, batteries and certificate	919345

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

Devices

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	*VISOCOLOR® ECO* tests (see page 76) *VISOCOLOR® Powder Pillows* (see page 82) *NANOCOLOR®* tube tests (see page 88)
Cuvette slot	Tubes 16 mm OD
Memory	50 results
Display	Backlit graphic display, 128 x 64 pixels, all important data at a glance: result with unit, date, time
Auto-off function	Inactive or automatic shutdown after 5 min, 10 min, 15 min, 20 min
Quality control	With *NANOCONTROL* NANOCHECK 2.0
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

NANOCOLOR® TIC-Ex

Removal of inorganic carbon in TOC analysis

The *NANOCOLOR*® TIC-Ex is required during the sample preparation of MACHEREY-NAGEL TOC tube tests. For evaluation of the total organic carbon (TOC) prior to determination, the inorganic carbon needs to be removed from the sample. The removal is accomplished by purging of air with the help of the *NANOCOLOR*® TIC-Ex through the prepared sample solution.

The acidified sample solutions are put into the cuvette holder and placed in the premarked positions of the *NANOCOLOR*® TIC-Ex. The preinstalled pipette tips are dipped into the sample solutions by pressing down the lowering mechanism of the *NANOCOLOR*® TIC-Ex. After switching on the device, air is automatically purged through the sample solutions in the cuvettes for five minutes. Hereby the inorganic carbon is removed as carbon dioxide quantitatively. After the elapsed time the process stops automatically. The pipette tips are removed from the solutions and can be disposed using the removing mechanism on top. Afterwards the sample solutions are treated following the next steps of the respective TOC test kit.

Good to know

The *NANOCOLOR*® TIC-Ex can be used even for very hard waters with up to 48° d and therefore is superior to other methods for TIC removal. To check the carbonate hardness of your samples, we recommend QUANTOFIX® carbonate hardness (REF 91323).

Ordering information

Description	REF
NANOCOLOR® TIC-Ex Device for removal of TIC, incl. cuvette holder, manual, mains adapter and certificate in a cardboard box	916993

Technical data

TIC-Ex	
Type	Device for removal of TIC
Operation	Via two buttons
Operating range	5–40 °C, 20–80 % relative humidity (non-condensing)
Power supply	9 V DC / 2.0 A
Dimensions	350 x 300 x 235 mm
Weight	4.95 kg
Warranty	2 years
CE	CE certified

NANOCOLOR® Sipper module

Dealing with large sample numbers in photometric analysis often requires a lot of time and resources due to the preparation of the samples in different cuvettes and the frequent changes of the cell in the photometer. The sipper module *NANOCOLOR*® FP-200 is an optional accessory for the spectrophotometers *NANOCOLOR*® *VIS* II and *UV/VIS* II, which can significantly reduce the analysis effort for high sample quantities. A constant amount of liquid is pumped through a flow cell (2 mm, 10 mm or 50 mm) in the photometer and the absorbance is measured automatically. As the same optical conditions apply to both the zero measurement and the measurement of the sample, the measuring accuracy can be improved by working with the *NANOCOLOR*® FP-200.

Good to know

Using the sipper module, the danger of direct contact with chemicals is drastically reduced. A recasting of samples into the cuvettes is no longer necessary.

Ordering information

Description	REF
Sipper module *NANOCOLOR*® FP-200 for *NANOCOLOR*® *UV/VIS* II and *NANOCOLOR*® *VIS* II incl. manual, USB cable, tygon-tubing set with adapters, intake needle and certificate	919180

Technical data

FP-200	
Type	Peristaltic pump
Operation	Fully automatic using the spectrophotometers *NANOCOLOR*® *VIS* II and *UV/VIS* II
Housing	Protection rating IP 30
Interfaces	USB B
Additional information	Wavelength range - 340 nm–900 nm (plastic), 190 nm–900 nm (quartz glass)
Pumping capacity	1 mL/s
Power supply	Via USB cable, 5 V, 500 mA
Operating range	10–40 °C max. 80 % relative humidity (non-condensing)
Dimensions	125 x 177 x 69 mm
Weight	365 g
Warranty	2 years
CE certified	Yes

NANOCONTROL

Analytical quality control for the entire analysis system

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

Checking the photometric accuracy

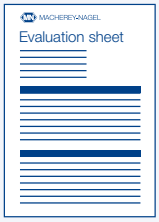
NANOCONTROL NANOCHECK 2.0 is used as secondary standard for the determination of photometric accuracy and linearity. It is a crucial tool for the inspection of spectrophotometers and filter photometers, besides the use of standards and spiking solutions. Two different colored solutions are included in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

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

Checking the turbidity calibration

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

Good to know



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

Ordering information

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

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

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 module *NANOCOLOR*® FP-200 for instance enables timesavings and increased accuracy for standard tests with high sample throughput. The user receives all accessories from a single source ensuring compatibility with the different photometers at all times.

Ordering information

Description	REF	Content
Transport cases for photometers		
Transport case for spectrophotometer *NANOCOLOR*® UV/VIS II	919624	1 piece
Transport case for spectrophotometer *NANOCOLOR*® *VIS* II	919652	1 piece
Transport case for spectrophotometer *NANOCOLOR*® Advance	919757	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	919841.2	1 piece
Special filter incl. ex-factory installation (wavelengths on request)	919850.2	1 piece
Handheld scanner		
Handheld scanner for *NANOCOLOR*® spectrophotometers	919134	1 piece
Sipper		
Sipper module *NANOCOLOR*® FP-200 for *NANOCOLOR*® UV/VIS II and *NANOCOLOR*® *VIS* II incl. manual, USB cable, tygon-tubing set with adapters, intake needle and certificate	919180	1 piece
Tubing set for sipper module *NANOCOLOR*® FP-200 consisting of tygon-tube set with adapters and pump tubing with pre-installed fittings	919181	1 piece
Support stand for *NANOCOLOR*® FP-200	919143	1 piece
Manuals		
Manual (quick start guide) for *NANOCOLOR*® *VIS* II and UV/VIS II	919601	1 piece
Manual (quick start guide) for *NANOCOLOR*® Advance	919754	1 piece
Manual for photometer PF-12*Plus*	919252	1 piece
Manual for photometer PF-3	919392	1 piece
VISOCOLOR® *ECO* test instructions for photometer PF-3	934001	1 piece
VISOCOLOR® *ECO* test instructions for photometer PF-12*Plus*	931503	1 piece
Manual for Sipper module *NANOCOLOR*® FP-200	919182	1 piece
Lamps		
Halogen lamp for *NANOCOLOR*® *VIS* II and UV/VIS II	919604	1 piece
Halogen lamp for *NANOCOLOR*® Advance	919759	1 piece
Deuterium lamp for *NANOCOLOR*® UV/VIS II	919603	1 piece
Tungsten lamp for *NANOCOLOR*® 500 D / 400 D / 350 D / 300 D / 250 D / PT-3	919787	1 piece
Cuvettes		
Calibration cuvette 16 mm for *NANOCOLOR*® photometers	916908	1 piece
Calibration cuvette 24 mm for *NANOCOLOR*® Advance	916930	1 piece
Flow cuvette, quartz glass, 2 mm optical path, for *NANOCOLOR*® UV/VIS and UV/VIS II	919127	1 piece
Flow cuvette, quartz glass, 10 mm optical path, for *NANOCOLOR*® UV/VIS II	919626	1 piece
Flow cuvette, optical glass, 10 mm optical path, for *NANOCOLOR*® *VIS*, *VIS* II and UV/VIS II	919158	1 piece
Flow cuvette, quartz glass, 50 mm optical path, for *NANOCOLOR*® *VIS*, *VIS* II and UV/VIS II	919149	1 piece

[1] Required additionally: Cable set, REF 919133 ;
[2] Required additionally: Mains adaptor, REF 91906
[3] Required additionally for PF-3: Mini USB-cable, REF 919390

Accessories for photometers

Description	REF	Content
Quartz glass cuvette, 2 mm optical path, for *NANOCOLOR*® UV/VIS and UV/VIS II	919122	1 piece
Quartz glass cuvette, 10 mm optical path, for *NANOCOLOR*® UV/VIS and UV/VIS II	919120	1 piece
Quartz glass cuvette, 50 mm optical path, for *NANOCOLOR*® UV/VIS and UV/VIS II	919121	1 piece
Glass cuvettes, 5 mm optical path	91932	2 pieces
Glass cuvettes, 10 mm optical path	91933	2 pieces
Glass cuvettes, 20 mm optical path	91934	2 pieces
Glass cuvette, 50 mm optical path	91935	1 piece
Semi-micro cuvette, 50 mm optical path	91950	1 piece
Lids for glass cuvettes, 10 mm	91941	2 pieces
Lids for glass cuvettes, 50 mm	91940	2 pieces
Disposable plastic cuvettes, 10 mm optical path	91937	100 pieces
Fixing for 10 mm cuvette for *NANOCOLOR*® Advance, *VIS* II, UV/VIS and UV/VIS II	919136	1 piece
Test tubes, 16 mm OD	91680	20 pieces
Test tubes, 24 mm OD	936101	6 pieces
Cuvette adapter A and B for 10, 16, 20, 50 mm and 24 mm cuvettes for *NANOCOLOR*® Advance	919752	1 piece
Cover		
Cover for cuvette slot for *NANOCOLOR*® UV/VIS II	919606	1 piece
Cover for cuvette slot for *NANOCOLOR*® *VIS* II	919654	1 piece
Cover for cuvette slot for *NANOCOLOR*® Advance	919753	1 piece
Protective coverings		
Protective covering for *NANOCOLOR*® UV/VIS II	919605	1 piece
Protective covering for *NANOCOLOR*® *VIS* II	919651	1 piece
Protective covering for *NANOCOLOR*® Advance	919751	1 piece
Protective covering for *NANOCOLOR*® 500 D / 400 D / 350 D	91918	1 piece
Printer		
NANOCOLOR® thermal printer for photometer *NANOCOLOR*® *VIS* II and UV/VIS II (incl. mains adapter and manual)	919655	1 piece
NANOCOLOR® thermal printer for *NANOCOLOR*® UV/VIS [1) 2)] / VIS [1) 2)] / 500 D / 400 D / 350 D / 300 D / 250 D and photometer PF-11 [2)] (incl. printer cable, without mains adapter)	91916	1 piece
Printer paper rolls for *NANOCOLOR*® thermal printer for *NANOCOLOR*® *VIS* II / UV/VIS II, 79 mm width, core 12 mm, OD 80 mm	919656	3 pieces
Software		
NANOCOLOR® software for Linus / 500 D / 400 D / 350 D / 300 D / 250 D / PF-12*Plus* / PF-12 / BioFix® Lumi-10	91902	1 piece
Accessories for data transfer		
USB cable AA for *NANOCOLOR*® 500 D	919686	1 piece
USB cable AB for *NANOCOLOR*® *VIS* / *VIS* II / UV/VIS / UV/VIS II / *VARIO 4* / *VARIO C2* / PF-12*Plus* / PF-12 / FP-200	919687	1 piece
LAN cable (1.5 m) for *NANOCOLOR*® Advance, *VIS* II and UV/VIS II	919682	1 piece
Mini USB cable for photometer PF-3 and *VARIO Mini*	919390	1 piece
Zero modem cable, serial, 2x9 pin SUB-D socket, for *NANOCOLOR*® 500 D / 400 D / 350 D / 300 D / 250 D / PT-3 / PF-10 / PF-11 and BioFix® Lumi-10	919773	1 piece
Adaptor, 9 pin SUB-D-plug to 25 pin SUB-D socket	919681	1 piece
NANOCOLOR® USB stick for *NANOCOLOR*® Advance, *VIS* II / UV/VIS II / *VARIO Mini*	919123	1 piece
NANOCOLOR® USB stick for *NANOCOLOR*® *VIS* / UV/VIS / *VARIO 4* / *VARIO C2* / *VARIO C2 M* / *VARIO HC*	919119	1 piece
Power supply		
Mains adaptor for *NANOCOLOR*® Advance, VIS, *VIS* II and *VARIO Mini*	919156	1 piece

[1)] Required additionally: Cable set, REF 919133 ;
[2)] Required additionally: Mains adaptor, REF 91906
[3)] Required additionally for PF-3: Mini USB-cable, REF 919390

Accessories for photometers

Description	REF	Content
USB mains adaptor for photometer PF-12^{Plus} / PF-12 / PF-3 [3]	919220	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	91906	1 piece
Rechargeable battery pack for photometer PF-12^{Plus} / PF-12	919201	1 piece
Rechargeable battery pack for photometer PF-3	919391	1 piece
Battery charger for photometer PF-3 / PF-12^{Plus} / PF-12 / PF-11 / PF-10, incl. 4 rechargeable batteries	919221	1 piece

[1] Required additionally: Cable set, REF 919133 ;
[2] Required additionally: Mains adaptor, REF 91906
[3] Required additionally for PF-3: Mini USB-cable, REF 919390

NANOCOLOR® *VARIO 4*, *VARIO C2* and *VARIO C2 M*

Heating blocks for reliable digestions

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

The small one and the big one

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

Extremely versatile and maximally secure

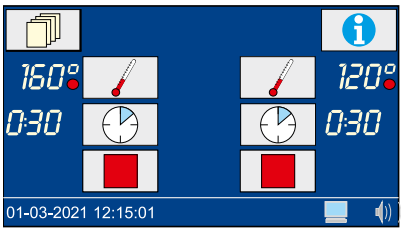
In addition to the preprogrammed temperatures and heating times, a large number of user-specific digestion methods can be stored. The USB and RS232 interfaces allow an easy connection to a PC and enable the convenient linkage to the *NANOCONTROL* inspection equipment monitoring tools. The graphical representation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

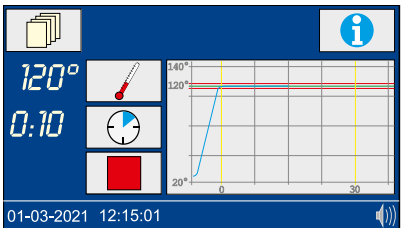
Temperature testing and calibration

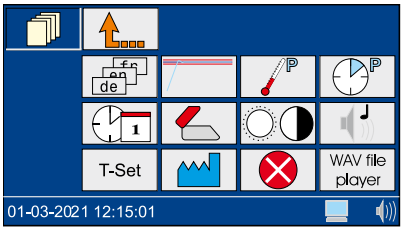
A temperature test can be performed using the *NANOCOLOR*® T-Sets to safeguard results against authorities and supervisors. The free PC software of the heating blocks facilitates checking of temperatures and the creation of the respective reports. After measurement data transfer via the interfaces using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

Good to know

The *NANOCOLOR*® USB 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*® USB T-Set see page 150.







Suitable for all *NANOCOLOR*® digestion methods

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

NANOCOLOR® *VARIO 4*, *VARIO C2* and *VARIO C2 M*

Easy

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

Fast

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

Secure

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

Ordering information

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

NANOCOLOR® *VARIO 4*, *VARIO C2* and *VARIO C2 M*

Technical data

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

Compact heating block for mobile analysis

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

Simply clever

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

Good to know

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

Ordering information

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

Technical data

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

NANOCOLOR® VARIO HC

Heating block for fast digestions

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

Simply fast

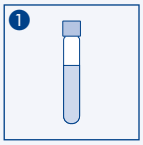
Thanks to the intelligent linkage of heating-up, digestion and cooling-down the *NANOCOLOR® VARIO HC* allows the performance of a COD test in less than 45 minutes. The readily prepared cuvettes are directly inserted into the cold heating block, which means an additional time saving for the user as the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

Approved and versatile

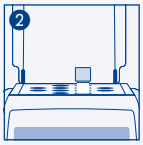
In addition to the cooling function, the *NANOCOLOR® VARIO HC* comes with all features provided by our proven heating blocks *NANOCOLOR® VARIO 4* and *VARIO C2*. Naturally, this includes the possibility of checking and calibrating the temperature with the *NANOCOLOR®* T-Sets, thus fulfilling the requirements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

How it's done

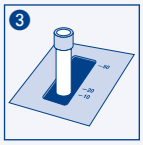
Heating and cooling



Prepare sample



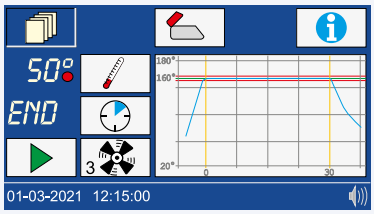
Digestions and cooling in *VARIO HC*



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	919330

Technical data

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

NANOCOLOR® T-Set and USB T-Set

Analytical quality control for the entire analysis system

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

Independent self-control

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

Data transfer and documentation

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

Now with temperature display

The new *NANOCOLOR*® USB T-Set is 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

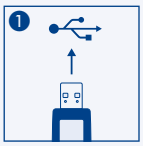
The *NANOCOLOR*® T-Sets can be used also for external temperature measurements, e.g. for the determination of the sample temperature.

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

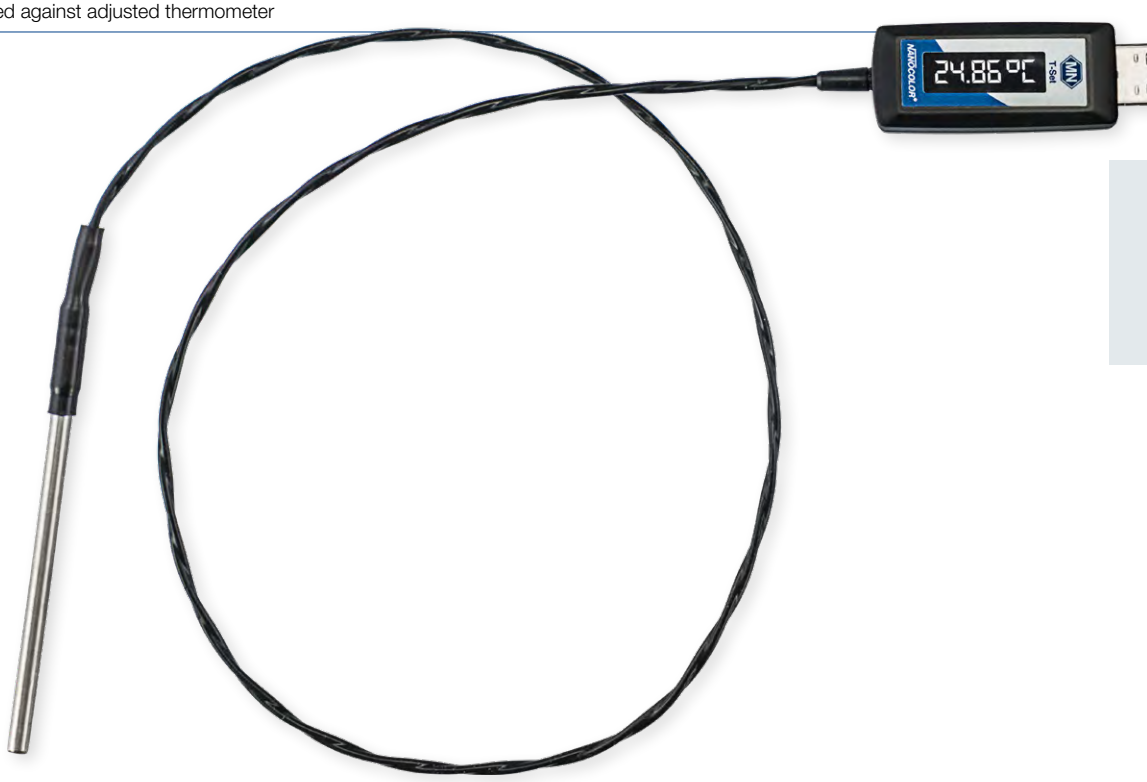
Ordering information

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*	919917
NANOCOLOR® USB T-Set for electronic temperature control and calibration of the heating blocks *NANOCOLOR*® *VARIO 4* / *VARIO C2* / *VARIO C2 M* / *VARIO HC* / *VARIO Mini* [1)]	919921

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

Technical data

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



Accessories for heating blocks

The complete analytics from a single source

MACHEREY-NAGEL heating blocks represent an important corner stone of the *NANOCOLOR*® analytical system. By the perfect combination of test kits, heating blocks and photometers, the user is well equipped for daily laboratory analysis. In addition to the digestion for the classical parameters such as COD and phosphate, some customers require special solutions, e.g. for the digestion of metals using *NanOx* Metal. The accessories required for this purpose are available as a complete package from MACHEREY-NAGEL. For an overview of available digestion reagents see page 110. All this ensures the compatibility of the equipment and a reliable analysis.

Good to know

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

Accessories

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

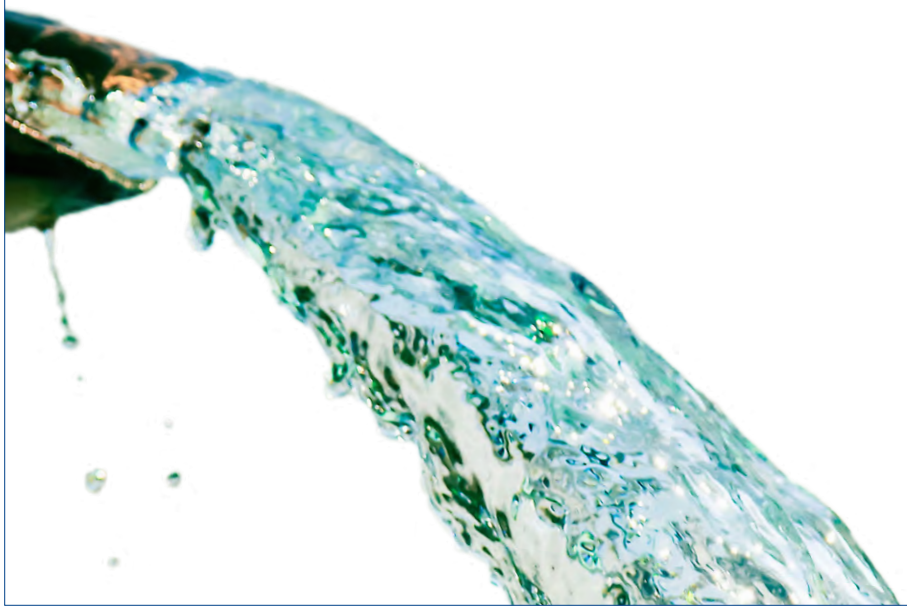
[1)] For information about an external battery for *NANOCOLOR*® *VARIO Mini*, please contact MACHEREY-NAGEL.

NANOCOLOR® COD test kits

Safe, safer, the safest

Reliable COD analysis

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



QUANTOFIX® Relax

Reflectometer for evaluation of test strips

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

Excellent usability

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

Quantitative results

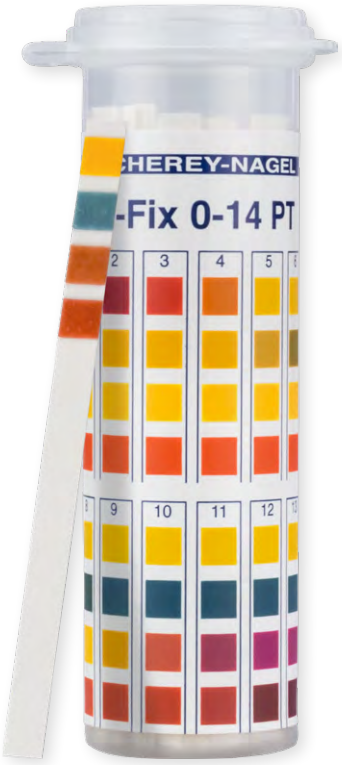
The optics of the QUANTOFIX® Relax has been proven for years in medical technology and supplies secure and standardized values. Thereby an accuracy of ≤ 10 % is achieved for many parameters; a hardly achieved level in the analysis of test strips, yet. The evaluation with the QUANTOFIX® Relax is not interfered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

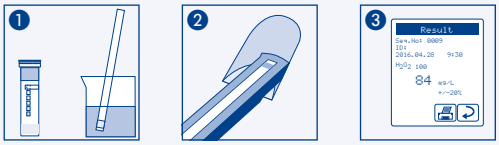
Good to know

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	91346

Accessories

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

Objective

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

Easy

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

Safe

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

Technical data

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

BioFix® Lumi-10

Compact luminometer for mobile use

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

Incredibly versatile

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

Individually programmable

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

Good to know

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

Ordering information

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

Accessories

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

Technical data

BioFix® Lumi-10	
Type	Luminometer
Optics	Ultra-Fast Single Photon Counter
Wavelengths range	380 nm–630 nm
Software	Microprocessor software
Measuring modes	3 preprogrammed tests, 6 free programmable methods, % inhibition, % stimulation, RLU
Cuvette holder	Cuvettes 12 mm OD
Data storage	2000 results
Display	Backlit graphic display (128 x 64 pixel)
Operation	Foil covered push buttons
Languages	DE / EN
Interface	USB 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


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	931301	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	931304	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	914353	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)	934118	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)	934119	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 environmental analysis
–	4–60 mg/L NO_3^-	110	
–	0.02–0.50 mg/L NO_2^-	120	
pH: 4.0 · 5.0 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0	–	450	
–	0.2–5.0 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)	934124	340 x 275 x 83 mm	Drinking water	■	■		*VISOCOLOR*® *ECO* Chlorine 2, free + total *VISOCOLOR*® *ECO* Chlorine dioxide *VISOCOLOR*® *ECO* Iron 2 *VISOCOLOR*® *ECO* Fluoride *VISOCOLOR*® *ECO* pH 6.0–8.2
■ *VISOCOLOR*® Reagent case with PF-3 Drinking Water (Cl_2 solid)	934125	340 x 275 x 83 mm	Drinking water	■	■		*VISOCOLOR*® *ECO* Chlorine 6, free + total *VISOCOLOR*® *ECO* Chlorine dioxide *VISOCOLOR*® *ECO* Iron 2 *VISOCOLOR*® *ECO* Fluoride *VISOCOLOR*® *ECO* pH 6.0–8.2
■ Reagent case *VISOCOLOR*® School	933100	275 x 230 x 83 mm	Schools	■			*VISOCOLOR*® School Ammonium *VISOCOLOR*® School Total hardness *VISOCOLOR*® School Nitrate *VISOCOLOR*® School Nitrite *VISOCOLOR*® School pH 4.0–9.0 *VISOCOLOR*® School Phosphate
■ Reagent case *VISOCOLOR*® Fish	933101	275 x 230 x 83 mm	Fishing waters	■			*VISOCOLOR*® Fish Ammonium *VISOCOLOR*® Fish Total hardness *VISOCOLOR*® Fish Nitrate *VISOCOLOR*® Fish Nitrite *VISOCOLOR*® Fish pH 4.0–9.0 *VISOCOLOR*® Fish Phosphate
■ Reagent case *VISOCOLOR*® Fish with PF-3 Fish	934127	395 x 295 x 106 mm	Fishing waters	■	■		QUANTOFIX® Chloride QUANTOFIX® Multi-stick for aquarium owners *VISOCOLOR*® *ECO* Ammonium 3 *VISOCOLOR*® *ECO* Chlorine 6, free + total *VISOCOLOR*® *ECO* Iron 2 *VISOCOLOR*® *ECO* Silica *VISOCOLOR*® *ECO* Copper *VISOCOLOR*® *ECO* Nitrate *VISOCOLOR*® *ECO* Nitrite *VISOCOLOR*® *ECO* pH 6.0–8.2 *VISOCOLOR*® *ECO* Phosphate *VISOCOLOR*® *ECO* Oxygen *VISOCOLOR*® *HE* Alkalinity AL 7 *VISOCOLOR*® *HE* Phosphate
■ *VISOCOLOR*® Reagent case for soil analysis, with accessories	931601	500 x 420 x 175 mm	Soil	■			pH-Fix 2.0–9.0 QUANTOFIX® Ammonium QUANTOFIX® Nitrate/Nitrite *VISOCOLOR*® *ECO* Potassium *VISOCOLOR*® *HE* pH 4.0–10.0 *VISOCOLOR*® *HE* Phosphate
■ *VISOCOLOR*® Reagent case for soil analysis with PF-3 Soil, with accessories	934220	500 x 420 x 175 mm	Soil	■	■		pH-Fix 2.0–9.0 QUANTOFIX® Nitrate/Nitrite *VISOCOLOR*® *ECO* Ammonium 3 *VISOCOLOR*® *ECO* Potassium *VISOCOLOR*® *ECO* Nitrate *VISOCOLOR*® *ECO* Phosphate
■ *VISOCOLOR*® Reagent case for soil analysis with PF-3 Soil	934210	340 x 275 x 83 mm	Soil	■	■		*VISOCOLOR*® *ECO* Ammonium 3 *VISOCOLOR*® *ECO* Potassium *VISOCOLOR*® *ECO* Nitrate *VISOCOLOR*® *ECO* Phosphate

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

Reagent cases for special applications

Measuring range (visual)	Measuring range (photometric)	Number of tests	Reagent cases
–	0.10–2.00 mg/L Cl_2	150	*VISOCOLOR*®
–	0.20–3.80 mg/L ClO_2	150	Reagent case with PF-3
–	0.04–2.00 mg/L Fe	100	Drinking Water (Cl_2 liquid)
–	0.1–2.0 mg/L F^-	150	
–	pH 6.1–8.4	150	
–	0.05–6.00 mg/L Cl_2	200	*VISOCOLOR*®
–	0.20–3.80 mg/L ClO_2	150	Reagent case with PF-3
–	0.04–2.00 mg/L Fe	100	Drinking Water (Cl_2 solid)
–	0.1–2.0 mg/L F^-	150	
–	pH 6.1–8.4	150	
0 · 0.2 · 0.5 · 1 · 3 mg/L NH_4^+	–	50	Reagent case
1 drop equals 1.25 °e	–	50	*VISOCOLOR*® School
0 · 1 · 5 · 10 · 20 · 50 · 90 mg/L NO_3^-	–	50	
0 · 0.02 · 0.05 · 0.1 · 0.2 · 0.5 mg/L NO_2^-	–	50	
pH: 4.0 · 5.0 · 6.0 · 7.0 · 8.0 · 9.0	–	50	
0 · 0.5 · 1.5 · 3 · 6 · 15 mg/L PO_4^{3-}	–	50	
0 · 0.2 · 0.5 · 1 · 3 mg/L NH_4^+	–	50	Reagent case
1 drop equals 1.25 °e	–	50	*VISOCOLOR*® Fish
0 · 1 · 5 · 10 · 20 · 50 · 90 mg/L NO_3^-	–	50	
0 · 0.02 · 0.05 · 0.1 · 0.2 · 0.5 mg/L NO_2^-	–	50	
pH: 4.0 · 5.0 · 6.0 · 7.0 · 8.0 · 9.0	–	50	
0 · 0.5 · 1.5 · 3 · 6 · 15 mg/L PO_4^{3-}	–	50	
0 · 500 · 1000 · 1500 · 2000 · ≥ 3000 mg/L Cl^-	–	100	Reagent case
Total hardness: 0 · 6.3 · 12.5 · 18.8 · 25.0 · 31.3 °e	–	100	*VISOCOLOR*® Fish with
Carbonate hardness: 0 · 3.8 · 7.5 · 12.5 · 18.8 · 25.0 °e	–	100	PF-3 Fish
pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.0 · 8.4	–	100	
–	0.1–2.5 mg/L NH_4^+	50	
–	0.05–6.00 mg/L Cl_2	200	
–	0.04–2.00 mg/L Fe	100	
–	0.2–3.0 mg/L SiO_2	80	
–	0.1–5.0 mg/L Cu^{2+}	100	
–	4–60 mg/L NO_3^-	110	
–	0.02–0.50 mg/L NO_2^-	120	
–	pH 6.1–8.4	100	
–	0.2–5.0 mg/L PO_4-P	80	
–	1–8 mg/L O_2	50	
0.2–7.2 mmol/L OH^- (1 syringe filling)	–	200	
0.0 · 0.05 · 0.10 · 0.15 · 0.20 · 0.3 · 0.4 · 0.6 · 0.8 · 1.0 mg/L PO_4-P	–	300	
pH: 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0	–	100	*VISOCOLOR*®
0 · 10 · 25 · 50 · 100 · 200 · 400 mg/L NH_4^+	–	100	Reagent case for soil
Nitrate: 0 · 10 · 25 · 50 · 100 · 250 · 500 mg/L NO_3^-	–	100	analysis, with accessories
Nitrite: 0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO_2^-	–	100	
2 · 3 · 4 · 6 · 8 · 10 · 15 mg/L K^+	–	60	
pH: 4.0 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 10.0	–	500	
0.0 · 0.05 · 0.10 · 0.15 · 0.20 · 0.3 · 0.4 · 0.6 · 0.8 · 1.0 mg/L PO_4-P	–	100	
pH: 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0	–	100	*VISOCOLOR*®
Nitrate: 0 · 10 · 25 · 50 · 100 · 250 · 500 mg/L NO_3^-	–	100	Reagent case for soil
Nitrite: 0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO_2^-	–	100	analysis with PF-3 Soil,
–	0.1–2.5 mg/L NH_4^+	50	with accessories
–	2–25 mg/L K^+	60	
–	4–60 mg/L NO_3^-	110	
–	0.2–5.0 mg/L PO_4-P	80	
–	0.1–2.5 mg/L NH_4^+	50	*VISOCOLOR*®
–	2–25 mg/L K^+	60	Reagent case for soil
–	4–60 mg/L NO_3^-	110	analysis with PF-3 Soil
–	0.2–5.0 mg/L PO_4–P	80	

Reagent cases for individual solutions

Compact laboratories for mobile analysis

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

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

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

Therefore, the reagent cases for individual solutions are 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	913990	280 x 220 x 80 mm					
VISOCOLOR® *ECO* Reagent case	931303	340 x 275 x 83 mm					
VISOCOLOR® Reagent case	931305	450 x 360 x 140 mm					■
VISOCOLOR® Reagent case with PF-3 Pool	934102	340 x 275 x 83 mm					
VISOCOLOR® Reagent case with PF-3 Drinking Water	934402	340 x 275 x 83 mm					
VISOCOLOR® Reagent case with PF-3 Soil	934202	340 x 275 x 83 mm					
VISOCOLOR® Reagent case with PF-3 Fish	934602	340 x 275 x 83 mm					
VISOCOLOR® Reagent case with PF-12^{Plus}	914351	450 x 360 x 140 mm					■
NANOCOLOR® Reagent case with PF-3 COD	919212	534 x 427 x 207 mm	■	■	■	■	
NANOCOLOR® Reagent case with PF-12^{Plus}	919214	534 x 427 x 207 mm	■	■	■	■	

Reagent cases for individual solutions

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

Accessories for reagent cases

The complete analysis from one source

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

Good to know

For general accessories for the *VISOCOLOR*® reagent cases see page 84

Ordering information

Description	REF	Content	GHS
Accessories for Reagent case *VISOCOLOR*® School			
VISOCOLOR® School refill pack	933200	1 piece	
VISOCOLOR® School color scale	933300	1 piece	
VISOCOLOR® School manual	933150	1 piece	
Accessories for Reagent case *VISOCOLOR*® Fish			
VISOCOLOR® Fish refill pack	933201	1 piece	
VISOCOLOR® Fish color scale	933301	1 piece	
VISOCOLOR® Fish manual for reagent case *VISOCOLOR*® Fish	933151	1 piece	
VISOCOLOR® Fish manual for reagent case *VISOCOLOR*® Fish with PF-3 Fish	933161	1 piece	
Accessories for *VISOCOLOR*® Reagent cases for soil analysis			
100 mL $CaCl_2$ stock solution	914612	3 pieces	■
100 mL CAL stock solution	914614	4 pieces	
Reagent set *VISOCOLOR*® *HE* Phosphorus in soil	920183	1 piece	■
Color chart *VISOCOLOR*® *HE* Phosphorus in soil	920383	1 piece	
30 mL pyrophosphate solution	914611	3 pieces	
Folded filters MN 616 1/4, 18.5 cm Ø	532018	100 pieces	
Soil sieve (2 mm mesh size)	914650	1 piece	
Plastic bottle 500 mL with spraying attachment	91689	1 piece	
Balance 250 g	914651	1 piece	
Sample beaker 250 mL	914652	5 pieces	
Wide neck bottles 500 mL for soil samples	914653	5 pieces	
Shaking bottle 300 mL	914654	5 pieces	
Measuring cylinder 100 mL with base	914655	2 pieces	
Plastic scoop	914656	1 piece	
Funnel 80 mm Ø, plastic	914657	3 pieces	
Sedimentation tubes with screw caps	914659	2 pieces	
Syringe 10 mL with tube	914660	1 piece	
Manual for *VISOCOLOR*® Reagent cases for soils analysis	914602	1 piece	
Thermometer -10 °C to +60 °C	914497	1 piece	

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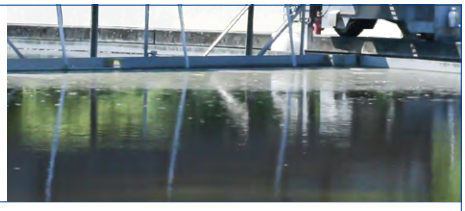
NANOCOLOR® Reagent case
Mobile analysis for sewage plants



Mobile photometric analysis

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

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