

Visual test kits



VISOCOLOR®

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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	Molybdenum phosphorous blue
■ Residual hardness	935080	0.00 · 0.05 · 0.10 · 0.19 · 0.38 °e	200	1 year	Mixed indicator
■ Total hardness	935042	1 drop equals 1.25 °e	100	1.5 years	Complexometric titration

¹⁾ Please see the instruction leaflet.

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



	Colorimetric	Titrimetric	Sea water "	GHS	Test	
	■		■	■	■	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 130) and PF-12^{Plus} (see page 128). This enables a quantitative evaluation of the test kit.

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

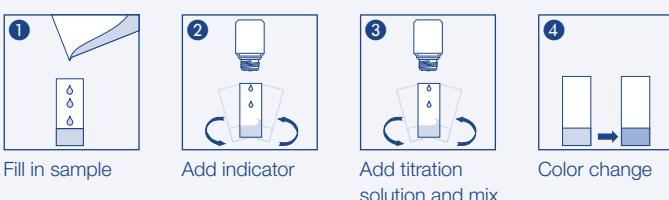
All VISOCOLOR® ECO test kits are delivered in a practical cardboard box with plastic inlay and easy to understand instruction manual. In addition, pictogram instructions are available for every test kit on the MACHEREY-NAGEL website.

How it's done

Colorimetric



Titrimetric



Good to know

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



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

Easy

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

Safe

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

Unique

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



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

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

¹⁾ Please see the instruction leaflet.

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

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

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

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refill: Refill pack

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

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.

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refill.: Refill pack

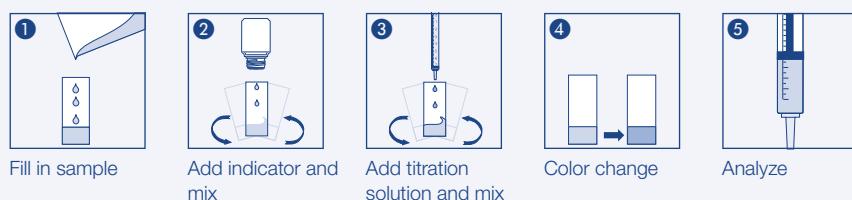
How it's done



Colorimetric



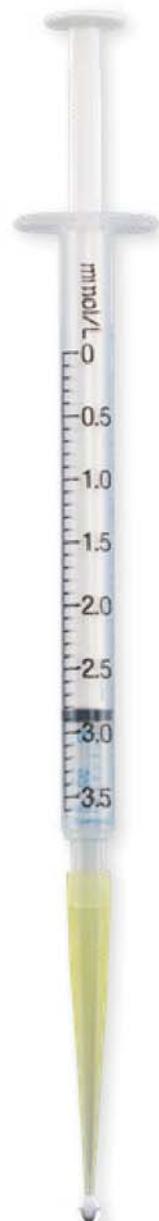
Titrimetric



Method

Colorimetric
Titrimetric
Sea water
GHS
Test

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



VISOCOLOR® Powder Pillows

Photometric reagent Powder Pillows

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

Good to know

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



How it's done

Application VISOCOLOR® Powder Pillows



Ordering information

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

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

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

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

Easy

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

Safe

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

Unique

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

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



VISOCOLOR® accessories

The complete analysis from one source

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

Good to know



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

Ordering information

Description	REF	Content	GHS
Inspection solutions			
■ VISOCOLOR® Color standards Chlorine for checking consistent instrument response of NANOCOLOR® uv/vis II, VIS II, PF-12 ^{Plus} and PF-3	914820	4 solutions	
Accessories			
■ Measuring glasses for VISOCOLOR® ECO with screw caps	931151	10 pieces	
■ Slide comparator for VISOCOLOR® ECO	931152	2 pieces	
■ Color comparison chart for VISOCOLOR® ECO (REF end No. see test kit)	9314..	1 piece	
■ Titration test tube with 5-mL-marking	915499	1 piece	
■ Sample bottle 30 mL for oxygen determination	915498	1 piece	
■ Sample beaker 25 mL	914498	1 piece	
■ Sample tube with 10-/20-mL-marking	914496	1 piece	
■ Measuring tube 25–200 mg/L Sulfate	914495	1 piece	
■ Measuring tube 2–15 mg/L Potassium	914444	1 piece	
■ Test tubes 16 mm OD	91680	20 pieces	
■ Plastic spoon (measuring spoon) black, 85 mm	914663	10 pieces	
■ Plastic spoon (measuring spoon) orange, 85 mm	914664	10 pieces	
■ Plastic spoon (measuring spoon) black, 70 mm	914492	10 pieces	
■ VISOCOLOR® ECO test instructions for photometer PF-12 ^{Plus}	931503	1 piece	
■ VISOCOLOR® ECO test instructions for photometer PF-12	931501	1 piece	
■ VISOCOLOR® ECO test instructions for photometer PF-3	934001	1 piece	
■ VISOCOLOR® ECO test instructions for visual determination	931502	1 piece	
■ Additive reagent Z-1 to eliminate copper ions prior determination of total hardness	931929	30 mL	
■ Measuring tube for VISOCOLOR® HE with screw cap	920401	10 pieces	
■ Comparator block for VISOCOLOR® HE	920402	1 piece	
■ Color comparison disk for VISOCOLOR® HE (REF end No. see test kit)	9203..	1 piece	
■ Spare syringes for VISOCOLOR® HE (REF end No. see test kit)	9154..	2 pieces	
■ Thermometer -10 °C to +60 °C	914497	1 piece	

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



VISOCOLOR®

Color standards Chlorine



Simplest photometer control

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



Photometric tests



NANOCOLOR®

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NANOCOLOR® tube tests

Precise rapid tests for photometric water analysis

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

Ideally packed

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

The perfect test for every user

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

Good to know

Certificate



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

Good to know

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



Easy

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

Safe

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

Reliable

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

ISO conform COD tests

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

Time-saving and reliable analysis of total nitrogen

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

Good to know

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



NANOCOLOR® tube tests

Ordering information

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

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

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

²⁾ Decomposition only possible in microwave.

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

⁴⁾ Without barcode.

⁵⁾ Please see the instruction leaflet.

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

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

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

NANOCOLOR® tube tests

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

NANOCOLOR® tube tests

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

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

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

²⁾ Decomposition only possible in microwave.

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

⁴⁾ Without barcode.

⁵⁾ Please see the instruction leaflet.

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

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

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

NANOCOLOR® tube tests

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

NANOCOLOR® tube tests

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

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).

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NANOCOLOR® tube tests

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

NANOCOLOR® robot tests

Fully automated water analysis

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

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

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

Good to know

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



Ordering information

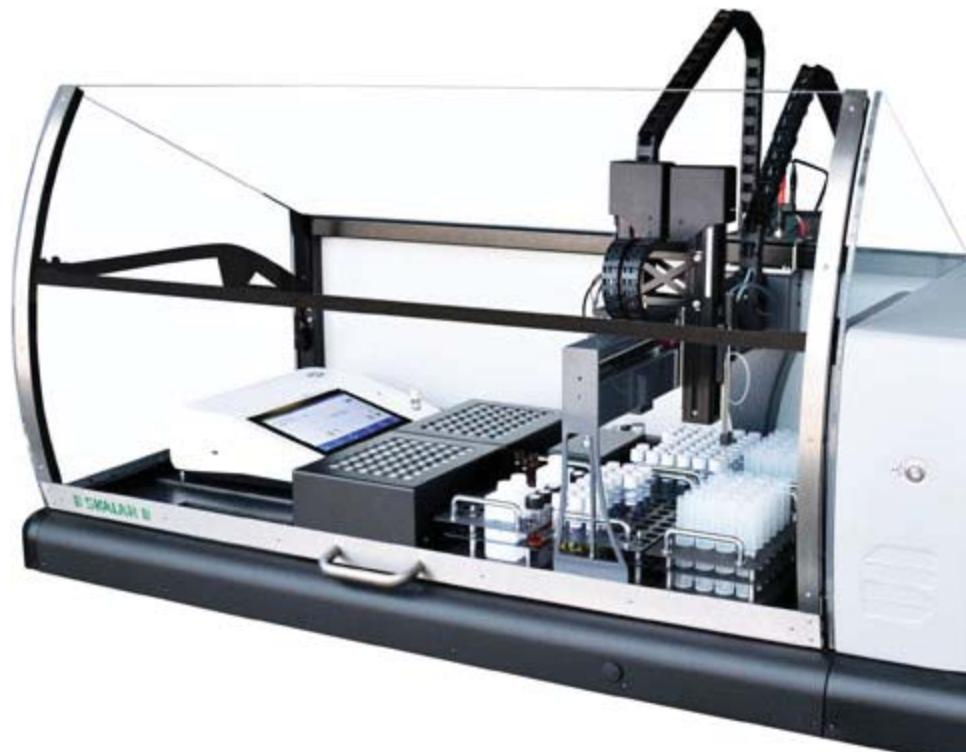
Test	REF	Measuring range NANOCOLOR® VIS II ¹⁾		Number of tests	Shelf life	Method
Ammonium 3	985603	0.04–2.30 mg/L NH ₄ -N	0.05–3.00 mg/L NH ₄ ⁺	20	1 year	Indophenol
Ammonium 50	985605	1–40 mg/L NH ₄ -N	1–50 mg/L NH ₄ ⁺	20	1 year	Indophenol
Chloride 50	985621	0.5–50.0 mg/L Cl ⁻		20	1 year	Mercury(II)-thiocyanate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

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

²⁾Please see the instruction leaflet.

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

	Sea water 2)	GHS
1	■	■
2	■	■
3	■	■
4	■	■
5	■	■
6	■	■
7	■	■
8	■	■
9	■	■
10	■	■
11	■	■
12	■	■
13	■	■
14	■	■
15	■	■
16	■	■
17	■	■
18	■	■
19	■	■
20	■	■
21	■	■
22	■	■
23	■	■
24	■	■
25	■	■
26	■	■
27	■	■
28	■	■
29	■	■
30	■	■
31	■	■
32	■	■
33	■	■
34	■	■
35	■	■
36	■	■
37	■	■
38	■	■
39	■	■
40	■	■
41	■	■
42	■	■
43	■	■
44	■	■
45	■	■
46	■	■
47	■	■
48	■	■
49	■	■
50	■	■
51	■	■
52	■	■
53	■	■
54	■	■
55	■	■
56	■	■
57	■	■
58	■	■
59	■	■
60	■	■
61	■	■
62	■	■
63	■	■
64	■	■
65	■	■
66	■	■
67	■	■
68	■	■
69	■	■
70	■	■
71	■	■
72	■	■
73	■	■
74	■	■
75	■	■
76	■	■
77	■	■
78	■	■
79	■	■
80	■	■
81	■	■
82	■	■
83	■	■
84	■	■
85	■	■
86	■	■
87	■	■
88	■	■
89	■	■
90	■	■
91	■	■
92	■	■
93	■	■
94	■	■
95	■	■
96	■	■
97	■	■
98	■	■
99	■	■
100	■	■



NANOCOLOR® standard tests

High sensitivity for photometric water analysis

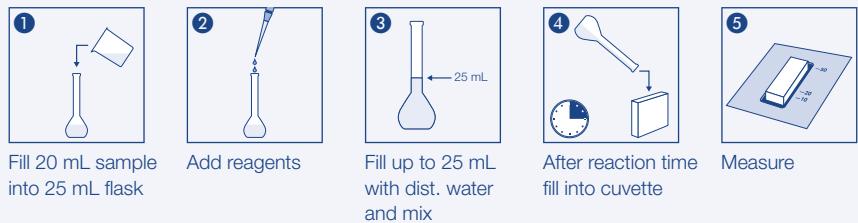
NANOCOLOR® standard tests are convenient reagent kits for photometric analysis. With ready-to-use reagents up to 500 determinations are possible with only one test kit, resulting in low costs per determination for the user. Even very low limits can be evaluated precisely, due to high sample volumes and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

Good to know

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

How it's done

Procedure of standard tests



Good to know

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





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-CI-PADAB
■ Color (Hazen/DIN) ⁴⁾	Test 1-39	5–500 mg/L Pt (Hazen)	0.2–20.0 ^{1)/m}	–	–	Hazen
■ Copper	91853	0.01–10.0 mg/L Cu ²⁺		250	2 years	Cuprizone
■ Cyanide	91830	0.001–0.50 mg/L CN ⁻		250	1 year	Barbituric acid / pyridine
■ Detergents, anionic	91832	0.02–5.0 mg/L MBAS		40	3 years	Methylene blue
■ Detergents, cationic	91834	0.05–5.0 mg/L CTAB		40	3 years	Bromphenol blue
■ Fluoride	918142	0.05–2.00 mg/L F ⁻		500	2 years	SPADNS
■ Hydrazine	91844	0.002–1.50 mg/L N ₂ H ₄		250	1 year	4-(Dimethylamino)-benzaldehyde
■ Iron	91836	0.01–15.0 mg/L Fe		250	3 years	1,10-Phanthroline
■ Lead ³⁾	918101	0.005–1.00 mg/L Pb ²⁺		50	1.5 years	Dithizone
■ Manganese	91860	0.01–10.0 mg/L Mn		250	3 years	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® u/v-vis II.

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

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

NANOCONTROL

Analytical quality control for a complete analytical system

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

Single and multistandards

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

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

Good to know

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

Find an overview on page 17.



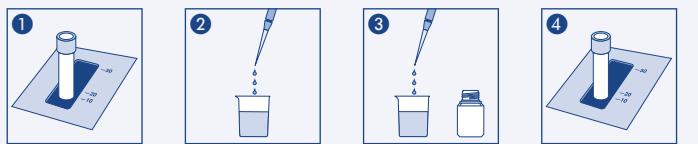
Spiking solutions

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 0-83	Ammonium 3 COD 40 COD 60 Nitrate 8 Nitrate 50 Nitrate total Phosphate 1 total Phosphate 5 total Nitrogen TN _b 22	12–120	1.50 mg/L NH ₄ -N 30 mg/L O ₂ 30 mg/L O ₂ 3.00 mg/L NO ₃ -N 3.0 mg/L NO ₃ -N 3.0 mg/L NO ₃ -N 1.00 mg/L P 1.00 mg/L P 12.0 mg/L N	1.30–1.70 mg/L NH ₄ -N 26–34 mg/L O ₂ 26–34 mg/L O ₂ 2.60–3.40 mg/L NO ₃ -N 2.6–3.4 mg/L NO ₃ -N 2.6–3.4 mg/L NO ₃ -N 0.90–1.10 mg/L P 0.90–1.10 mg/L P 10.0–14.0 mg/L N
■ Sewage inflow	925012	0-05 0-30 0-29 0-28 0-12 0-38 0-64 0-66 0-80 0-88	Ammonium 50 COD 600 COD 1500 COD 15000 COD 60000 COD HR 1500 Nitrate 50 Nitrate 250 total Phosphate 15 total Nitrogen TN _b 220	30–300	25.0 mg/L NH ₄ -N 400 mg/L O ₂ 400 mg/L O ₂ 10.0 g/L O ₂ 10.0 g/L O ₂ 400 mg/L O ₂ 15.0 mg/L NO ₃ -N 15 mg/L NO ₃ -N 8.00 mg/L P 75 mg/L N	22.0–28.0 mg/L NH ₄ -N 360–440 mg/L O ₂ 360–440 mg/L O ₂ 9.0–11.0 g/L O ₂ 9.0–11.0 g/L O ₂ 360–440 mg/L O ₂ 13.5–16.5 mg/L NO ₃ -N 13–17 mg/L NO ₃ -N 7.20–8.80 mg/L P 67–83 mg/L N

¹⁾Please see the instruction leaflet / evaluation sheet.

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

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

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



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

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



NANOCOLOR® reagents for sample decomposition

Sample preparation for photometric analysis

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

NANOCOLOR® NanOx N – Oxidative digestion of samples containing nitrogen

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

NANOCOLOR® NanOx Metal – Oxidation of samples containing heavy metals

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

Good to know

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



NANOCOLOR® reagents for sample decomposition

NANOCOLOR® crack set

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

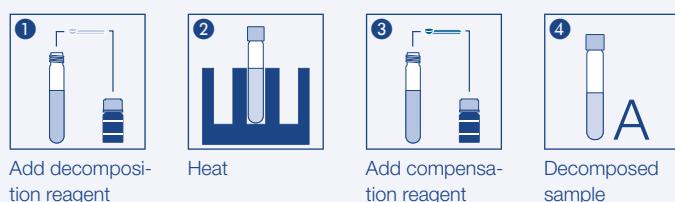
NANOCOLOR® sludge

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

How it's done



Decomposition in heating block with NanOx N



Ordering information

Description	REF	Number of decompositions	Shelf life	GHS
Determination of total Nitrogen				
■ NANOCOLOR® NanOx N solid reagents for the oxidative digestion prior to total nitrogen determination (heating block or microwave)	918979	50–100	1 year	<input checked="" type="checkbox"/>
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	<input checked="" type="checkbox"/>
Crack set for aqueous systems				
■ Crack set incl. sulfuric acid / potassium peroxodisulfate for the oxidative digestion in the heating block	91808	100	3 years	<input checked="" type="checkbox"/>
■ 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	<input checked="" type="checkbox"/>
■ 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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NANOCOLOR® accessories

Description	REF	Content	Number of tests	Shelf life	GHS
■ Piston pipette 2.0 mL	916917	1 piece			
■ Plastic tips transparent for piston pipettes 1.0–5.0 mL	916916	100 pieces			
■ Digital piston pipette 5–50 µL, adjustable, with tip ejector	91658	1 piece			
■ Digital piston pipette 50–200 µL, adjustable, with tip ejector	916914	1 piece			
■ Plastic tips transparent for piston pipettes 5–50 µL and 50–200 µL	916915	100 pieces			
■ Digital piston pipette 100–1000 µL, adjustable, with tip ejector	91677	1 piece			
■ Plastic tips transparent for piston pipettes 100–1000 µL	91676	100 pieces			
■ Digital piston pipette 1.0–5.0 mL, adjustable, with tip ejector	916909	1 piece			
■ Plastic tips transparent for piston pipettes 1.0–5.0 mL	916916	100 pieces			
■ Pipette stand for 6 piston pipettes	91679	1 piece			
Extraction					
■ 100 mL separation funnel with NS glass tap and PE stopper for extraction methods	91664	2 pieces			
■ Stand with clamps and bosses for 4 separation funnels, height 70 cm	91695	1 piece			
AOX					
■ Supplement kit for AOX for the sensitive AOX range (0.01–0.30 mg/L AOX) and for higher COD values (required above 50 mg/L COD)	918072	2 x 4 g	20	1 year	■
■ Chloride detection kit AOX for samples with high chloride contents	918073	10 mL		1 year	■
■ Starter set for AOX, consists of tweezers, funnel, cartridge adaptor, beaker, glass rods, 1 L bottle and syringes	916111	1 set			
■ Pump set for AOX, consists of centrifugal pump, connecting tubes, graduated 1 L reservoir with tap and stand with clamps and bosses	916115	1 set			
■ NANOCOLOR® cartridge adapter for AOX pump-set	916113	1 piece			
BOD₅					
■ BOD ₅ nutrient mixture (without 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			

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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	■

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