

Photometer AL250



The AL250 models each offer one test method, while the AL250+ units are programmed for a number of different parameters. The units supply accurate, reproducible results very quickly. Other major advantages include ease of operation, ergonomic design, compact dimensions and safe handling.

The calibration and software-based adjustment options mean that the AL250 is also suitable for use as a testing instrument.

The tests are conducted using either AQUALYTIC® tablet reagents with long-term stability and a guaranteed minimum 5 or 10 year shelf life, VARIO powder reagents or using liquid reagents.

Scroll Memory (SM)

To avoid unnecessary scrolling for the required test method, the instrument memorizes the last method used before switching off the instrument. When the instrument is switched on again, the scroll list comes up with the last used test method first.

N.I.S.T Traceability

The instruments have a factory calibration, which is related to internal standards which are not N.I.S.T traceable. The instrument may be calibrated by the user in a "user calibration mode" with N.I.S.T traceable standards.

(N.I.S.T. = National Institute of Standards and Technology)

Manufacturers Test Certificate M

Besides the "Certificate of Compliance" which is supplied with the AL250, manufacturers test certificates M are available at cost on request. Manufacturers test certificates M are individually supplied per instrument and per method.

The manufacturers test certificate M has to be ordered together with the new instrument and cannot be delivered at a later stage.

Delivery Content

Each AL250 is supplied in a case complete with 9 V battery, 3 round vials with lids, 1 stirring rod, 1 brush, 1 syringe, tablets and/or liquid reagents or VARIO Powder Packs, accessories, instruction manual, guarantee sheet and a certificate of compliance.



**Reagents (order codes),
please see pages 32 onwards**

Highlights

- Waterproof
- Automatic Switch-Off
- Real-Time-Clock and Date
- Calibration Mode
- Backlit Display
- Storage Function
- Suitable for use as a testing instrument

Test Methods AL250

Test	λ (nm)	Formula	Range	Reagent	Code
Aluminium	528	Al ³⁺	0.05–0.3 mg/l	ALUMINIUM No.1 / No.2	4206400
Ammonia	660	NH ₄ ⁺	0.02–1 ; 0.2–10 mg/l*	AMMONIA No.1 / No.2	4206500
Chlorine DPD ¹⁾ free, combined, total	528	Cl ₂	0.01–6 mg/l	DPD No.1 / No.3	4266900
Chlorine DPD ²⁾ free, combined, total	528	Cl ₂	0.01 – 4 mg / l	DPD Liquid Reagents	4267000
Chlorine PP ⁴⁾ free, combined, total	528	Cl ₂	0.01–2 mg/l	VARIO DPD Powder Chlorine FREE-DPD/F10 Chlorine TOTAL-DPD/F10	4269950
Chlorine HR (KI)	470	Cl ₂	5–200 mg/l	ACIDIFYING GP CHLORINE HR (KI)	4267100
Chloride	528	Cl ⁻	0.5–25 ; 5–250 mg / l*	CHLORIDE T1 / T2	4206800
COD ³⁾	430 605 605	O ₂ O ₂ O ₂	0 – 150 mg / l 0 – 1500 mg / l 0 – 15000 mg / l	Supplied without tube tests and reactor	4269250
COD	430 605 605	O ₂ O ₂ O ₂	0 – 150 mg / l 0 – 1500 mg / l 0 – 15000 mg / l	Supplied with tube tests (2 ranges) and reactor	4269240
Copper	528	Cu	0.05–5 mg/l	COPPER No.1 / No.2	4267200
Copper / Zinc	580	Cu/ Zn	0.02–1 mg / l	COPPER / ZINC LR / EDTA	4207210
DEHA	528		0.02 – 0.5 mg / l	DEHA-Reagents	4209700
Fluoride	580	F ⁻	0.05 – 2.0 mg / l	SPADNS-Reagent Solution ⁶⁾	4209300
Hardness, total	528	CaCO ₃	50–500 mg / l*	HARDCHECK P	4208010
Hazen	470	Pt-Co Units	0 - 500 mg Pt/l	No reagents required	4207240
Hydrazin	470	N ₂ H ₄	0.05 - 0.5 mg/l	HYDRAZINE TEST POWDER ⁷⁾	4207300
Hydr.Peroxide	528	H ₂ O ₂	0.05–3 mg / l	HYDROGEN PEROXIDE LR	4208600
Iron (II, III)	528	Fe	0.02 – 1 ; 0.2–10 mg / l*	IRON LR	4207400
Manganese	430	Mn	0.05 – 4 mg / l	MANGANESE LR 1 / LR 2	4209400
Nitrite LR	528	NO ₂	0.02–0.5 mg / l	NITRITE LR	4207600
Ozone (Indigo)	605	O ₃	0.05–0.5 mg / l	OZONE	4207700
Phosphate LR	660	PO ₄	0.05–4 mg / l	PHOSPHATE LR No.1 / No.2	4207900
Phosphate HR	470	PO ₄	10–100 mg / l	PHOSPHATE HR No.1 / No.2	4207800
Silica	580	SiO ₂	0.05–4 mg / l	SILICA No.1 / No.2/ P R	4208100
Suspended Solids	605		5–750 mg / l	No reagents required	4209270
Turbidity ⁵⁾	860		0.01–1100 NTU (FNU, TE/F)	No reagents required	4266020
Urea	660	CH ₄ N ₂ O	0.1–2.5 ; 0.2–5 mg / l*	UREA-Reagent 1/2 AMMONIA No.1 / No.2	4268500

Zinc, see Copper/Zinc

* High range by dilution ; ¹⁾ Kit with tablet reagents ; ²⁾ Kit with liquid reagents ;

³⁾ AL250 basic unit COD only ; ⁴⁾ PP = VARIO Powder Packs ;

⁵⁾ Turbidity: see pages 64 to 69 ; ⁶⁾ without reagents, must be ordered separately

⁷⁾ required accessories for filtration are not included

Test	λ (nm)	Range	Reagent	Resolution
Alkalinity-m (total)	605	5–200 mg/l CaCO ₃	Alka M-Photometer	1 mg/l CaCO ₃
Bromine	528	0.02 – 13 mg/l	DPD No.1	0.01 mg/l
Calcium Hardness	528	0 – 500 mg/l	Calcio H No.1 / No.2	1 mg/l CaCO ₃
Chlorine free, combined**, total Tablet Reagents	528	0.01 – 6 mg/l	DPD No.1 / No.3	0.01 mg/l
Chlorine free, combined**, total	528	0.01 – 4 mg/l	DPD Liquid Reagents	0.01 mg/l
Chlorine free, combined**, total Free/Total Chlorine***	528	0.01 – 2 mg/l	VARIO DPD Powder	0.01 mg/l
Chlorine HR (KI)	470	5 – 200 mg/l	Acidifying GP/Chlorine HR	1 mg/l
Chlorine Dioxide	528	0.02 – 11 mg/l	DPD No.1	0.01 mg/l
Copper (Biquinoline)	528	0.05 – 5 mg/l	Copper No.1/No.2	0.01 mg/l
Copper (Zincon)	580	0.02 – 1 mg/l	Copper/Zinc LR / EDTA	0.01 mg/l
Cyanuric Acid	528	2 – 160 mg/l*	Cyanuric Acid	1 mg/l
Iron	528	0.02 – 1 mg/l	Iron LR	0.01 mg/l
pH-value	528	6.5 – 8.4 pH	Phenol Red Photometer	0.01 mg/l
Urea	660	0.1 – 2.5 mg/l 0.2 – 5.0 mg/l*	Urease 1/2 AMMONIA No.1/No.2	0.1 mg/l

* by 1:1 sample dilution; ** may be calculated by deducting free from total chlorine

*** VARIO DPD-Powder is also suitable for use with Hach-Photometers

2in1

Item	Test	Code
2 in 1	Chlorine, pH-value with tablet reagents	4268940
2 in 1	Chlorine, pH-value with VARIO DPD Free/Total Chlorine (Powder)	4269960
2 in 1	Copper¹⁾, pH-value	4207230

3in1

Item	Test	Code
3 in 1	Chlorine, pH-value, Bromine	4266180
3 in 1	Chlorine Dioxide, Chlorine LR, HR	4268800
3 in 1	Chlorine, pH-value, Alkalinity, total (M) with tablet reagents	4268900
3 in 1	Chlorine, pH-value, Alkalinity, total (M) with liquid reagents for Chlorine and pH	4268930
3 in 1	Chlorine, pH-value, Cyanuric Acid with tablet reagents for Chlorine and pH	4266010
3 in 1	Chlorine, pH-value, Cyanuric Acid with liquid reagents for Chlorine and pH	4268200

¹⁾ Zincon

4in1

Item	Test	Code
4 in 1	Chlorine, pH-value, Cyanuric Acid, Alkalinity, total (M) with tablet reagents for Chlorine and pH	4266050
4 in 1	Chlorine, pH-value, Cyanuric Acid, Alkalinity, total (M) with liquid reagents for Chlorine and pH	4266054
4 in 1	Chlorine, pH-value, Cyanuric Acid, Urea	4269220
4 in 1	Chlorine, pH-value, Alkalinity, total (M), Urea	4266290

5in1

Item	Test	Code
5 in 1	Chlorine, pH-value, Cyanuric Acid, Alkalinity, total (M), Calcium Hardness	4266120
5 in 1	Chlorine, pH-value, Cyanuric Acid, Alkalinity, total (M), Iron	4206240

6in1

Item	Test	Code
6 in 1	Chlorine, Bromine, pH-value, Cyanuric Acid, Alkalinity, total (M), Calcium Hardness	4266190
6 in 1	Chlorine, pH-value, Cyanuric Acid, Alkalinity, total (M), Copper²⁾, Iron	4206210

²⁾ Biquinoline

Photometer AL450

Dual Beam Technology and Interference Filters for highest accuracy



The AL450 is a contemporary, microprocessor-controlled photometer with ergonomically designed keypad and large-format graphic display. It is equipped with a wide range of pre-programmed methods based on the proven range of AQUALYTIC® tablet reagents, liquid reagents, tube tests and powder reagents (VARIO Powder Packs). Users can also store their own methods.

The AL450 is a filter photometer using interference filters at 6 different wavelengths. The unique design of the optics allows the automatic selection of the required wavelength without any moving parts. This and the dual beam technology utilizing an internal reference channel, guarantees the highest accuracy.

For portable use, the instrument operates with seven standard rechargeable batteries (supplied). These batteries are available all over the world and are easily changed. The integrated intelligent charge controller allows simultaneous operation of the unit and battery charging (using the supplied power pack). The AL450 also operates without a power pack by using alkaline manganese batteries.

The entire instrument, including sample chamber (the most critical component of any photometer) and battery compartment, is waterproof, ensuring that no water comes in contact with the electronic components.

Highlights

- A wide range of pre-programmed methods
- Long-term stable LEDs as light sources
- Update of new methods and languages via Internet (free of charge)
- Interface
- Memory for 1000 data sets
- Mobile

N.I.S.T. Traceability

The instrument has a factory calibration, which is related to internal standards, which are not N.I.S.T traceable. The instrument may be calibrated by the user in a "user calibration mode" with N.I.S.T traceable standards.

(N.I.S.T. = National Institute of Standards and Technology)

New methods

Test methods are regularly updated to suit market requirements. You can find software updates for new methods and additional languages on our website at www.aqualytic.de.

Polynomials

With the help of an external mathematical program, the corresponding polynomial is created from data pairs (concentration/absorption). A known polynomial may also be used. 25 order polynomials ($y = A+Bx+Cx^2+Dx^3+Ex^4+Fx^5$) can be stored together with user-specific parameters such as wavelength, measuring range, unit and number of decimals

Concentration

This function can be used to measure 2 to 14 known standards. On the basis of the concentrations/absorption pairs obtained, the photometer will calculate a linear interpolation between the measured points. Up to 10 methods can be stored for further sample measurements.

Applications

- Waste Water
- Drinking Water
- Industrial Process Water
- Scientific & Research
- Governmental and Private Laboratories
- Mobile Applications

Delivery Content

The instrument is supplied complete and ready-to-use incl. 7 rechargeable batteries and mains charger, 100-240 V, PC connection cable, 3 x 24 mm vials, 3 x 16 mm vials, 1 adapter for 16 mm vials, 3 syringes of various sizes, 1 plastic beaker 100 ml, carrying case with water resistance foam, **but without reagents**.

Order code: 4210000

Order code: 4210005 (basic version)
with batteries instead of
rechargeable batteries,
without mains charger and
PC connection cable

Please specify the reagents or parameters required at time of order.

You can find updated information on parameters and measuring ranges on our website at www.aqualytic.de



Please see pages 34 onwards for tests, ranges and reagents



Photometer AL450



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➔ Please see pages 34 onwards for tests, ranges and reagents

Technical Data

Display	Graphic-display
Optics	6 temperature compensating LED, internal reference channel, photodiode in protected sample chamber
Wavelengths	6 interference filters in one unit, $\lambda_1 = 430 \text{ nm IF } \Delta\lambda \text{ (nm)} = 5$ $\lambda_2 = 530 \text{ nm IF } \Delta\lambda \text{ (nm)} = 5$ $\lambda_3 = 560 \text{ nm IF } \Delta\lambda \text{ (nm)} = 5$ $\lambda_4 = 580 \text{ nm IF } \Delta\lambda \text{ (nm)} = 5$ $\lambda_5 = 610 \text{ nm IF } \Delta\lambda \text{ (nm)} = 6$ $\lambda_6 = 660 \text{ nm IF } \Delta\lambda \text{ (nm)} = 5$ IF = interference filter
Interface	RS232 for printer and PC-connection
Download	Software and methods update by means of the internet
Operation	Acid and solvent resistant, touch-sensitive keypad with audible feedback
Power Supply	7 Ni-MH-battery pack (AA/Mignon), charged whilst in the unit with external mains charger, integrated overload cut-out
Dimensions (L x W x H)	265 x 195 x 70 mm
Weight (unit)	approx. 1000 g with rechargeable batteries
Ambient Conditions	up to max. 90 % humidity (non condensing) approx. 5–40 °C
Auto-Off	approx. 20 minutes after last keypress with no loss of data
Auto-Check	By pressing ON/OFF-key
Memory Capacity	approx. 1000 data sets with date, time and registration number
CE-Conformity	

Spectrophotometer AL800

Water and waste water testing
330 - 900 nm



The AL800 is a modern single-beam spectrophotometer with an excellent price/performance ratio that is specifically designed for water testing.

The instrument is equipped with a wide range of pre-programmed methods based on the proven range of AQUALYTIC® tube tests, tablet reagents, liquid reagents and powder reagents (Vario Powder Packs).

Optics

The AL800 is a single-beam spectral photometer (see illustration).

The light source is a tungsten halogen lamp with flash function. The lamp is switched on only momentarily during of the measurement process¹⁾, so there is no need for a warm-up period. The AL800 is ready to perform a self-test as soon as it is switched on.

The light passes through an entry slot to the monochromator, where it is split into spectral ranges. The monochromator is a holographically produced, transparent grating. The movable mirror ensures that light of the desired wavelength is focused automatically so that it passes through the exit slot, into the sample chamber and therefore through the water sample. The light that is not absorbed by the sample travels to the silicon photodiode detector. This signal is then evaluated by a micro-processor and shown as a result in the display.

¹⁾ (Exception: permanent light is used for a wavelength scan).

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➔ Please see pages 34 onwards for tests, ranges and reagents

Highlights

- Interface RS232
- Large illuminated display
- Touch-sensitive film keypad with logical layout
- Use of round vials and rectangular cells of different sizes without adapter
- 35 user-specific methods
- Fast, easy lamp change
- Update via Internet

Multifunctional sample chamber

Round vials measuring 16 mm and 24 mm in diameter and rectangular cells with pathlengths from 10 to 50 mm may be used without an adapter. Only the 10 mm cell will be fixed by a little holder that must be inserted into the sample chamber.

New methods

Test methods are continuously updated to suit market requirements.

You can find updates for new methods and additional languages on our website at www.aqualytic.de.

Functions

- Pre-programmed AQUALYTIC® methods
- Absorption
- Transmission
- Spectral data recording
- User calibration (polynomials)
- Concentration (linear)
- Kinetics

Self-test

After it is switched on, the AL800 automatically performs a self-test – beginning with a function test of the stepper motor and the halogen lamp, followed by an optics test. For this purpose, the unit has a built-in didymium glass filter. This filter checks the correct wavelength setting. If the wavelengths are incorrect, the optical system is automatically adjusted during the self-test.

Maintenance

Thanks to the design of the AL800, the only maintenance that is required is replacement of the light source. The lamp is situated at the back of the photometer in an easily accessible position. Changing the lamp is fast and simple and does not require any tools. The positioning of the assembly ensures optimum focusing of the halogen lamp.

Power supply

The required input voltage is 12 V. The AL800 is connected to an external power pack as standard. Battery operation is also possible by using an external energy station (see accessories).

Applications

- Waste Water
- Drinking Water
- Industrial Process Water
- Scientific & Research
- Governmental and Private Laboratories

Choice of language

The user prompt in the display can be switched to German, English, French, Italian, Spanish, Portuguese or Polish. If further languages are available they can be updated via internet.

N.I.S.T. Traceability

This spectrophotometer can be calibrated using a Secondary Standard Filter Set (order code 711160) which is N.I.S.T. traceable. Furthermore the instrument may be calibrated for each method in a "user calibration mode" with N.I.S.T. traceable standards.

(N.I.S.T. = National Institute of Standards and Technology)

Printer/PC connection

On the back of the AL800 photometer, there is an RS232 interface with a 9-pin D-Sub connector for connection of a PC or a printer with serial interface (see accessories).

Printing data

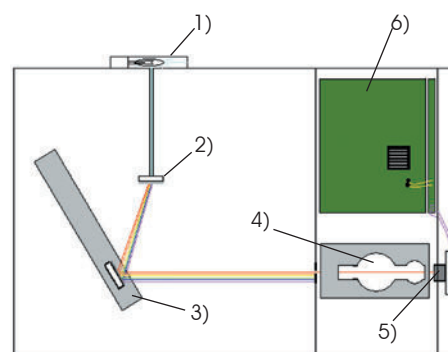
Every result is printed with date, time, reg. no, code no., measuring range and method number.

Storing data

You can store results of programmed and user-specific methods (polynomials) in a memory with a capacity of 1000 data sets. Alongside the result, the data sets contain information on method, date and time of the test.

User prompt

The user prompt is a convenient and easy to understand feature that guides the user step by step all the way through to the test result.



- | | |
|--------------------------|------------------------|
| 1) Tungsten halogen lamp | 4) Sample chamber |
| 2) Monochromator | 5) Silicon photodiode |
| 3) Movable mirror | 6) Microprocessor unit |

Technical data

Wavelength range	330 to 900 nm
Photometric range	-0.3 to 2.5 Abs
Spectral bandwidth	10 nm
Wavelength accuracy	±2 nm
Wavelength reproducibility	±1 nm
Light source	Pre-adjusted tungsten halogen lamp
Monochromator	Holographic grating
Detector	Silicon photodiode
Multifunctional sample chamber	Round vials 24 and 16 mm Ø, Rectangular cells 10-50 mm
Display	Backlit LCD graphic display
Language options	German, English, French, Italian, Spanish, Portugese
Storage capacity	1000 test data sets
Serial interface	RS232
Dimensions (L x W x H)	270 x 275 x 150 mm
Weight	approx. 3.2 kg
Power supply unit	Input: 100 - 240 V ~ 1.0 A 50 - 60 Hz Output: 12 V 30 W
CE-Conformity	

Accessories**Code**

Replacement halogen lamp	7110 00
Magnetical pin (for updates)	19801687
Connection cable to a PC	198197
Connection to a 12 V plug	711040
Case for transport	712050
Universal adapter for sockets	192065
Secondary standard set	711160
Plastic funnel with handle	471007
Cleaning cloth for vials	197635
Power supply unit 100-240 V / 50-60 Hz	711090
Power station, 230 V / 50 Hz with cable for connection	711050
12 round vials with lid Height 48 mm, 24 mm Ø	197620
5 round vials with lid Height 48 mm, 24 mm Ø	197629
10 round vials with lid Height 90 mm, 16 mm Ø	197665
W 100, rectangular cell optical glass OG, 10 mm path length	601040
W 100, rectangular cell optical glass OG, 50 mm path length	601070
W 110, rectangular cell Quartz-UV-glass, 10 mm path length	661130
Paper printer DPN 2335 with power pack (230 V, 50 Hz) connection cable and one paper roll	198075
Arsenic glass apparatus	370500
delivery content:	
Erlenmeyer flask	370501
Glass stopper	370502
Absorption tube	370503

additionally required (**not** included, please order separately):

W 100, cell, Optical-Glass-OG, 20 mm path length	601050
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AQUALYTIC® AL800**Spectrophotometer 330 - 900 nm**

complete with power supply unit (100-240 V, 50-60 Hz), two batteries for keeping data and serial cable for connection to a PC (D9F-D9M).

Order code: 4712000

AQUALYTIC® AL800**Spectrophotometer 330 - 900 nm**

in case as above, with energy station, replacement lamp, 12 round vials with lid (height 48 mm, ø 24 mm), 10 round vials with lid (height 90 mm, ø 16 mm), W 100 rectangular cell (50 mm path length), W 100 rectangular cell (10 mm path length), plastic stirring rod, but without reagents.

Order code: 4712005

We would be pleased to quote a ready to use spectrophotometer unit for the parameters and required accessories.



Please see pages 34 onwards for tests, ranges and reagents