

Operating instructions PUROTAP® AP-18



**Installation
Function
Operation
Maintenance**



ELYSATOR 
engineering water
www.elysator.com

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1. Conductivity meter



PUROTAP® EC-18

The PUROTAP® EC-18 tests conductivity, salts and salt concentration, with automatic temperature compensation (ATC). The LCD screen simultaneously shows the temperature compensated conductivity reading and the temperature of the liquid. The meter can be carried around as easily as a pen and has its own clip. The display has a backlight for work in dark places. The AAA batteries have a life of up to 400 hours. The automatic switch-off function extends the battery life.

Performing a test

Remove the cover and press the POWER button. Dip the probe into the liquid you wish to test and stir gently until the measurement stabilises. Press the HOLD button, so the reading can be taken when the probe is out of the liquid. Press the HOLD button again to prepare for the next test.



If only one water sample is available for pH and conductivity testing, the conductivity test must be carried out before the pH test. Conductivity is increased by pH testing.



Cleaning

Calibration

The conductivity meter is factory calibrated and will generally not need recalibration.

Water hardness conversion factor for domestic hot water

Electrical conductivity is a measure of the total mineral content in water. The mineral content of untreated drinking water is composed almost exclusively of the hardness-forming substances calcium and magnesium. This means that a formula can be used to convert the mineral content into water hardness. The measurement in microsiemens divided by 20 gives the water hardness in °fH. The measurement in microsiemens divided by 35 gives the water hardness in °dH.

Conductivity reading ($\mu\text{S}/\text{cm}$) / 20 = °fH value

Conductivity reading ($\mu\text{S}/\text{cm}$) / 35 = °dH value

Corrosion at high conductivity levels

Corrosion in heating systems is caused by oxygen, acid and dissolved salts. The speed at which corrosion takes place, however, is mainly dictated by electrical conductivity. The higher the electrical conductivity, the faster the process of corrosion.

Reading 0 – 100 ($\mu\text{S}/\text{cm}$)	inhibited corrosion
Reading 100 – 350 ($\mu\text{S}/\text{cm}$)	very slow corrosion
Reading 350 – 500 ($\mu\text{S}/\text{cm}$)	slow corrosion
Reading > 500 ($\mu\text{S}/\text{cm}$)	accelerated corrosion



Detailed operating instructions can be found on the internet under the product PUROTAP® EC-18 or by scanning the QR code opposite.

2. Neodymium magnet



The super magnet can be placed in a sample pot and used to separate rust particles containing magnetic iron oxide from any other deposits. If the particles adhere to the magnet, this tells you that they are the product of iron corrosion (dissolved iron is not magnetic and therefore also cannot be drawn out using a magnet).

3. pH meter



PUROTAP® PH-18

The PUROTAP® PH-18 is a portable meter for pH testing, with calibration and automatic temperature compensation (ATC). The LCD screen simultaneously shows the temperature compensated pH readings and the temperature of the liquid. The meter can be carried around as easily as a pen and has its own clip. The display has a backlight for work in dark places. The AAA batteries have a life of up to 400 hours. The automatic switch-off function extends the battery life.

Keeping the probe ready for operation

The probe needs to be kept moist using the electrode storage solution. For this, the cap is completely filled with the solution. Salt deposits (due to the potassium salt in the solution) on the cap are to be expected after a certain period of time.



Performing a test

Remove the cover and press the POWER button.

Dip the probe into the liquid you wish to test, stir gently and wait until the reading stabilises. This may take several minutes in desalinated water.

Press the HOLD button, so the reading can be taken when the probe is out of the liquid. Press the HOLD button again to prepare for the next test.

The probe should be rinsed afterwards with desalinated water if the water being tested is contaminated. Fill the cap with electrode storage solution, refit it and switch off the device by pressing the POWER button (for longer than 3 seconds).



After each test, the probe must be cleaned with demineralised water.



If only one water sample is available for pH and conductivity testing, the conductivity test must be carried out before the pH test. Conductivity is increased by pH testing!



Testing the pH value of demineralised water is difficult, as it is not very conductive. The test can therefore take several minutes. To simplify testing, 1-2 drops of the electrode storage solution can be added to the sample. This drastically increases conductivity and makes pH testing easier.

pH calibration

Correct calibration is essential for accurate results. The device must always be calibrated before use.

Switch the meter on and dip it into the pH 7.00 buffer solution. If the reading is pH 7.00, repeat the process with pH 10.00 buffer solution. Calibration is not necessary if both tests produce a correct value.

If calibration is required, press the middle CAL button for 3 seconds. The CAL symbol will flash. Use the right-hand button (up arrow) to select pH 7.00. Dip the probe into the pH 7.00 buffer solution and wait for the pH value to settle. Confirm with the middle button (only press the CAL button briefly 1 x). Use the right-hand button (up arrow) to select pH 10.00. Dip the probe into the

pH 10.00 buffer solution and wait for the pH value to settle. Confirm with the middle button (only press the CAL button briefly 1 x). Calibration is now complete. Switch the device off. (The device can also be calibrated with a pH 4.00 solution).



Between calibrations, the probe must always be cleaned with demineralised water.

Calibrating solutions



Calibrating solutions only have the specified pH value at the correct temperature.

Temperature	Calibrating solution pH 7.00	Calibrating solution pH 10.00
10 °C	7.06	10.17
20 °C	7.02	10.05
25 °C	7.00	10.00
30 °C	6.99	9.96

Probe

The service life of the probe is 12 – 18 months. After this, it must be replaced.



Detailed operating instructions can be found on the internet under the product PUROTAP® PH-18 or by scanning the QR code opposite.

4. Total hardness testing



Make sure you have the correct test kit!

French hardness kit °fH (item no. 102 072)

German hardness kit °dH (item no. 102 071)

1. Rinse the titration vessel with the sample water to be tested and fill to the 5 ml mark.
2. Whilst carefully swirling the vessel, add the reagent solution drop by drop until the colour changes from red to green. The colour change is relatively slow. The number of drops required multiplied by a factor of 2 gives the total hardness in French/German degrees of hardness. (1 drop equates to 2 °fH/2 °dH)
3. For water samples with low hardness, fill the titration vessel to the 10 ml mark. (1 drop then equates to 1 °fH/1 °dH)

Please note:

If the water hardness is below 1 °fH/1 °dH, the sample will turn green after one drop of reagent is added. Rinse the titration vessel in clean water after use.

$$^{\circ}\text{dH} \times 1.78 = ^{\circ}\text{fH} \quad | \quad ^{\circ}\text{fH}: 1.78 = ^{\circ}\text{dH}$$

5. Responsibility and checking

As soon as a heating system passes the factory acceptance test, responsibility for water quality and record keeping passes from the contractor to the owner of the system. This is the moment when the installer or engineer gives the system user a handbook containing the analysis of the fill water quality and results of the initial check carried out after 2 months. To request a report, contact: info@elysator.com. All professionally serviced heating systems are subject to an annual check. It should be noted that SWKI-compliant checks [Switzerland], though not a statutory requirement, are recommended to

ensure the component manufacturer's warranty conditions are met. A maintenance contract that includes a water analysis would therefore have benefits all round.

"Fill water must be analysed before the system is filled."

[Art. 5, SWKI BT 102-01]

"Initial check of the pH value after 2 months, or at least ... during annual maintenance."

"The water analysis must be recorded."

[Art. 5 SWKI BT 102-01]

Straightforward, assured compliance with the applicable guidelines and standards with our case:

• SWKI BT 102-01 • VDI 2035 • ÖNORM H 5195-1

6. Fill and top-up water

For modern heat generators and heating system components to operate properly, the fill and top-up water needs to be treated to prevent damage. Even low level scaling can cause heat to build up on heat transfer surfaces, thus overloading the heat exchanger. This can result in thermal shocks that will damage the equipment.

Requirements for fill and top-up water for all heating systems according to SWKI BT-102-01.

Total hardness	< 1	°fH
Electrical conductivity	< 100	µS
pH value	6.0 - 8.5	pH

7. Circulating or system water

Three things are necessary to prevent corrosion in heating systems:

1. low salinity,
2. a high pH value and
3. the absence of aggressive gases in the water.

If the system has been designed correctly and filled with desalinated water, the values can balance out within the required range (additional checks will still be needed). If the pH value has to be corrected, inorganic alkalinising agents should be used. If oxidation (rusting) has occurred, we would recommend using sacrificial anodes.

Requirements for circulating water for all heating systems according to SWKI BT-102-01.

Total hardness	< 5	°fH
Electrical conductivity	< 200	µS
pH value	8.2 – 10.0	pH
Chlorides	< 30	mg/ l
Sulphates	< 50	mg/ l
Dissolved oxygen	< 0.1	mg/ l
Dissolved iron	< 0.5	mg/ l
TOC (total organic carbon)	< 30	mg/ l

8. Spare parts

Item no.	Designation
100 280	PUROTAP® device batteries AAA
102 107	PUROTAP® calibrating solution pH 7.00
102 411	PUROTAP® calibrating solution pH 10.00
102 071	PUROTAP® total hardness test drops -°dH
102 072	PUROTAP® total hardness test drops -°fH
102 444	PUROTAP® storage solution for pH probe
102 413	PUROTAP® PH-18 maintenance kit (storage solution, calibrating solution pH 7.00 & pH 10.00, replacement probe)