

Water Analysis

Photometer PF-12^{Plus}

NEW!



Increased flexibility

Compact photometer PF-12^{Plus}

- More than 100 preprogrammed methods
- Backlit graphic display with intuitive userguidance
- Nephelometric turbidity measurements
- Integrated turbidity control (NTU-Check)
- USB interface for data transfer, update and power supply

MACHEREY-NAGEL

www.mn-net.com



Since 1911

Compact photometer PF-12^{Plus}

Increased flexibility

The new compact photometer PF-12^{Plus} is a consequent extension of its well accepted prerunner PF-12. The PF-12^{Plus} is tailor-made for the mobile analysis and is now equipped with more than 100 preprogrammed methods and additional functions. An 860 nm LED enables the nephelometric turbidity measurement in the range of 1-1000 NTU. This feature also allows for the well established NTU-Check during the measurement of our **NANOCOLOR**[®] tube tests; a big PLUS in terms of safe measurement results.

The icon-based user guidance and the new task bar turn the PF-12^{Plus} into a user friendly, easy and intuitively operated photometer for all scope of applications in water and waste water analysis. The delivery is carried out in a robust case, equipped with helpful accessories, allowing for an analysis directly at the point of interest. Numerous versions of our **VISOCOLOR**[®] and **NANOCOLOR**[®] reagent cases are also available with the new PF-12^{Plus}.

Save time and make your lab work easier

Backlit graphic display with intuitive user guidance

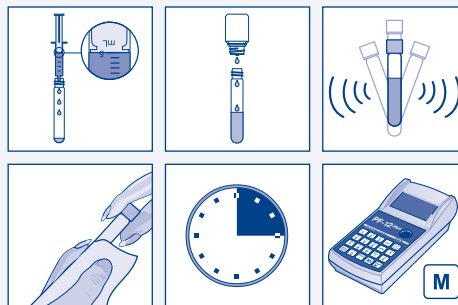
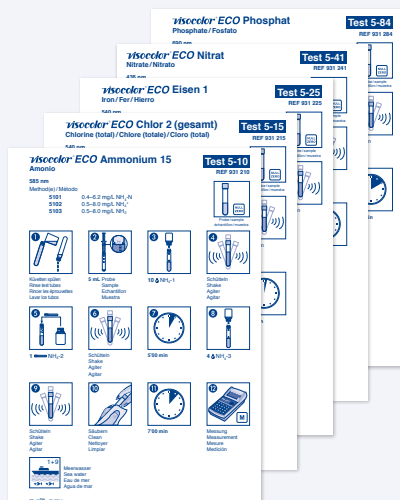
- Ready to use immediately
- All tests and menu items can be activated fast and easily

Results within seconds

- The progressively designed optics is insensitive to external light and makes measuring straightforward

Preprogrammed tests and photometric basic functions

- More than 100 preprogrammed methods
- Manual with pictogram instructions



Experience precision and increase accuracy

Highest accuracy

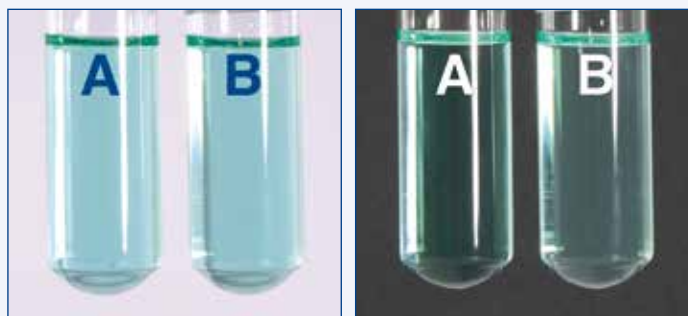
- Warning of potential interferences by fully automatic turbidity control measurement with 90° (NTU-Check)
- Display of the 20–80 % measurement range bar

Measurement without cuvette slot cover

- The state-of-art optical system is insensitive to external light and allows straightforward measurements

Self-explanatory userguidance

- Operation without complex and time-consuming training



2 tubes (A / B) with the same COD concentration
Deviations up to 30 % are possible.

```
22.10.2014      09:30
  0291 COD 1500
    391 m9/L O2
-----
0001 Dueren    1+0
↑↓|           EXT  NM
```

```
Method:
- Settings
Basic functions
Tube tests
VISOCOLOR-ECO
↑↓
```

```
956
-----
↑↓
```

```
22.10.2014      09:30
          Method
-----
↑↓ M: 029
```

Assure results

Documentation of results according to GLP

- Individual entries of sample number, sample location and dilution

Clear memory management

- GLP-conform storage of results incl. date, time, sample number, sample location and dilution
- Fast and easy access to stored results and data sets

Convenient data export

- NANOCOLOR[®] software DVD included in delivery
- Easy transfer of results to PC
- Data export directly to MS EXCEL
- Recording of calibration curves to program user-defined methods



Internal quality control according to ISO 9001

- Fulfill supervisor and authority requirements
- Fast and easy self-monitoring of photometric accuracy with NANOCHECK (REF 925 701)

Compact photometer PF-12^{Plus}

Be mobile and enjoy versatility

Works under any condition

- Variable power supply for mobile use
- Waterproof housing (IP 68)
- Battery info and status

Free programming of user-defined methods

- Programmable for 50 user-defined methods
- 4th degree polynomial with In-function



Be prepared for the future

Fast photometer update – free of charge

- At any time, stay up-to-date with our easy online software update
- For current software updates please visit www.mn-net.com



A wide range of applications

All branches of water and waste-water analysis

- Public authorities
- Industrial laboratories
- Maintenance companies for mobile water analysis
- Metalworking industries and galvanics
- Fish farmers
- Schools and universities



Individual mini-labs

VISOCOLOR[®] reagent case with PF-12^{Plus}

- The allrounder for all applications
- Infinite options and cost-efficient refill packs
- Available with PF-12^{Plus} and pre-packed VISOCOLOR[®] ECO tests
- Available with PF-12^{Plus} and space for individual combination of:
 - VISOCOLOR[®] ECO tests for photometric determination
 - pH indicator papers
 - pH-Fix test strips
 - Qualitative test papers
 - QUANTOFIX[®] test strips
 - Accessories

QUANTOFIX[®] test strips
pH-Fix test strips
pH indicator papers

Integrated cuvette holder



Photometer PF-12^{Plus}
for photometric analysis of
VISOCOLOR[®] ECO tests



Accessories



Qualitative test papers
VISOCOLOR[®] reagent bottles



NANOCOLOR[®] reagent case with PF-12^{Plus}

- Especially designed for fast and save controlling of water purification in sewage plants
- Rugged case ensures highest security during transport
- Available with and without compact photometer PF-12^{Plus}
- For the individual combination with
 - Heating block NANOCOLOR[®] VARIO C2
 - 2 pipettes
 - 3 NANOCOLOR[®] tube tests
 - Accessories



Example for fully combined
NANOCOLOR[®] analysis case

For further information about the possibilities of reagent cases with compact photometer PF-12^{Plus} please contact your distributor or MACHEREY-NAGEL directly.

Compact photometer PF-12^{Plus}

The right test for any application

Test	Ranges	Test no	Wave-length	Number of tests	Stability (months)	Seawater	REF
VISOCOLOR[®] ECO							
Alkalinity TA	5–250 mg/L CaCO ₃	5-04	436 / 585	100	12	yes	931 204
Ammonium 3*	0.1–2.5 mg/L NH ₄ ⁺	5-08	690	50	18	1+9	931 208
Ammonium 15*	0.5–8.0 mg/L NH ₄ ⁺	5-10	585	50	18	1+9	931 210
Bromine	0.10–13.00 mg/L Br ₂	5-11	540	200	24	yes	931 211
Chloride*	1–50 mg/L Cl ⁻	5-18	470	90	12	no	931 218
Chlorine 1, free + total	0.05–2.00 mg/L Cl ₂	5-35	540	150	24	yes	931 235
Chlorine 2, free + total*	0.05–2.00 mg/L Cl ₂	5-15	540	150	18	no	931 215
free Chlorine 2	0.05–2.00 mg/L Cl ₂	5-16	540	150	18	no	931 216
Chlorine 6, free + total	0.05–6.00 mg/L Cl ₂	5-17	540	200	24	yes	931 217
free Chlorine 6	0.05–6.00 mg/L Cl ₂	5-19	540	400	24	yes	931 219
Chlorine dioxide*	0.20–3.80 mg/L ClO ₂	5-21	540	150	18	no	931 221
Chromium(VI)*	0.04–1.00 mg/L CrO ₄ ²⁻	5-20	540	140	18	yes	931 220
Copper	0.1–5.0 mg/L Cu ²⁺	5-37	585	100	24	yes	931 237
Cyanide*	0.01–0.20 mg/L CN ⁻	5-22	585	100	12	1+3	931 222
Cyanuric acid*	10–100 mg/L Cya	5-23	540	100	18	yes	931 223
Fluoride	0.1–2.0 mg/L F ⁻	5-27	585	150	18	after distillation	931 227
Hydrazine*	0.05–0.40 mg/L N ₂ H ₄	5-30	436	130	12	yes	931 230
Iron 1*	0.04–2.00 mg/L Fe	5-25	540	200	24	yes	931 225
Iron 2	0.04–2.00 mg/L Fe	5-26	540	100	24	yes	931 226
Manganese*	0.1–5.0 mg/L Mn ²⁺	5-38	436	70	18	yes	931 238
Nickel*	0.04–5.00 mg/L Ni ²⁺	5-40	470	150	18	1+9	931 240
Nitrate*	4–60 mg/L NO ₃ ⁻	5-41	436	110	18	yes	931 241
Nitrite	0.02–0.50 mg/L NO ₂ ⁻	5-44	540	120	18	yes	931 244
Oxygen*	1–8 mg/L O ₂	5-88	540	50	18	yes	931 288
pH 6.0–8.2	pH 6.1–8.4	5-70	436/540	150	18	yes	931 270
Phosphate*	0.2–5.0 mg/L PO ₄ -P 0.6–15.0 mg/L PO ₄ ³⁻	5-84	690	80	36	yes	931 284
Potassium*	2–25 mg/L K ⁺	5-32	690	60	36	1+1	931 232
Silica	0.2–3.0 mg/L SiO ₂	5-33	690	80	36	yes	931 233
Sulfate*	20–200 mg/L SO ₄ ²⁻	5-92	436	100	36	1+49	931 292
Sulfide*	0.05–0.80 mg/L S ²⁻	5-94	620	90	36	yes	931 294
Zinc	0.1–3.0 mg/L Zn ²⁺	5-98	620	120	12	1+9	931 298
NANOCOLOR[®] tube tests							
Aluminium 07	0.02–0.70 mg/L Al ³⁺	0-98	540	19	12	yes	985 098
Ammonium 3*	0.04–2.30 mg/L NH ₄ -N 0.05–3.00 mg/L NH ₄ ⁺	0-03	690	20	12	1+1	985 003
Ammonium 10*	0.2–8.0 mg/L NH ₄ -N 0.2–10.0 mg/L NH ₄ ⁺	0-04	690	20	12	yes	985 004
Ammonium 50*	1.0–40.0 mg/L NH ₄ -N 1.0–50.0 mg/L NH ₄ ⁺	0-05	690	20	12	yes	985 005
Ammonium 100*	4–80 mg/L NH ₄ -N 5–100 mg/L NH ₄ ⁺	0-08	585	20	12	yes	985 008
Ammonium 200*	30–160 mg/L NH ₄ -N 40–200 mg/L NH ₄ ⁺	0-06	585	20	12	yes	985 006
AOX 3*	0.1–3.0 mg/L AOX 0.01–0.30 mg/L AOX	0-07	470	20	12	yes, 200 mL flushing solution	985 007
BDO ₅ * BDO ₅ -TT*	0.5–12.0 mg/L O ₂ 0.5–7.5 mg/L O ₂	8-22 8-25	470 436	25–50 11–21	24 24	yes yes	985 822 985 825
Cadmium 2	0.05–2.00 mg/L Cd ²⁺	0-14	540	10–19	12	yes	985 014
Carbonate hardness 15	1.0–18.0 °e 0.4–5.4 mmol/L H ⁺	0-15	436/585	20	12	yes	985 015
Chloride 50*	0.5–50.0 mg/L Cl ⁻	0-21	470	20	12	no	985 021
Chloride 200*	5–200 mg/L Cl ⁻ 0.10–1.00 g/L Cl ⁻	0-19	470	20	12	1+199	985 019
Chlorine / Ozon 2*	0.05–2.50 mg/L Cl ₂ 0.05–2.00 mg/L O ₃	0-17	540	20	12	yes	985 017
Chlorine dioxide 5	0.15–5.00 mg/L ClO ₂	0-18	540	20	12	yes	985 018
Chromate 5	0.05–2.00 mg/L Cr(VI) 0.1–4.0 mg/L CrO ₄ ²⁻	0-24	540	20	24	yes	985 024
total Chromium 2*	0.05–2.00 mg/L Cr	0-59	540	20	24	no	985 059
COD 40*	2–40 mg/L O ₂	0-27	345	20	12 at 2–8°C	no	985 027
COD 60*	5–60 mg/L O ₂	0-22	345	20	12 at 2–8°C	no	985 022
COD 160*	15–160 mg/L O ₂	0-26	436	20	12	no	985 026
COD 160 Hg-frei*	15–160 mg/L O ₂	0-26	436	20	12 at 2–8°C	no	963 026
COD 300*	50–300 mg/L O ₂	0-33	436	20	12	no	985 033
COD 600*	50–600 mg/L O ₂	0-30	620	20	12 at 15–25°C	no	985 030
COD 1500*	100–1500 mg/L O ₂	0-29	620	20	12	no	985 029
COD 4000*	400–4000 mg/L O ₂	0-11	620	20	12 at 15–25°C	no	985 011
COD 10000*	1,00–10,00 g/L O ₂	0-23	620	20	12	no	985 023
COD 15000*	1,0–15,0 g/L O ₂	0-28	620	20	12	no	985 028
COD 60000*	5,0–60,0 g/L O ₂	0-12	620	20	12	no	985 012
COD LR 150*	3–150 mg/L O ₂	0-36	436	20	12	no	985 036

* This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see MSDS.

The right test for any application

Test	Ranges	Test no	Wave-length	Number of tests	Stability (months)	Seawater	REF
COD HR 1500*	20–1500 mg/L O ₂	0-38	620	20	12	no	985 038
org. Complexing agents 10 (Screeningtest)	0,5–10,0 mg/L I _{Bik}	0-52	540	10-19	12	1+19	985 052
Copper 5	0,10–7,00 mg/L Cu ²⁺	0-53	585	20	24	yes	985 053
Copper 7	0,10–7,00 mg/L Cu ²⁺	0-54	585	20	24	yes	985 054
Cyanide 08*	0,02–0,80 mg/L CN ⁻	0-31	585	20	12	1+3	985 031
DEHA 1 (Diethylhydroxylamin)	0,05–1,00 mg/L DEHA	0-35	540	20	12	yes	985 035
Ethanol 1000	0,10–1,00 g/L EtOH 0,013–0,130 Vol. % EtOH	8-38	620	23	24 at < 0°C	no	985 838
Fluoride 2	0,1–2,0 mg/L F ⁻	0-40	620	20	18	1+9	985 040
Formaldehyde 8*	0,1–8,0 mg/L HCHO	0-41	585	20	24	no	985 041
Formaldehyde 10	0,20–10,00 mg/L HCHO	0-46	436	10–19	24	yes	985 046
Hardness Ca/Mg	1,0–20,0 °d; 5–50 mg/L Mg ²⁺ 0,2–3,6 mmol/L; 10–100 mg/L Ca ²⁺	0-44	540	20	18	1+29	985 044
Hardness 20	1,0–20,0 °d; 5–50 mg/L Mg ²⁺ 0,2–3,6 mmol/L; 10–100 mg/L Ca ²⁺	0-43	540	20	18	1+29	985 043
HC 300* (hydrocarbons)	0,5–5,6 mg/L KW 30–300 mg/kg KW	0-57	436	20	12	yes	985 057
Iron 3*	0,10–3,00 mg/L Fe	0-37	540	20	12	yes	985 037
Lead 5*	0,10–5,00 mg/L Pb ²⁺	0-09	540	20	12	nein	985 009
Manganese 10*	0,1–10,0 mg/L Mn	0-58	470	20	18	yes	985 058
Methanol 15	0,2–15,0 mg/L MeOH	8-59	620	23	12 at < 0°C	no	985 859
Molybdenum 40*	1,0–40,0 mg/L Mo (VI) 1,6–65,0 mg/L MoO ₄ ²⁻	0-56	345	20	24	no	985 056
Nickel 4*	0,10–7,00 mg/L Ni ²⁺	0-71	470	20	24	1+9	985 071
Nickel 7*	0,10–7,00 mg/L Ni ²⁺	0-61	470	20	24	1+9	985 061
Nitrate 8*	0,30–8,00 mg/L NO ₃ ⁻ N 1,3–35,0 mg/L NO ₃ ⁻	0-65	345	20	24	no	985 065
Nitrate 50*	0,3–22,0 mg/L NO ₃ ⁻ N 2–100 mg/L NO ₃ ⁻	0-64	345	20	24	no	985 064
Nitrate 250*	4–60 mg/L NO ₃ ⁻ N 20–250 mg/L NO ₃ ⁻	0-66	345	20	24	no	985 066
Nitrite 2*	0,003–0,460 mg/L NO ₂ ⁻ N 0,02–1,50 mg/L NO ₂ ⁻	0-68	540	20	12	yes	985 068
Nitrite 4	0,1–4,0 mg/L NO ₂ ⁻ N 0,3–13,0 mg/L NO ₂ ⁻	0-69	540	20	12	yes	985 069
total Nitrogen TN _b 22*	0,5–22,0 mg/L N	0-83	345	20	12	no	985 083
total Nitrogen TN _b 60*	3–60 mg/L N	0-92	345	20	12	no	985 092
total Nitrogen TN _b 220*	5–220 mg/L N	0-88	345	20	12	no	985 088
Organic acids 3000*	30–3000 mg/L CH ₃ COOH 0,5–50,0 mmol/L CH ₃ COOH	0-50	470	20	18	yes	985 050
Oxygen 12*	0,5–12,0 mg/L O ₂	0-82	436	22	24	yes	985 082
Peroxide 2	0,03–2,00 mg/L H ₂ O ₂	8-71	620	10–19	12 at 2–8°C	yes	985 871
pH 6,5–8,2	pH 6,1–8,4	0-72	436 / 540	100	18	yes	918 72
Phenolic index 5*	0,2–5,0 mg/L Phenol	0-74	470	10–19	18	after extraction	985 074
ortho and total Phosphate 1*	0,05–1,50 mg/L P 0,2–5,0 mg/L PO ₄ ³⁻	0-76	690	20	12	yes (ortho-P)	985 076
ortho and total Phosphate 5*	0,20–5,00 mg/L P 0,5–15,0 mg/L PO ₄ ³⁻	0-81	690	20	12	yes (ortho-P)	985 081
ortho and total Phosphate 15*	0,30–15,00 mg/L P 1,0–45,0 mg/L PO ₄ ³⁻	0-80	690	20	12	yes (ortho-P)	985 080
ortho and total Phosphate 45*	5,0–50,0 mg/L P 15–150 mg/L PO ₄ ³⁻	0-55	690	20	12	yes (ortho-P)	985 055
ortho and total Phosphate 50*	10,0–50,0 mg/L P 30–150 mg/L PO ₄ ³⁻	0-79	436	19	36	yes (ortho-P)	985 079
POC 200 (acides polycarboxyliques)	20–200 mg/L	0-70	436	20	18	1+3	985 070
Potassium 50*	2–50 mg/L K ⁺	0-45	690	20	24	1+9	985 045
residual Hardness 1	0,02–1,00 °d 0,004–0,180 mmol/L	0-84	540	20	12	no	985 084
Silver 3	0,20–3,00 mg/L Ag ⁺	0-49	620	20	18	no	985 049
Starch 100*	5–100 mg/L Stärke	0-85	540	19	12	1+1	985 085
Sulfate 200*	10–200 mg/L SO ₄ ²⁻	0-86	436	20	36	no	985 086
Sulfate 1000*	200–1000 mg/L SO ₄ ²⁻	0-87	436	20	36	no	985 087
Sulfide 3*	0,05–3,00 mg/L S ²⁻	0-73	620	20	36	1+3	985 073
Sulfite 10*	0,2–10,0 mg/L SO ₃ ²⁻	0-89	436	20	12	1+19	985 089
Sulfite 100*	5–100 mg/L SO ₃ ²⁻	0-90	470	19	12	yes	985 090
Surfactants: Anionic surfactants 4*	0,20–4,00 mg/L MBAS	0-32	620	20	24	1+19	985 032
Surfactants: Cationic surfactants 4*	0,20–4,00 mg/L CTAB	0-34	620	20	24	1+19	985 034
Surfactants: Nonionic surfactants 15*	0,3–15,0 mg/L Triton® X-100	0-47	620	20	24	no	985 047
Thiocyanate 50*	0,5–50,0 mg/L SCN ⁻	0-91	470	20	24	1+1	985 091
TOC 25*	2,0–25,0 mg/L C	0-93	585	10	12	no	985 093
TOC 60*	10–60 mg/L C	0-94	585	10	12	no	985 094
TOC 600*	40–600 mg/L C	0-99	585	10	12	no	985 099
TTC/Sludge activity150*	5–150 µg TPF; 0,050–2,300 E	8-90	470	20	24 at 2–8°C	no	985 890
Zinc 4*	0,10–4,00 mg/L Zn ²⁺	0-96	620	20	12	1+1	985 096
Zinc 3* (special filter required)	0,10–3,00 mg/L Sn	0-97	520	18	12	1+9	985 097

* This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see MSDS.

Compact photometer PF-12^{Plus}

Technical Data

Type:	Filter photometer with microprocessor control, self-test and auto-calibration Wavelength range 340–860 nm
Optics:	Automatic filter wheel with 7 interference filters Insensitive to external light—no light shield required
Wavelengths:	345 / 436 / 470 / 540 / 585 / 620 / 690 nm plus 1 compartment for an additional filter, 860 nm LED for NTU-measurement
Wavelength accuracy:	± 2 nm, bandwidth at half transmission 10–12 nm
Light source:	Xenon lamp
Detector:	Silicon photodiode
Blank value:	Automatic
Measuring modes:	Over 100 preprogrammed tests (<i>NANOCOLOR</i> [®] tube tests and <i>VISOCOLOR</i> [®] ECO tests) Absorbance, transmission, factor, standard, 50 freely programmable methods
Photometric range	± 3 E
Photometric accuracy:	± 1 %
Stability:	< 0.002 E/h
Cuvette holder:	Round tubes 16 mm OD
Data memory:	1000 results, GLP conform
Display:	Backlit graphic display, 64 x 128 pixels All important data at a glance: Result in respective unit, date, time, sample number, sample location and dilution
Operation:	Display userguidance, plastic foil keyboard Test selection via test number or parameter lists 12 languages (de, en, fr, es, it, nl, hu, pl, pt, cz, id, si)
Quality Control:	With <i>NANOCONTROL</i> <i>NANOCHECK</i>
Interface:	USB 2.0
Update:	Via Internet / PC, free of charge
Operating range:	0–50 °C, up to 90 % relative humidity
Power supply:	Via USB power supply, standard or rechargeable batteries
Housing:	Waterproof, IP 68
Dimensions and weight:	215 x 100 x 65 mm, 0.7 kg
Warranty:	2 years

Ordering information:

Compact photometer PF-12^{Plus} **REF 919 250**
Incl. software DVD, manual, 4 batteries, 4 empty test tubes, funnel, beaker,
syringe, USB cabel, calibration cuvette and certificate in rugged case

Akku pack **REF 919 201**
USB power supply **REF 919 220**
Charger **REF 919 221**

For further information please ask for our catalogue „Rapid tests“ on
info@mn-net.com.

Your local distributor:



www.mn-net.com

MACHEREY-NAGEL



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