Water Analysis

Water Analysis: PF-11

Photometer PF-11

Portable photometer for field and laboratory use

MACHEREY-NAGEL
www.mn-net.com

Photometer PF-11

Application with *VISOCOLOR*® reagents

The photometer PF-11 offers an easy start into photometric water analysis. When evaluated with PF-11 our economically priced *VISOCOLOR*® reagents, which have been successfully used in our colorimetric or turbidimetric test kits ❶ for years, give rapid and accurate results, which are even more precise than a visual evaluation. Photometry allows reliable measurements, independent of surrounding light conditions or personal colour assessments.

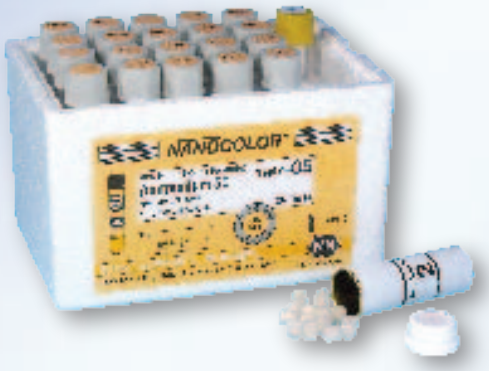
Evaluating *VISOCOLOR*® reagent kits with PF-11 requires the same simple step-by-step procedure as for the visual evaluation. The only difference is that the analysis is performed in a test tube ❷, rather than in a comparator. The test tube is then placed in the photometer. An easy push-button operation starts the measurement. After a few seconds the large display of the PF-11 gives the result directly in mg/l.

Water analysis has never been easier!

Application with *NANOCOLOR*® reagents

If there is a need for more accurate results, a lower detection limit or simply, if a large variety of test kits with various measuring ranges is requested, the use of *NANOCOLOR*® tube tests 3 is the choice.

NANOCOLOR® reagent sets contain precisely predosed reagents in round test tubes 4 to which the sample is added. Convenient and accurate dosage of additional reagents is possible through *NANOFIX* reagent capsules 5. Step-by-step instructions lead through the test procedure to obtain accurate results in a minimum of time.



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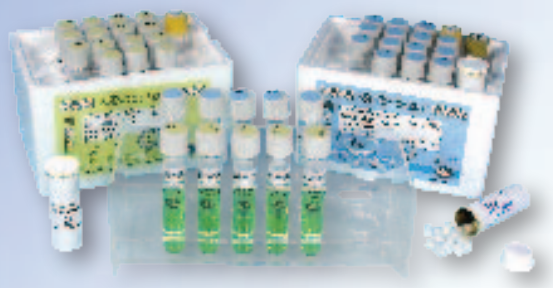
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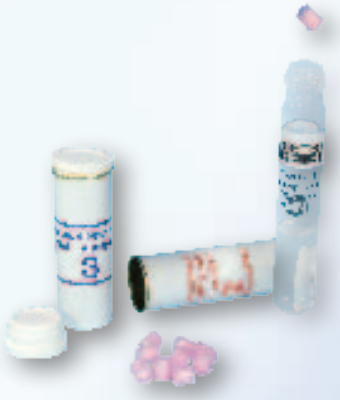
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Our range of *NANOCOLOR*® products does not only consist of reagents for specific detection of various substances. It also includes instruments and reagents for sample preparation 6. Thus, PF-11, together with *NANOCOLOR*® reagents, is suitable for professional analysis of water and waste water, including the determination of such important parameters like Chemical Oxygen Demand (COD) 7, Biochemical Oxygen Demand (BOD), *total* Nitrogen (*total*-N), *total* Phosphorous (*total*-P) and many more.


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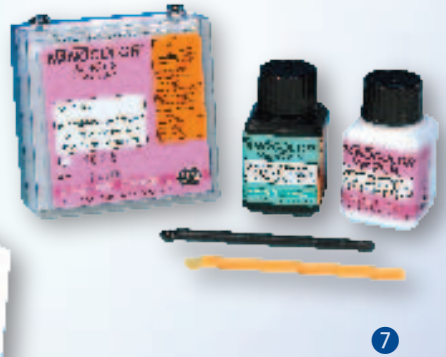
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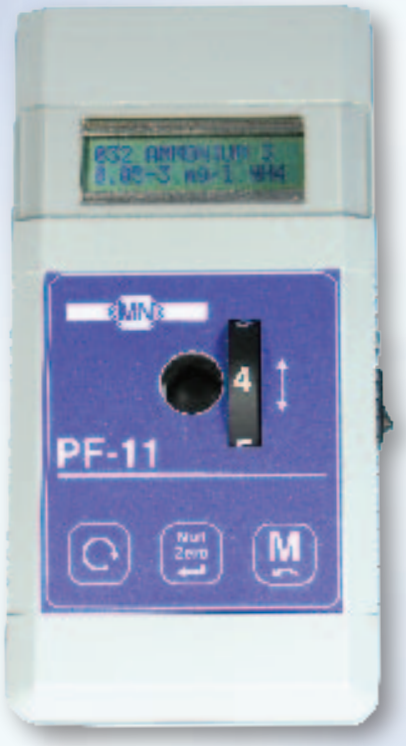
Features of PF-11

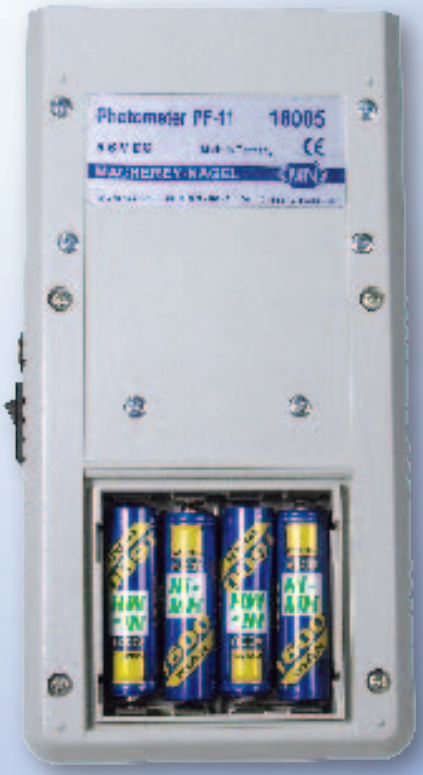
- Portable multiparameter photometer
- Field and laboratory use
- Battery and mains operable
- More than 100 preprogrammed calibrations
- 27 *VISOCOLOR*® *ECO* calibrations
- 26 *VISOCOLOR*® calibrations
- 89 *NANOCOLOR*® calibrations
- Direct reading in mg/l
- Extinction measurement
- Cuvette slot for 16 mm round tubes
- User-friendly
- Large display with clear user guidance in 8 languages
- Photometric pH-measurement
- Interface for data transfer to a PC



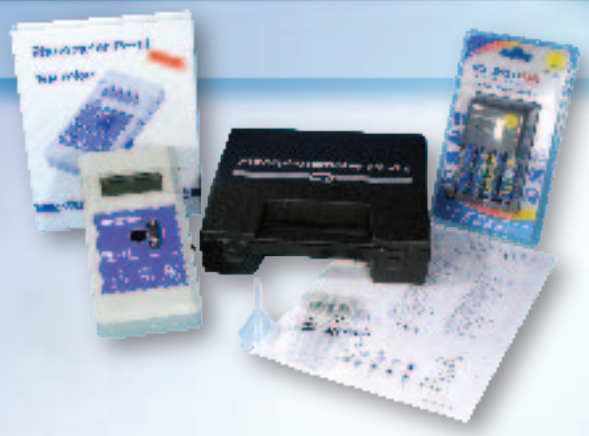
Designed to produce accurate and reliable results, the PF-11 is an outstanding choice. It is fully recognized and appreciated both by qualified analysts, who require time-saving procedures, as well as by operators with limited experience, who expect an easy step-by-step use.

Technical data

Type:	Single beam filter photometer
Optics:	Filter wheel with 6 coloured glassfilters
Wavelengths:	380/405/470/520/605/720 nm
Light source:	Tungsten lamp
Detector:	Silicon photoelement
Display:	2 x 16 characters, 5 mm high
Operation:	3 foil-covered keys
Measuring range:	± 2.5 E
Stability:	< 0.01 E/h
Data interface:	RS 232 serial interface
Power supply:	1600 mAh, 4 rechargeable batteries with external charger, sufficient for at least 1000 measurements or via socket with a separate mains adaptor (9 V/1.5 A)
Dimensions:	195 x 100 x 40 mm
Weight:	480 g incl. rechargeable batteries



Photometer PF-11



Ordering information

- **Photometer PF-11**

  Complete in a case, incl. manual, 4 rechargeable batteries, charger, 2 empty test tubes and funnel, **Cat. No. 919 05**

- **Accessories**

  External mains adaptor (100-240 V), **Cat. No. 919 06**
  Data Export Software, **Cat. No. 919 07.1**

  Heating block *NANOCOLOR® VARIO compact* for sample preparation prior to the determination of COD, total-N, total-P, total metals, hydrocarbons, AOX, **Cat. No. 919 13**

- **Portable field laboratories**

  VISOCOLOR® reagent cases "Environmental analysis"
  With photometer PF-11 and 8 *VISOCOLOR®* test kits (ammonium, carbonate hardness, iron, total hardness, nitrate, nitrite, pH, phosphate), **Cat. No. 914 304**

  VISOCOLOR® reagent cases with PF-11 (without test kits)
  For individual combination of up to 9 *VISOCOLOR® ECO* and *VISOCOLOR®* titration test kits, **Cat. No. 914 309**

VISOCOLOR® tests, which can be evaluated with photometer PF-11

Test	Ranges		Cat. No.
***VISOCOLOR® ECO* test kits**			
Ammonium 3	0.1 – 1.2 mg/l NH_4-N	0.1 – 1.5 mg/l NH_4^+/NH_3	931 208
Chloride	1 – 40 mg/l Cl^-		931 218
Chlorine 2 (free/total)	0.1 – 2.0 mg/l Cl_2		931 215
free Chlorine 2 ***New!***	0.1 – 2.0 mg/l Cl_2		931 216
Chlorine 6 (free and total) ***New!***	0.05 – 6.00 mg/l Cl_2		931 217
free Chlorine 6 ***New!***	0.05 – 6.00 mg/l Cl_2		931 219
Chromium(VI)	0.02 – 0.50 mg/l Cr(VI)	0.04 – 1.00 mg/l CrO_4^{2-}	931 220
Copper	0.2 – 1.5 mg/l Cu		931 237
Cyanide	0.01 – 0.20 mg/l CN^-		931 222
Cyanuric acid	10 – 100 mg/l Cya		931 223
Fluoride ***New!***	0.1 – 2.0 mg/l F^-		931 227
Iron	0.04 – 1.00 mg/l Fe		931 226
Manganese	0.1 – 1.5 mg/l Mn		931 238
Nickel	0.1 – 1.5 mg/l Ni^{2+}		931 240
Nitrate	1 – 27 mg/l NO_3-N	4 – 120 mg/l NO_3^-	931 241
Nitrite	0.01 – 0.15 mg/l NO_2-N	0.02 – 0.50 mg/l NO_2^-	931 244
Oxygen	1 – 10 mg/l O_2		931 288
pH 6.0-8.2 ***New!***	6.0 – 8.2 pH		931 270
Phosphate	0.2 – 5.0 mg/l PO_4-P	0.6 – 15.0 mg/l PO_4^{3-}	931 284
Potassium	2 – 15 mg/l K^+		931 232
Silica	0.1 – 1.4 mg/l Si	0.2 – 3.0 mg/l SiO_2	931 233
Sulphide ***New!***	0.05 – 0.80 mg/l S^{2-}		931 294
Zinc ***New!***	0.1 – 3.0 mg/l Zn^{2+}		931 298
***VISOCOLOR®* comparator test kits**			
Ammonium (DEV)	0.1 – 1.6 mg/l NH_4-N	0.1 – 2.0 mg/l NH_4^+/NH_3	914 238
Chlorine (free/total)	0.10 – 2.00 mg/l Cl_2		914 232
Chromate	0.1 – 1.0 mg/l Cr(VI)	0.1 – 2.0 mg/l CrO_4^{2-}	914 211
Copper	0.1 – 3.0 mg/l Cu^{2+}		914 234
Cyanide	0.05 – 1.00 mg/l CN^-		914 242
Iron (Triazine)	0.1 – 2.0 mg/l Fe		914 239
Iron (DEV)	0.1 – 7.0 mg/l Fe		914 217
Manganese	0.1 – 4.0 mg/l Mn		914 218
Nickel	0.2 – 10.0 mg/l Ni^{2+}		914 219
Nitrate 50	0.2 – 9.0 mg/l NO_3-N	1 – 40 mg/l NO_3^-	914 245
Nitrite	0.02 – 0.60 mg/l NO_2-N	0.05 – 2.00 mg/l NO_2^-	914 220
Phosphate (DEV)	0.1 – 1.5 mg/l PO_4-P	0.2 – 5.0 mg/l PO_4^{3-}	914 237
Phosphate	0.6 – 8.0 mg/l PO_4-P	2 – 25 mg/l PO_4^{3-}	914 223
Silica	0.1 – 2.5 mg/l Si	0.2 – 5.0 mg/l SiO_2	914 224
Sulphate	20 – 200 mg/l SO_4^{2-}		914 235
Sulphide	0.05 – 1.00 mg/l S^{2-}		914 233
Zinc	0.2 – 3.0 mg/l Zn^{2+}		914 241

Test	Ranges		Cat. No.
***NANOCOLOR*® tube tests**			
Aluminium 07	0.02 – 0.70 mg/l Al^{3+}		985 098
Ammonium 3	0.04 – 2.30 mg/l NH_4-N	0.05 – 3.00 mg/l NH_4^+/NH_3	985 003
Ammonium 10	0.2 – 8.0 mg/l NH_4-N	0.2 – 10.0 mg/l NH_4^+/NH_3	985 004
Ammonium 50	1 – 40 mg/l NH_4-N	1 – 50 mg/l NH_4^+/NH_3	985 005
Ammonium 200	30 – 160 mg/l NH_4-N	40 – 200 mg/l NH_4^+/NH_3	985 006
AOX 3	0.1 – 3.0 mg/l AOX	0.01 – 0.30 mg/l AOX	985 007
BOD_5 (biochem. oxygen demand)	2 – 3000 mg/l O_2		985 822
BOD_5 -TT (biochem. oxygen demand)	2 – 3000 mg/l O_2		985 825
Cadmium 2	0.10 – 2.00 mg/l Cd^{2+}		985 014
Carbonate hardness 15	1.0 – 15.0 °d	0.4 – 5.4 mmol/l H^+	985 015
Chloride 50	0.5 – 50.0 mg/l Cl^-		985 021
Chloride 200	5 – 200 mg/l Cl^-		985 019
Chlorine / Ozone 2	0.05 – 2.50 mg/l Cl_2	0.05 – 2.00 mg/l O_3	985 017
Chlorine dioxide 5	0.2 – 5.0 mg/l ClO_2		985 018
Chromate 5	0.03 – 1.80 mg/l Cr(VI)	0.1 – 4.0 mg/l CrO_4^{2-}	985 024
COD 160	15 – 160 mg/l O_2		985 026
COD 160 Hg-free	15 – 160 mg/l O_2		963 026
COD 300	50 – 300 mg/l O_2		985 033
COD 1500	100 – 1500 mg/l O_2		985 029
COD 10000 ***New!***	1.00 – 10.00 g/l O_2 (1000 – 10000 mg/l)		985 023
COD 15000	1.0 – 15.0 g/l O_2 (1000 – 15000 mg/l)		985 028
Colour	10 – 500 mg/l Pt		no reagents required
Org. Complexing agents 10	0.5 – 10.0 mg/l I_{BiC}		985 052
Copper 7	0.1 – 7.0 mg/l Cu^{2+}		985 054
Cyanide 08	0.01 – 0.80 mg/l CN^-		985 031
DEHA 1 (diethylhydroxylamine)	0.05 – 1.00 mg/l DEHA		985 035
Ethanol 1000	0.10 – 1.00 g/l EtOH	0.013 – 0.13 Vol% EtOH	985 838
Extinction	0.010 – 2.500 E		no reagents required
Fluoride 2	0.1 – 2.0 mg/l F^-		985 040
Formaldehyde 8	0.1 – 8.0 mg/l HCHO		985 041
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+}	985 043
HC 300 (hydrocarbons)	0.5 – 5.6 mg/l HC	30 – 300 mg/kg HC	985 057
Iron 3	0.1 – 3.0 mg/l Fe		985 037
Lead 5	0.1 – 5.0 mg/l Pb^{2+}		985 009
Manganese 10	0.1 – 10.0 mg/l Mn		985 058
Methanol 15	0.2 – 15.0 mg/l MeOH		985 859
Molybdenum 40	1.0 – 20.0 mg/l Mo(VI)	1.6 – 32.0 mg/l MoO_4^{2-}	985 056
Nickel 7	0.1 – 7.0 mg/l Ni^{2+}		985 061
Nitrate 50	0.5 – 16.0 mg/l NO_3-N	2 – 70 mg/l NO_3^-	985 064
Nitrite 2	0.01 – 0.45 mg/l NO_2-N	0.03 – 1.50 mg/l NO_2^-	985 068
Nitrite 4 ***New!***	0.1 – 4.0 mg/l NO_2-N		985 069
total Nitrogen 22	0.5 – 16.0 mg/l N	0.3 – 13.0 mg/l NO_2^-	985 083
total Nitrogen 220 ***New!***	5 – 160 mg/l N		985 088
Nonionic surfactants 15	0.3 – 10.0 Triton® X-100		985 047
Organic Acids 3000	30 – 3000 mg/l CH_3COOH	0.5 – 50.0 mmol/l CH_3COOH	985 050
Oxygen 12	0.5 – 12.0 mg/l O_2		985 082
Peroxide 2	0.1 – 2.0 mg/l H_2O_2		985 871
pH 6.5 – 8.2	pH 6.5 – 8.2		918 72
Phenolic Index 5	0.2 – 5.0 mg/l		985 074
ortho- and total Phosphate 1	0.1 – 1.5 mg/l PO_4-P	0.2 – 5.0 mg/l PO_4^{3-}	985 076
ortho- and total Phosphate 5	0.2 – 5.0 mg/l PO_4-P	0.5 – 15.0 mg/l PO_4^{3-}	985 081
ortho- and total Phosphate 15	0.3 – 15.0 mg/l PO_4-P	1.0 – 45.0 mg/l PO_4^{3-}	985 080
ortho- and total Phosphate 45 ***New!***	5.0 – 50.0 mg/l PO_4-P	15 – 150 mg/l PO_4^{3-}	985 055
ortho- and total Phosphate 50	10.0 – 50.0 mg/l PO_4-P	30 – 150 mg/l PO_4^{3-}	985 079
POC 200 ***New!***	20 – 120 mg/l POC AS 2020 20 – 120 mg/l POC HS 2020	20 – 120 mgl Polystabil® DK 2 – 40 mg/l Polystabil® KWI	985 070
Potassium 50	2 – 50 mg/l K^+		985 045
Residual hardness 1	0.05 – 1.00 °d	0,009 – 0.180 mmol/l	985 084
Starch 100	5 – 100 mg/l Starch		985 085
Sulphate 200	10 – 200 mg/l SO_4^{2-}		985 086
Sulphate 1000	200 – 1000 mg/l SO_4^{2-}		985 087
Sulphite 10	0.2 – 10.0 mg/l SO_3^{2-}		985 089
Sulphite 100	5 – 100 mg/l SO_3^{2-}		985 090
Thiocyanate 50	1.0 – 50.0 mg/l SCN^-		985 091
Tin 3	0.1 – 3.0 mg/l Sn		985 097
TOC 70 (*total* organic carbon) ***New!***	2 – 70 mg/l C		985 094
Turbidity	10 – 400 FAU	2 – 70 1/m	no reagents required
Zinc 4	0.1 – 4.0 mg/l Zn^{2+}		985 096

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