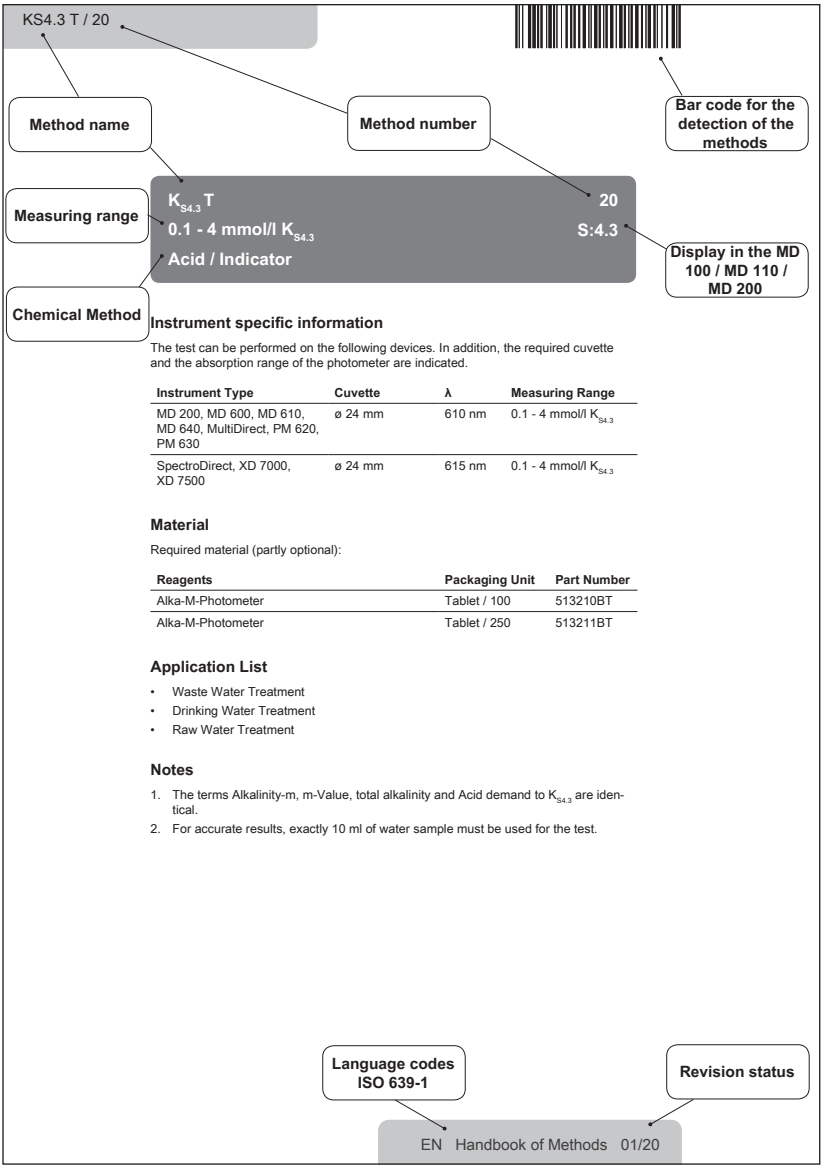
Lovibond® Water Testing

Tintometer® Group

Manual of Methods

MD 100 • MD 110 • MD 200

Acid Capacity | Chlorine | pH | Urea



Instrument specific information

The test can be performed on the following devices. In addition, the required cuvette and the absorption range of the photometer are indicated.

Instrument Type	Cuvette	λ	Measuring Range
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630	ø 24 mm	610 nm	0.1 - 4 mmol/l $K_{S4.3}$
SpectroDirect, XD 7000, XD 7500	ø 24 mm	615 nm	0.1 - 4 mmol/l $K_{S4.3}$

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Alka-M-Photometer	Tablet / 100	513210BT
Alka-M-Photometer	Tablet / 250	513211BT

Application List

- Waste Water Treatment
- Drinking Water Treatment
- Raw Water Treatment

Notes

1. The terms Alkalinity-m, m-Value, total alkalinity and Acid demand to $K_{S4.3}$ are identical.
2. For accurate results, exactly 10 ml of water sample must be used for the test.

Performing test procedure

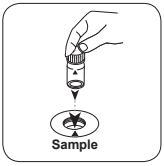
Implementation of the provision Acid capacity $K_{S4.3}$ with Tablet

Select the method on the device

For this method, no ZERO measurements are to be carried out with the following devices: XD 7000, XD 7500

Fill 24 mm vial with **10 ml sample**.

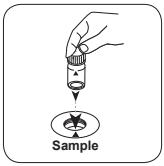
Close vial(s).



Place **sample vial** in the sample chamber. • Pay attention to the positioning.

• • •

Dissolve tablet(s) by inverting.



Place **sample vial** in the sample chamber. • Pay attention to the positioning.

Press the **TEST** (XD: **START**) button.

The result in Acid Capacity $K_{S4.3}$ appears on the display.

$K_{S4.3}$ T — M20

0.1 - 4 mmol/L $K_{S4.3}$ — S:4.3

Acid / Indicator

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Alka-M-Photometer	Tablet / 100	513210BT
Alka-M-Photometer	Tablet / 250	513211BT

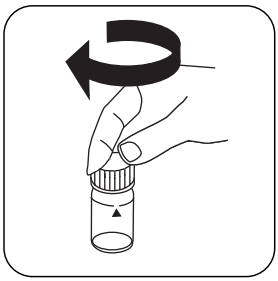
Notes

1. The terms Alkalinity-m, m-Value, total alkalinity and Acid demand to $K_{S4.3}$ are identical.
2. For accurate results, exactly 10 ml of water sample must be used for the test.

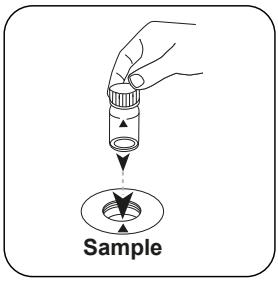
Determination of Acid capacity $K_{S4.3}$ with Tablet

Select the method on the device.

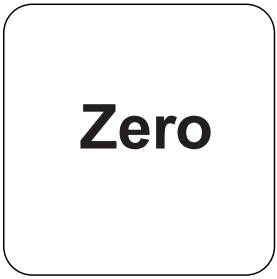
Fill 24 mm vial with **10 mL sample**.



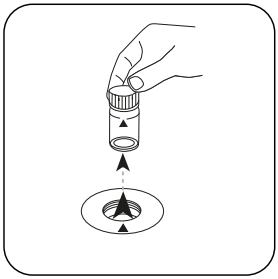
Close vial(s).



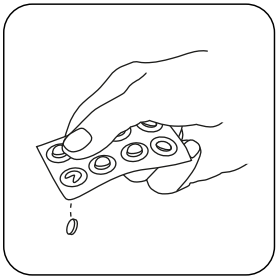
Place **sample vial** in the sample chamber. Pay attention to the positioning.



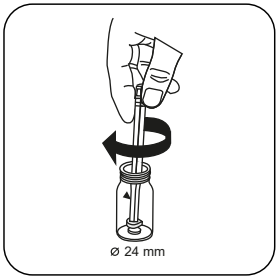
Press the **ZERO** button.



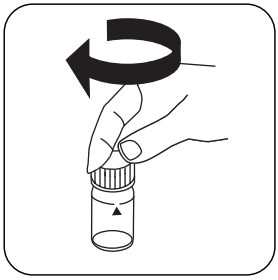
Remove the vial from the sample chamber.



Add **ALKA-M-PHOTOMETER tablet**.



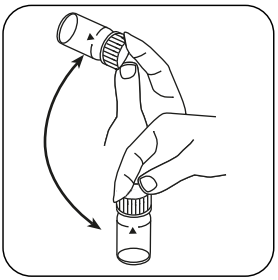
Crush tablet(s) by rotating slightly.



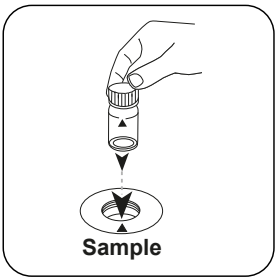
Close vial(s).

EN

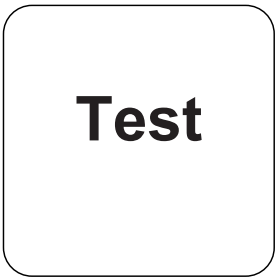
EN



Dissolve tablet(s) by inverting.



Place **sample vial** in the sample chamber. Pay attention to the positioning.



Press the **TEST** (XD: **START**)button.

The result in Acid Capacity $K_{S4.3}$ appears on the display.

Chemical Method

Acid / Indicator

Appendix

Derived from

DIN 38409 - H 7-2

Chlorine T M100

0.01 - 6.0 mg/L Cl_2 [a] CL6

DPD

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
DPD No.1	Tablet / 100	511050BT
DPD No. 1	Tablet / 250	511051BT
DPD No. 1	Tablet / 500	511052BT
DPD No. 3	Tablet / 100	511080BT
DPD No. 3	Tablet / 250	511081BT
DPD No. 3	Tablet / 500	511082BT
DPD No. 1 High Calcium [e]	Tablet / 100	515740BT
DPD No. 1 High Calcium [e]	Tablet / 250	515741BT
DPD No. 1 High Calcium [e]	Tablet / 500	515742BT
DPD No. 3 High Calcium [e]	Tablet / 100	515730BT
DPD No. 3 High Calcium [e]	Tablet / 250	515731BT
DPD No. 3 High Calcium [e]	Tablet / 500	515732BT
DPD No. 4	Tablet / 100	511220BT
DPD No. 4	Tablet / 250	511221BT
DPD No. 4	Tablet / 500	511222BT
DPD No. 3 Evo	Tablet / 100	511420BT
DPD No. 3 Evo	Tablet / 250	511421BT
DPD No. 3 Evo	Tablet / 500	511422BT
DPD No. 4 Evo	Tablet / 100	511970BT
DPD No. 4 Evo	Tablet / 250	511971BT
DPD No. 4 Evo	Tablet / 500	511972BT

Available Standards

Title	Packaging Unit	Part Number
ValidCheck Chlorine 1,5 mg/l	1 pc.	48105510

Sampling

1. When preparing the sample, chlorine outgassing, e.g. through the pipette or shaking, must be avoided.
2. The analysis must take place immediately after taking the sample.

Preparation

1. Cleaning of vials:
   As many household cleaners (e.g. dishwasher detergent) contain reducing substances, this can lead to lower results with the determination of chlorine. To avoid measurement errors, the glassware used should be free of chlorine consumption. To achieve this, all glassware should be placed in a sodium hypochlorite solution (0.1 g/L) for one hour and then rinsed thoroughly with deionised water.
2. For individual testing of free and total chlorine, the use of different sets of glassware is recommended (EN ISO 7393-2, 5.3)
3. The DPD colour development is carried out at a pH value of 6.2 to 6.5. The reagents therefore contain a buffer for the pH adjustment. Strong alkaline or acidic water samples must therefore be adjusted between pH 6 and pH 7 before the analysis (use 0.5 mol/L sulphuric acid or 1 mol/L sodium hydroxide).

Notes

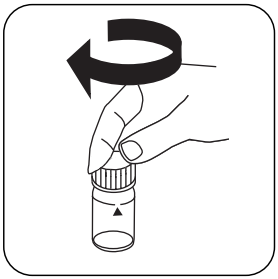
1. Evo tablets can be used as an alternative to the corresponding standard tablet (e.g. DPD No.3 Evo instead of DPD No.3).

EN

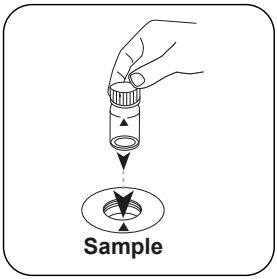
Determination of free chlorine with tablet

Select the method on the device.

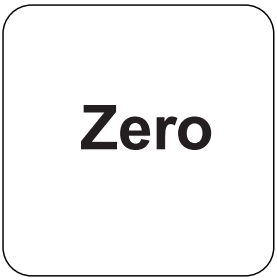
Fill 24 mm vial with **10 mL sample**.



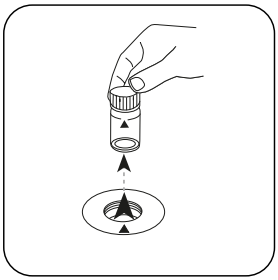
Close vial(s).



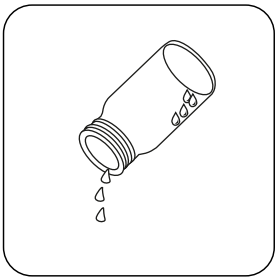
Place **sample vial** in the sample chamber. Pay attention to the positioning.



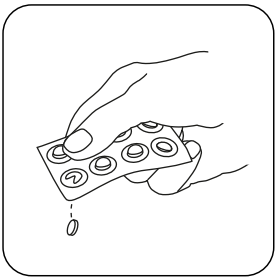
Press the **ZERO** button.



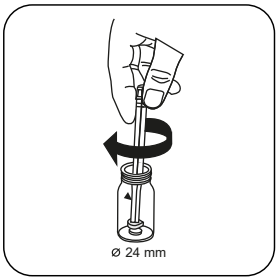
Remove the vial from the sample chamber.



Empty vial except for a few drops.

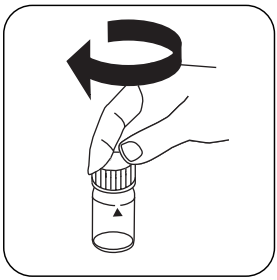


Add **DPD No. 1 tablet** .

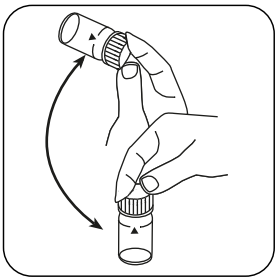


Crush tablet(s) by rotating slightly.

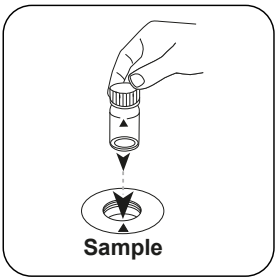
Fill up vial with **sample** to the **10 mL mark**.



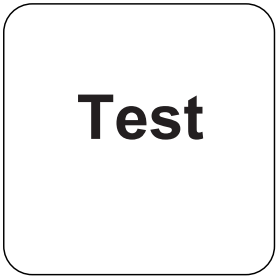
Close vial(s).



Dissolve tablet(s) by inverting.



Place **sample vial** in the sample chamber. Pay attention to the positioning.



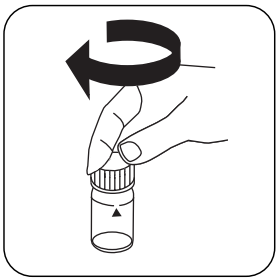
Press the **TEST** (XD: **START**)button.

The result in mg/L free chlorine appears on the display.

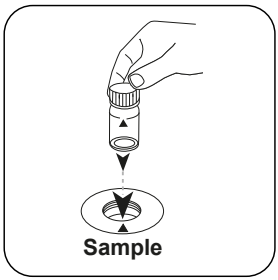
Determination of total Chlorine with tablet

Select the method on the device.

Fill 24 mm vial with **10 mL sample**.

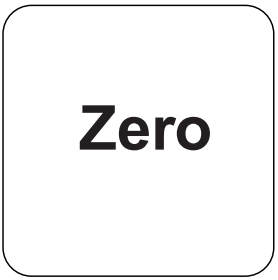


Close vial(s).

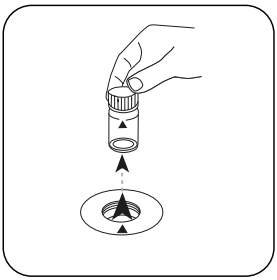


Place **sample vial** in the sample chamber. Pay attention to the positioning.

EN

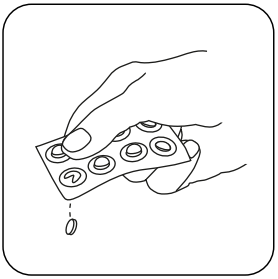


Press the **ZERO** button.

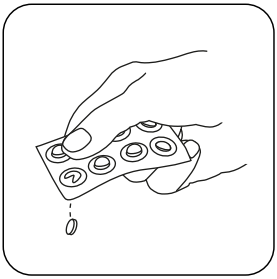


Remove the vial from the sample chamber.

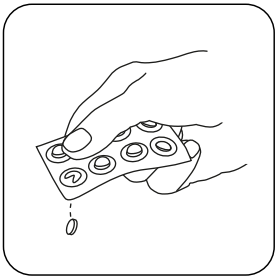
Empty vial except for a few drops.



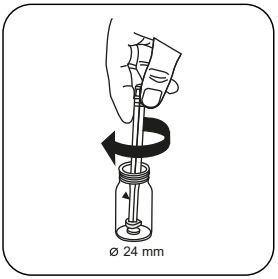
Add **DPD No. 1 tablet** .



Add **DPD No. 3 tablet** .

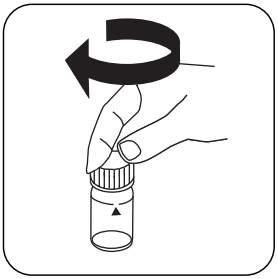


As an alternative to DPD No. 1 and No. 3 tablets, a DPD No. 4 tablet can be added.

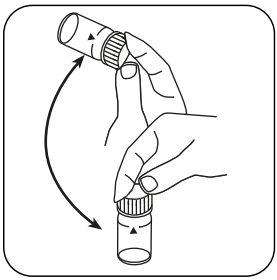


Crush tablet(s) by rotating slightly.

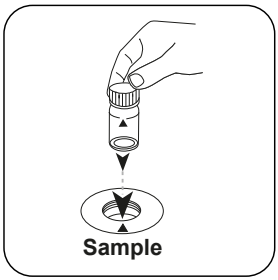
Fill up vial with **sample** to the **10 mL mark**.



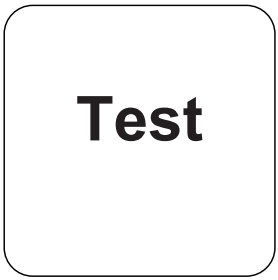
Close vial(s).



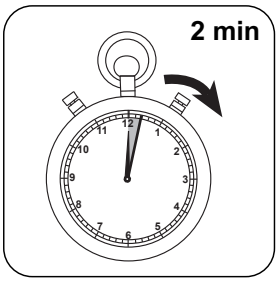
Dissolve tablet(s) by inverting.



Place **sample vial** in the sample chamber. Pay attention to the positioning.



Press the **TEST** (XD: **START**)button.



Wait for **2 minute(s) reaction time**.

Once the reaction period is finished, the measurement takes place automatically.

The result in mg/L total Chlorine appears on the display.

Chemical Method

DPD

Appendix

EN

Interferences

Persistant Interferences

- All oxidising agents in the samples react like chlorine, which leads to higher results.

Removeable Interferences

- Interference from copper and iron (III) are eliminated by the addition of EDTA.
- The use of reagent tablets in samples with high calcium content* and/or high conductivity* can lead to turbidity of the sample and therefore incorrect measurements. In this case, the alternative reagent tablet DPD No.1 High Calcium and reagent tablet DPD No.3 High Calcium should be used.
  *it is not possible to give exact values, because the development of turbidity depends on the composition and nature of the sample.
- Concentrations above 10 mg/L chlorine, in the event of using fluid reagents, can lead to results within the measuring range of up to 0 mg/L. In the event of a high concentration of chlorine, the sample must be diluted with chlorine-free water. 10 mL of the diluted sample should be mixed with the reagent and the measurement taken again (plausibility test).

Interference	from / [mg/L]
CrO_4^{2-}	0.01
MnO_2	0.01

Method Validation

Limit of Detection	0.02 mg/L
Limit of Quantification	0.06 mg/L
End of Measuring Range	6 mg/L
Sensitivity	2.05 mg/L / Abs
Confidence Intervall	0.04 mg/L
Standard Deviation	0.019 mg/L
Variation Coefficient	0.87 %

Conformity

EN ISO 7393-2

[a] determination of free, combined and total | [e] alternative reagent, used instead of DPD No.1/No.3 in case of turbidity in the water sample caused by high concentration of calcium and/or high conductivity

Chlorine L M101

0.02 - 4.0 mg/L Cl_2 [a] CL6

DPD

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
DPD 1 Buffer Solution, Blue Bottle	15 mL	471010
DPD 1 Buffer Solution	100 mL	471011
DPD 1 Buffer Solution	1 pc.	471016
DPD 1 Reagent Solution, Green Bottle	15 mL	471020
DPD 1 Reagent Solution	100 mL	471021
DPD 1 Reagent Solution	1 pc.	471026
DPD 3 Solution, Red Bottle	15 mL	471030
DPD 3 Solution	100 mL	471031
DPD 3 Solution	1 pc.	471036
DPD Reagent Set	1 pc.	471056

Available Standards

Title	Packaging Unit	Part Number
ValidCheck Chlorine 1,5 mg/l	1 pc.	48105510

Sampling

1. When preparing the sample, Chlorine outgassing, e.g. through the pipette or shaking, must be avoided.
2. The analysis must take place immediately after taking the sample.

Preparation

1. Cleaning of vials:
   As many household cleaners (e.g. dishwasher detergent) contain reducing substances, this can lead to lower results with the determination of Chlorine. To avoid measurement errors, the glassware used should be free of chlorine consumption. To achieve this, all glassware should be placed in a sodium hypochlorite solution (0.1 g/L) for one hour and then rinsed thoroughly with deionised water.
2. For individual testing of free and total Chlorine, the use of different sets of glassware is recommended (EN ISO 7393-2, 5.3)
3. The DPD colour development is carried out at a pH value of 6.2 to 6.5. The reagents therefore contain a buffer for the pH adjustment. Strong alkaline or acidic water samples must therefore be adjusted between pH 6 and pH 7 before the analysis (use 0.5 mol/l Sulphuric acid or 1 mol/l Sodium hydroxide).

Notes

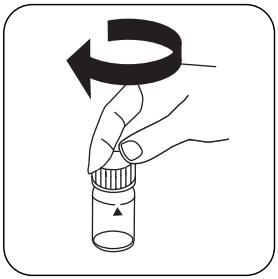
1. After use, ensure the cuvettes are once again closed with the respective same-coloured screw caps.
2. Reagent sets are to be stored in the cool at +6 °C to +10 °C.

EN

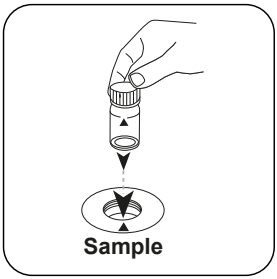
Determination of free chlorine with liquid reagent

Select the method on the device.

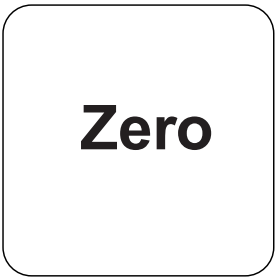
Fill 24 mm vial with **10 mL sample**.



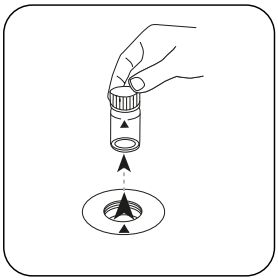
Close vial(s).



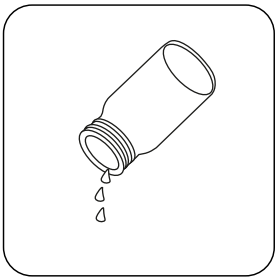
Place **sample vial** in the sample chamber. Pay attention to the positioning.



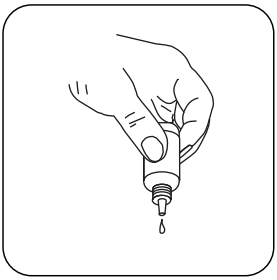
Press the **ZERO** button.



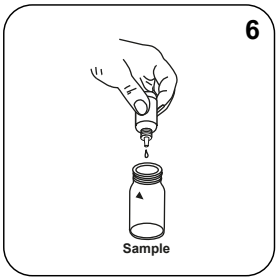
Remove the vial from the sample chamber.



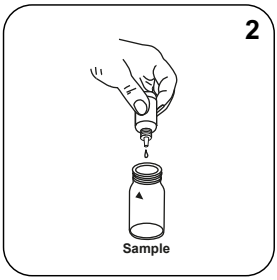
Empty vial.



Hold cuvettes vertically and add equal drops by pressing slowly.

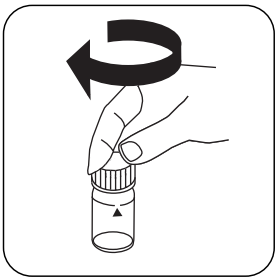


Add **6 drops DPD 1 Buffer Solution** to the **sample vial**.

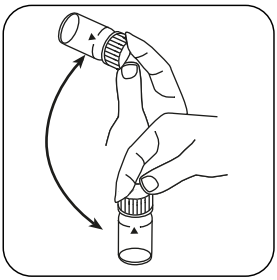


Add **2 drops DPD 1 Reagent Solution** to the **sample vial**.

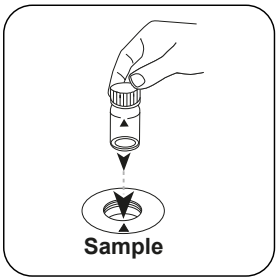
Fill up vial with **sample** to the **10 mL mark**.



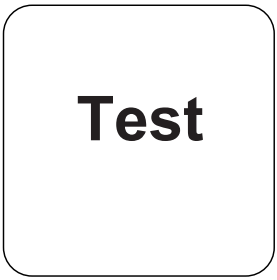
Close vial(s).



Invert several times to mix the contents.



Place **sample vial** in the sample chamber. Pay attention to the positioning.



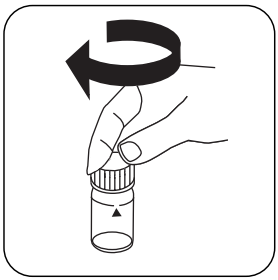
Press the **TEST** (XD: **START**)button.

The result in mg/L free chlorine appears on the display.

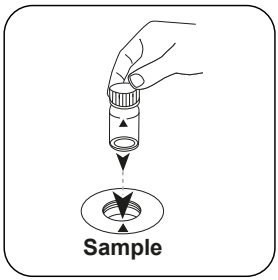
Determination of totale Chlorine with liquid reagent

Select the method on the device.

Fill 24 mm vial with **10 mL sample**.

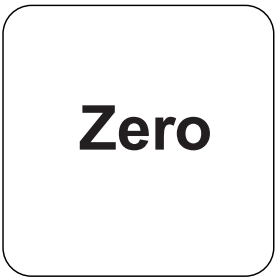


Close vial(s).

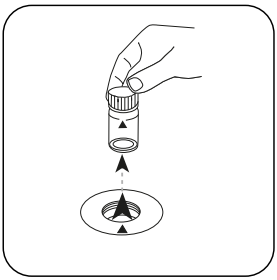


Place **sample vial** in the sample chamber. Pay attention to the positioning.

EN

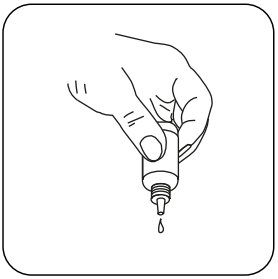


Press the **ZERO** button.

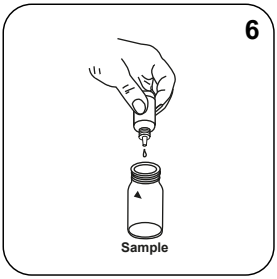


Remove the vial from the sample chamber.

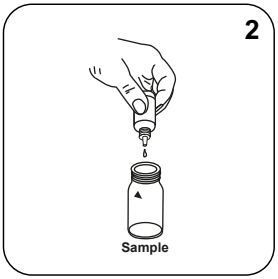
Empty vial.



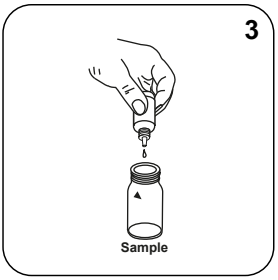
Hold cuvettes vertically and add equal drops by pressing slowly.



Add **6 drops DPD 1 Buffer Solution** to the **sample vial**.

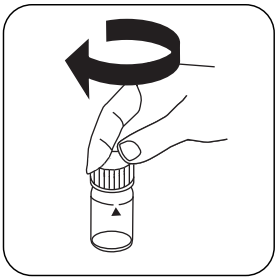


Add **2 drops DPD 1 Reagent Solution** to the **sample vial**.

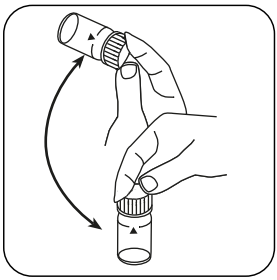


Add **3 drops DPD 3 Solution** to the **sample vial**.

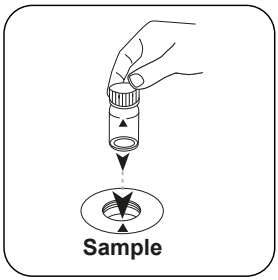
Fill up vial with **sample** to the **10 mL mark**.



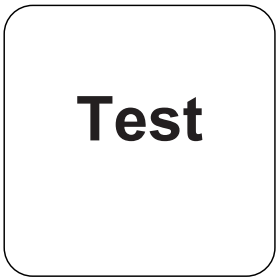
Close vial(s).



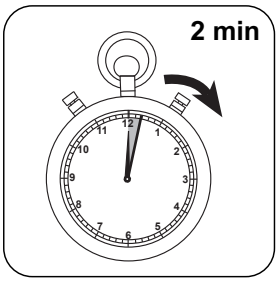
Invert several times to mix the contents.



Place **sample vial** in the sample chamber. Pay attention to the positioning.



Press the **TEST** (XD: **START**)button.



Wait for **2 minute(s) reaction time**.

Once the reaction period is finished, the measurement takes place automatically.

The result in mg/L total Chlorine appears on the display.

Chemical Method

DPD

Appendix

EN

Interferences

Persistant Interferences

- All oxidising agents in the samples react like chlorine, which leads to higher results.

Removeable Interferences

- Interference from Copper and Iron (III) are eliminated by the addition of EDTA.
- Concentrations above 4 mg/L Chlorine, in the event of using fluid reagents, can lead to results within the measuring range of up to 0 mg/L. In this case, the sample must be diluted with chlorine-free water. 10 ml of the diluted sample should be mixed with the reagent and the measurement taken again (plausibility test).

Interference	from / [mg/L]
CrO_4^{2-}	0,01
MnO_2	0,01

Conformity

EN ISO 7393-2

[a] determination of free, combined and total

Chlorine HR T M103

0.1 - 10 mg/L Cl_2 [a] CL10

DPD

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
DPD No. 1 HR	Tablet / 100	511500BT
DPD No. 1 HR	Tablet / 250	511501BT
DPD No. 1 HR	Tablet / 500	511502BT
DPD No. 3 HR	Tablet / 100	511590BT
DPD No. 3 HR	Tablet / 250	511591BT
DPD No. 3 HR	Tablet / 500	511592BT
Set DPD No. 1 HR/No. 3 HR 100 Pc. [#]	100 each	517791BT
Set DPD No. 1 HR/No. 3 HR 250 Pc. [#]	250 each	517792BT
DPD No. 1 High Calcium [e]	Tablet / 100	515740BT
DPD No. 1 High Calcium [e]	Tablet / 250	515741BT
DPD No. 1 High Calcium [e]	Tablet / 500	515742BT
DPD No. 3 High Calcium [e]	Tablet / 100	515730BT
DPD No. 3 High Calcium [e]	Tablet / 250	515731BT
DPD No. 3 High Calcium [e]	Tablet / 500	515732BT
DPD No.3 HR Evo	Tablet / 100	511920BT
DPD No. 3 HREvo	Tablet / 250	511921BT
DPD No. 3 HREvo	Tablet / 500	511922BT

Sampling

1. When preparing the sample, chlorine outgassing, e.g. through the pipette or shaking, must be avoided.
2. The analysis must take place immediately after taking the sample.

Preparation

1. Cleaning of vials:
   As many household cleaners (e.g. dishwasher detergent) contain reducing substances, this can lead to lower results with the determination of chlorine. To avoid measurement errors, the glassware used should be free of chlorine consumption. To achieve this, all glassware should be placed in a sodium hypochlorite solution (0.1 g/L) for one hour and then rinsed thoroughly with deionised water.
2. For individual testing of free and total chlorine, the use of different sets of glassware is recommended (EN ISO 7393-2, 5.3)
3. The DPD colour development is carried out at a pH value of 6.2 to 6.5. The reagents therefore contain a buffer for the pH adjustment. Strong alkaline or acidic water samples must therefore be adjusted between pH 6 and pH 7 before the analysis (use 0.5 mol/L sulphuric acid or 1 mol/L sodium hydroxide).

Notes

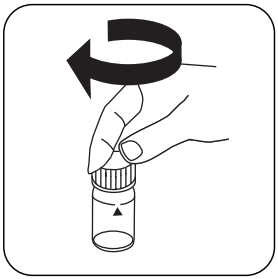
1. Evo tablets can be used as an alternative to the corresponding standard tablet (e.g. DPD No.3 Evo instead of DPD No.3).

EN

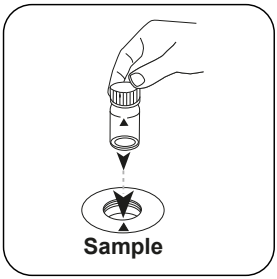
Determination of free chlorine HR with tablet

Select the method on the device.

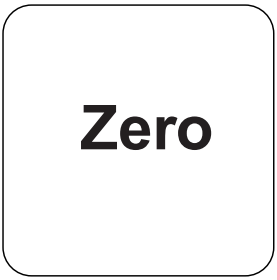
Fill 24 mm vial with **10 mL sample**.



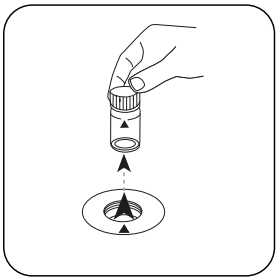
Close vial(s).



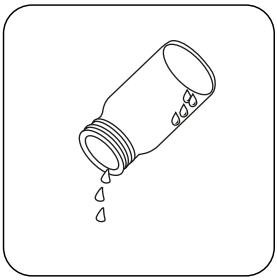
Place **sample vial** in the sample chamber. Pay attention to the positioning.



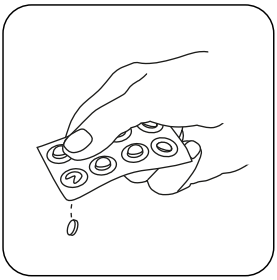
Press the **ZERO** button.



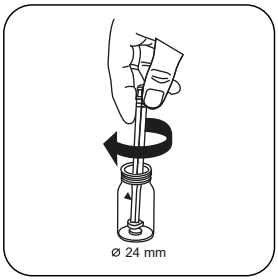
Remove the vial from the sample chamber.



Empty vial except for a few drops.

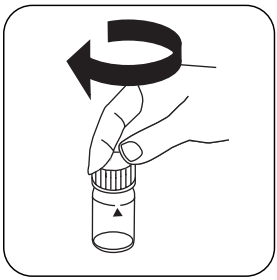


Add **DPD No. 1 HR tablet**.

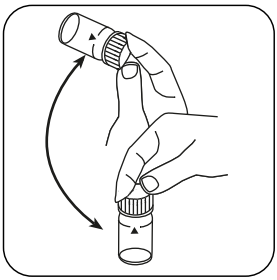


Crush tablet(s) by rotating slightly.

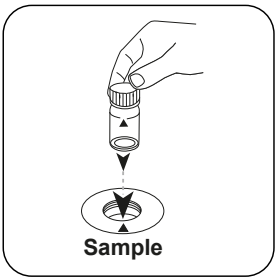
Fill up vial with **sample** to the **10 mL mark**.



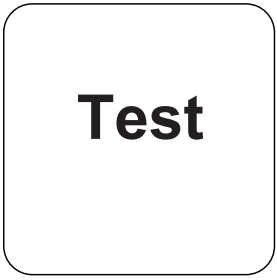
Close vial(s).



Dissolve tablet(s) by inverting.



Place **sample vial** in the sample chamber. Pay attention to the positioning.



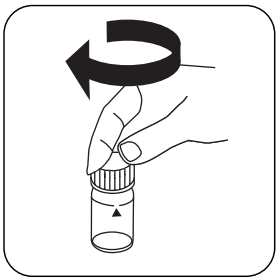
Press the **TEST** (XD: **START**)button.

The result in mg/L free chlorine appears on the display.

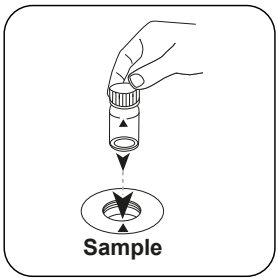
Determination of total Chlorine HR with tablet

Select the method on the device.

Fill 24 mm vial with **10 mL sample**.

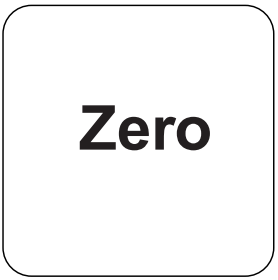


Close vial(s).

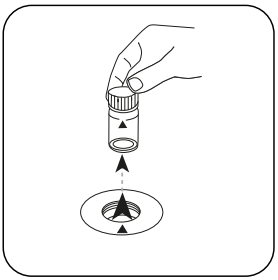


Place **sample vial** in the sample chamber. Pay attention to the positioning.

EN

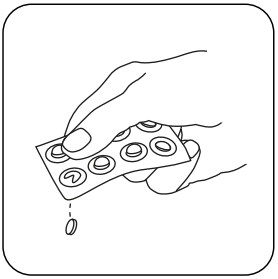


Press the **ZERO** button.

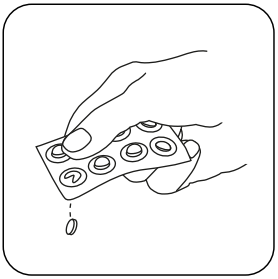


Remove the vial from the sample chamber.

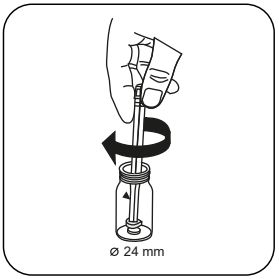
Empty vial except for a few drops.



Add **DPD No. 1 HR tablet**.



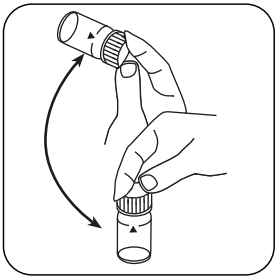
Add **DPD No. 3 HR tablet**.



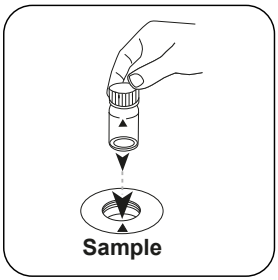
Crush tablet(s) by rotating slightly.

Fill up vial with **sample** to the **10 mL mark**.

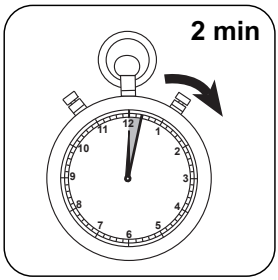
Close vial(s).



Dissolve tablet(s) by inverting.



Test



Place **sample vial** in the sample chamber. Pay attention to the positioning.

Press the **TEST** (XD: **START**)button.

Wait for **2 minute(s) reaction time**.

Once the reaction period is finished, the measurement takes place automatically.

The result in mg/L total Chlorine appears on the display.

Chemical Method

DPD

Appendix

EN

Interferences

Persistant Interferences

- All oxidising agents in the samples react like chlorine, which leads to higher results.

Removeable Interferences

- Interference from Copper and Iron (III) are eliminated by the addition of EDTA.
- The use of reagent tablets in samples with high Calcium content* and/or high conductivity* can lead to turbidity of the sample and therefore incorrect measurements. In this case, the alternative reagent tablet DPD No. 1 High Calcium and reagent tablet DPD No. 3 High Calcium should be used.
  *it is not possible to give exact values, because the development of turbidity depends on the composition and nature of the sample.

Conformity

EN ISO 7393-2

[a)] determination of free, combined and total | [e)] alternative reagent, used instead of DPD No.1/No.3 in case of turbidity in the water sample caused by high concentration of calcium and/or high conductivity | [#] including stirring rod, 10 cm

pH-value T M330

6.5 - 8.4 pH PH

Phenol Red

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Phenol Red Photometer	Tablet / 100	511770BT
Phenol Red Photometer	Tablet / 250	511771BT
Phenol Red Photometer	Tablet / 500	511772BT

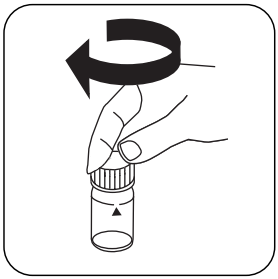
Notes

1. For photometric determination of pH values only use PHENOL RED tablets in black printed foil pack and marked with PHOTOMETER.

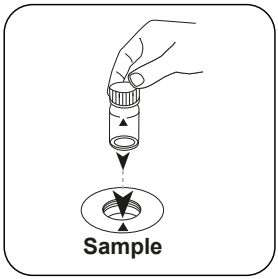
Determination of pH-value with Tablet

Select the method on the device.

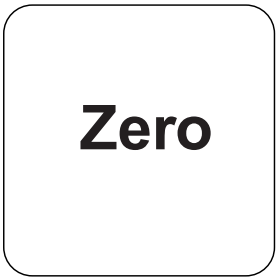
Fill 24 mm vial with **10 mL sample**.



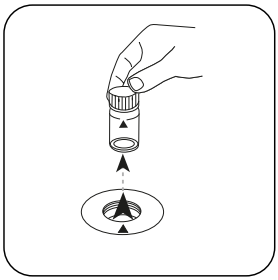
Close vial(s).



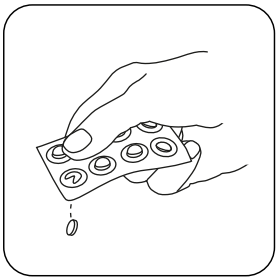
Place **sample vial** in the sample chamber. Pay attention to the positioning.



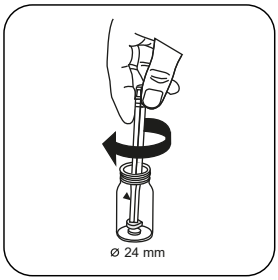
Press the **ZERO** button.



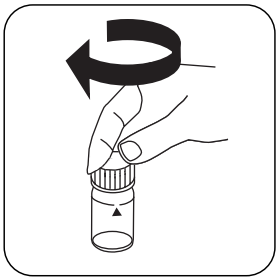
Remove the vial from the sample chamber.



Add **PHENOL RED PHOTOMETER tablet**.

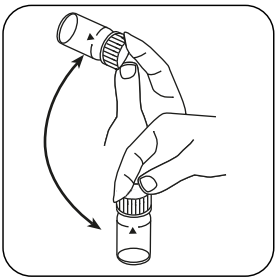


Crush tablet(s) by rotating slightly.

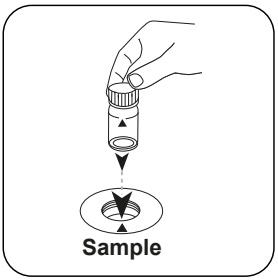


Close vial(s).

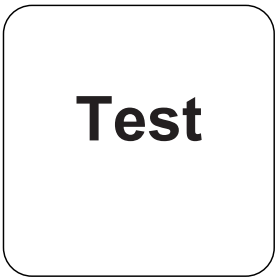
EN



Dissolve tablet(s) by inverting.



Place **sample vial** in the sample chamber. Pay attention to the positioning.



Press the **TEST** (XD: **START**)button.

The result in pH value appears on the display.

Chemical Method

Phenol Red

Appendix

Interferences

Persistant Interferences

1. Water samples with little Carbonate hardness* can lead to false pH values.
   *$K_{S4.3}$ < 0.7 mmol/l ≙ total alkalinity < 35 mg/L $CaCO_3$.

Removeable Interferences

1. pH values below 6.5 and above 8.4 can produce results inside the measuring range. A plausibility test (pH-meter) is recommended.
2. Salt error
   For salt concentrations below 2 g/L, no significant error, is expected due to the salt concentration of the reagent tablet. For higher salt concentrations the measurement values
   have to be adjusted as follows:

Salt content per sample in g/L	30 (seawater)	60	120	180
Correction	-0.15[1)]	-0.21[2)]	-0.26[2)]	-0.29[2)]

[1)] according to Kolthoff (1922)
[2)] according to Parson and Douglas (1926)

Bibliography

Colorimetric Chemical Analytical Methods, 9th Edition, London

pH value L M331

6.5 - 8.4 pH PH

Phenol Red

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Phenol Red Solution	15 mL	471040
Phenol Red Solution	100 mL	471041
Phenol Red Solution in 6-pack	1 pc.	471046

Preparation

1. Due to differing drop sizes results can show a discrepancy in accuracy by comparison with tablets.
   This can be minimised by using a pipette (0.18 ml equivalent to 6 drops).

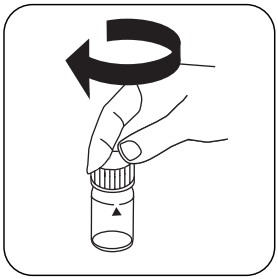
Notes

1. After use, ensure the cuvette is once again closed with the same-coloured screw caps.
2. Reagents are to be stored in the cool at +6 °C to +10 °C.

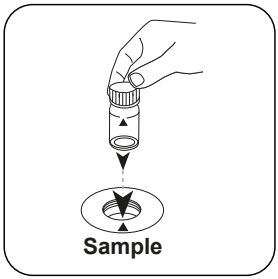
Determination of pH-value with liquid reagent

Select the method on the device.

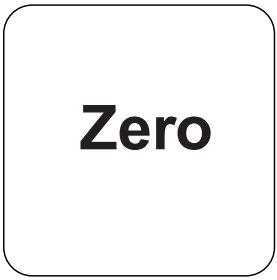
Fill 24 mm vial with **10 mL sample**.



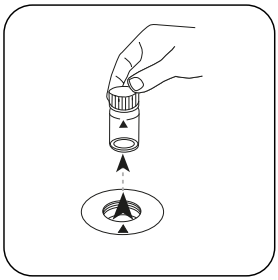
Close vial(s).



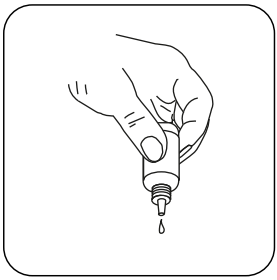
Place **sample vial** in the sample chamber. Pay attention to the positioning.



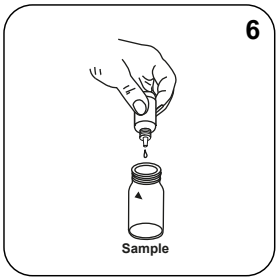
Press the **ZERO** button.



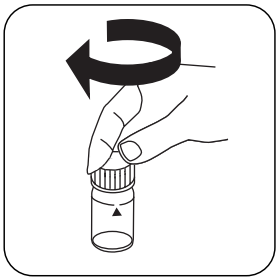
Remove the vial from the sample chamber.



Hold cuvettes vertically and add equal drops by pressing slowly.

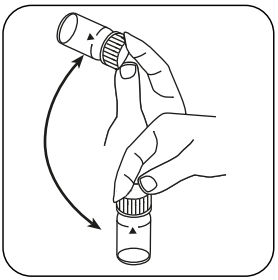


Add **6 drops PHENOL Red-Lösung** to the **sample vial**.

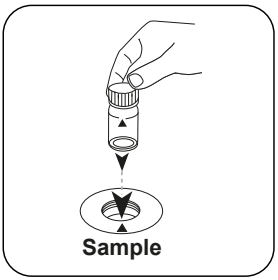


Close vial(s).

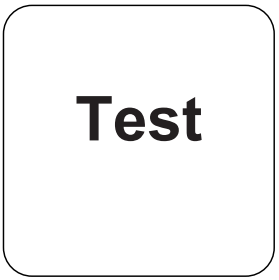
EN



Invert several times to mix the contents.



Place **sample vial** in the sample chamber. Pay attention to the positioning.



Press the **TEST** (XD: **START**)button.

The result in pH value appears on the display.

Chemical Method

Phenol Red

Appendix

Interferences

Removeable Interferences

1. Salt error Correction of test results (average values) for samples with salt contents of:

2.

Salt content of the sample	Correction
30 g/L (seawater)	-0.15 [1)]
60 g/L	-0.21 [2)]
120 g/L	-0.26 [2)]
180 g/L	-0.29 [2)]
[1)] according to Kolthoff (1922)	[2)] according to Parson and Douglas (1926)

3. When testing chlorinated water the residual chlorine contents can influence the colour reaction of the liquid reagent. This can be avoided by adding a small crystal of Sodiumthiosulphate ($Na_2S_2O_3 \cdot 5\ H_2O$) to the sample solution before adding the PHENOL RED solution.

Bibliography

Colorimetric Chemical Analytical Methods, 9th Edition, London

Urea T M390

0.1 - 2.5 mg/L Urea Ur1

Indophenol / Urease

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
UREA Reagent 1	15 mL	459300
UREA Reagent 2	10 mL	459400
Ammonia No. 1	Tablet / 100	512580BT
Ammonia No. 1	Tablet / 250	512581BT
Ammonia No. 2	Tablet / 100	512590BT
Ammonia No. 2	Tablet / 250	512591BT
Set Ammonia No. 1/No. 2 100 Pc.#	100 each	517611BT
Set Ammonia No. 1/No. 2 250 Pc.#	250 each	517612BT
Ammonia Conditioning Powder	Powder / 26 g	460170
Urea Pretreat (compensates for the interference of free Chlorine up to 2 mg/l)	Tablet / 100	516110BT
UREA Reagent Set	1 Set	517800BT

Preparation

1. The temperature of the sample should be between 20 °C and 30 °C.
2. The analysis must take place within one hour after taking the sample at the latest.
3. With the analysis of sea water samples, before the addition of Ammonia No. 1 Tablet, two scoops of ammonium conditioning powder must be added to the sample and dissolved by swirling.

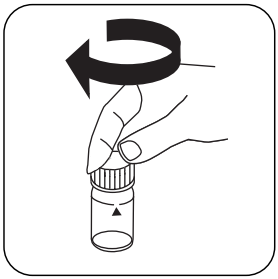
Notes

1. The AMMONIA No. 1 tablet will only dissolve completely after the AMMONIA No. 2 Tablet has been added.
2. Ammonium and chloramines are accounted for in the urea determination.

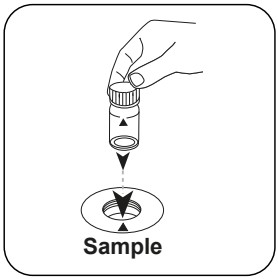
Determination of Urea with Tablet and Liquid Reagent

Select the method on the device.

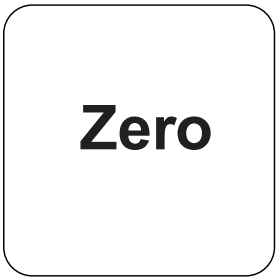
Fill 24 mm vial with **10 mL sample**.



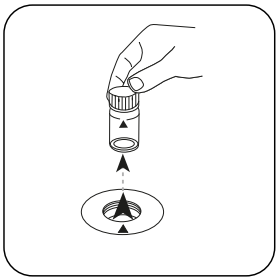
Close vial(s).



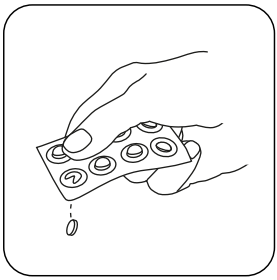
Place **sample vial** in the sample chamber. Pay attention to the positioning.



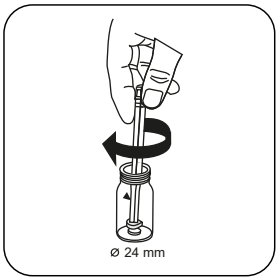
Press the **ZERO** button.



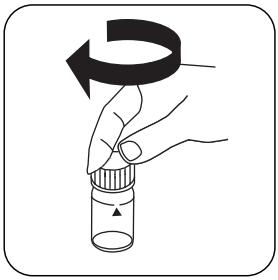
Remove the vial from the sample chamber.



If free chlorine (HOCl) is present, add **a UREA PRETREAT tablet**.

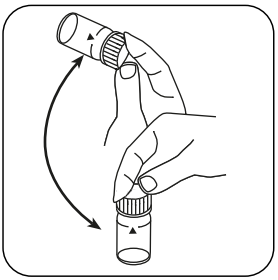


Crush tablet(s) by rotating slightly.

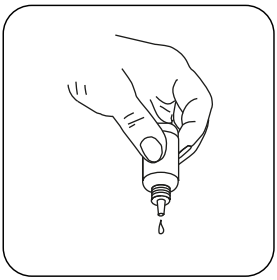


Close vial(s).

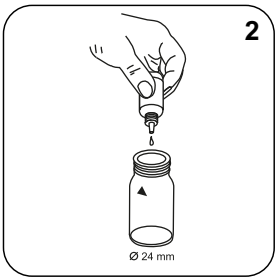
EN



Dissolve tablet(s) by inverting.

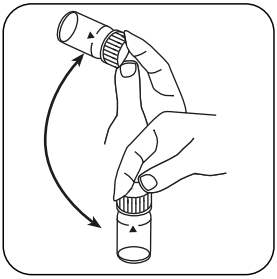


Hold cuvettes vertically and add equal drops by pressing slowly.

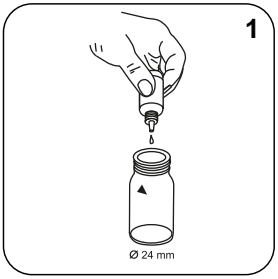


Add **2 drops Urea Reagenz 1**.

Close vial(s).

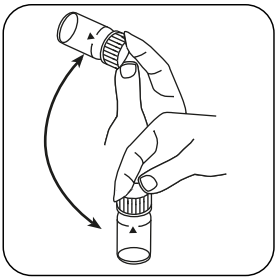


Invert several times to mix the contents.

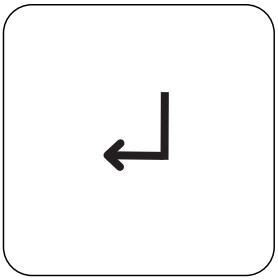


Add **1 drops Urea Reagenz 2**.

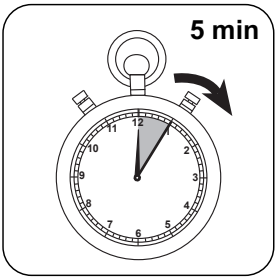
Close vial(s).



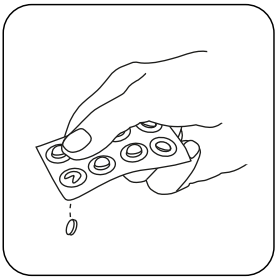
Invert several times to mix the contents.



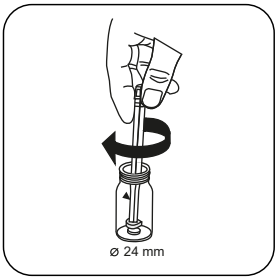
Press the **ENTER** button.



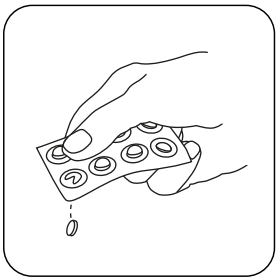
Wait for **5 minute(s) reaction time**.



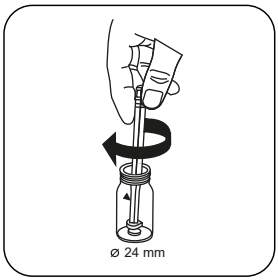
Add **AMMONIA No.1 tablet** .



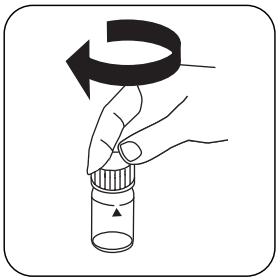
Crush tablet(s) by rotating slightly.



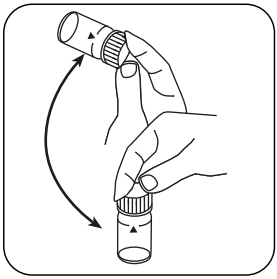
Add **AMMONIA No.2 tablet** .



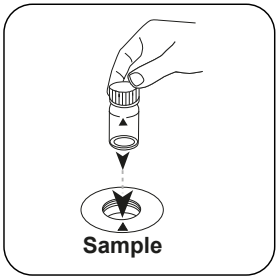
Crush tablet(s) by rotating slightly.



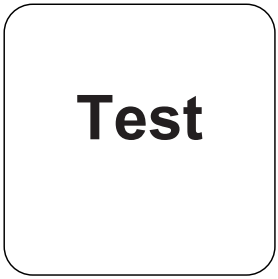
Close vial(s).



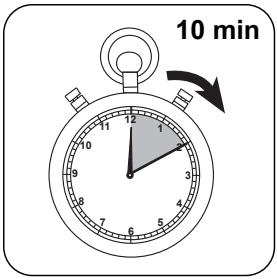
Dissolve tablet(s) by inverting.



Place **sample vial** in the sample chamber. Pay attention to the positioning.



Press the **TEST** (XD: **START**)button.



Wait for **10 minute(s) reaction time**.

Once the reaction period is finished, the measurement takes place automatically.

The result in mg/L Urea appears on the display.

Chemical Method

Indophenol / Urease

Appendix

EN

Interferences

Persistant Interferences

- Concentrations above 2 mg/L urea can lead to results within the measuring range. In this case, the water sample must be diluted with water that is free from urea and the measurement must be repeated (plausibility test).

Removeable Interferences

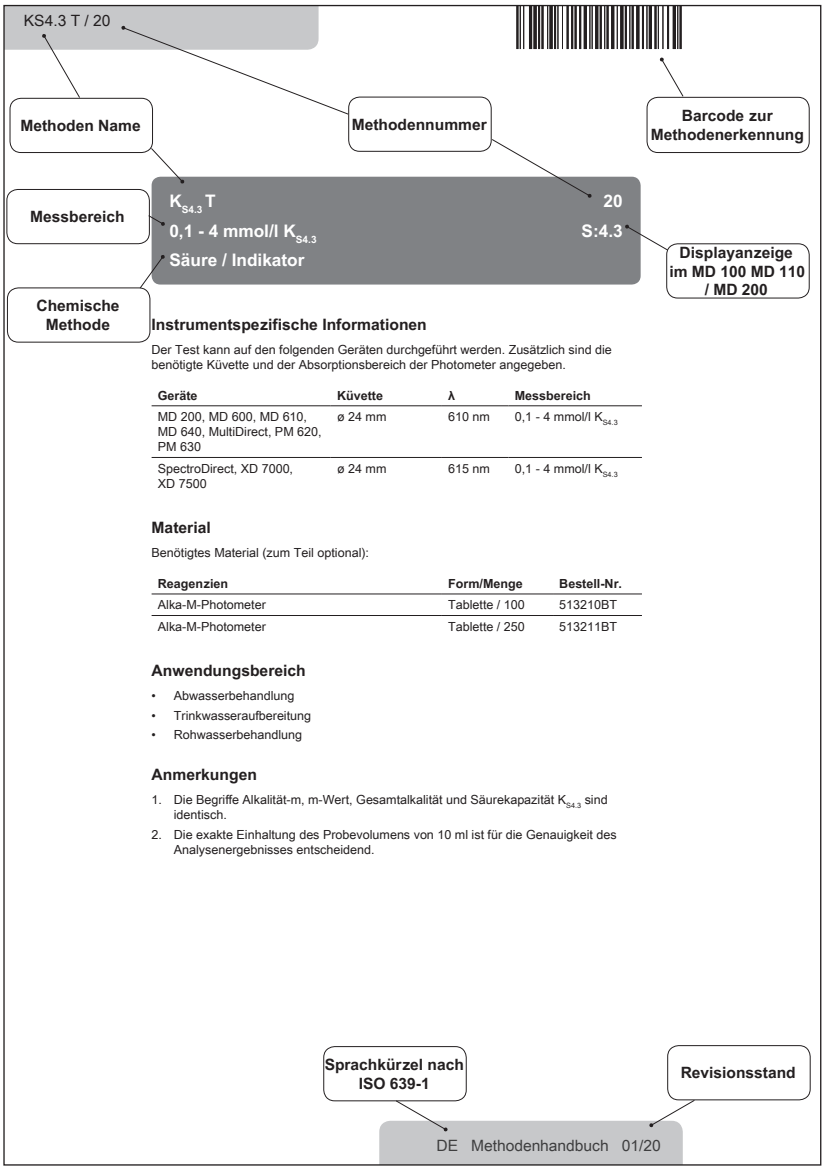
- A UREA PRETREAT Tablet eliminates the interference of free chlorine up to 2 mg/L (two tablets up to 4 mg/L, 3 tablets up to 6 mg/L).

Interference	from / [mg/L]
Cl_2	2

Bibliography

R.J. Creno, R.E. Wenk, P. Bohling, Automated Micromeasurement of Urea Using Urease and the Berthelot Reaction, American Journal of Clinical Pathology (1970), 54 (6), p. 828-832

including stirring rod, 10 cm



Instrumentspezifische Informationen

Der Test kann auf den folgenden Geräten durchgeführt werden. Zusätzlich sind die benötigte Küvette und der Absorptionsbereich der Photometer angegeben.

Geräte	Küvette	λ	Messbereich
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630	ø 24 mm	610 nm	0,1 - 4 mmol/l $K_{S4.3}$
SpectroDirect, XD 7000, XD 7500	ø 24 mm	615 nm	0,1 - 4 mmol/l $K_{S4.3}$

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
Alka-M-Photometer	Tablette / 100	513210BT
Alka-M-Photometer	Tablette / 250	513211BT

Anwendungsbereich

- Abwasserbehandlung
- Trinkwasseraufbereitung
- Rohwasserbehandlung

Anmerkungen

1. Die Begriffe Alkalität-m, m-Wert, Gesamtalkalität und Säurekapazität $K_{S4.3}$ sind identisch.
2. Die exakte Einhaltung des Probevolumens von 10 ml ist für die Genauigkeit des Analysenergebnisses entscheidend.

Durchführung der Messung

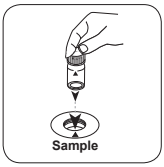
Durchführung der Bestimmung Säurekapazität $K_{S4.3}$ mit Tablette

Die Methode im Gerät auswählen.

Für diese Methode muss bei folgenden Geräten keine ZERO-Messung durchgeführt werden: XD 7000, XD 7500

24-mm-Küvette mit **10 ml Probe** füllen.

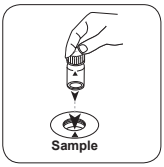
Küvette(n) verschließen.



Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

• • •

Tablette(n) durch Umschwenken lösen.



Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

Taste **TEST** (XD: **START**) drücken.

In der Anzeige erscheint das Ergebnis als Säurekapazität $K_{S4.3}$.

$K_{S4.3}$ T — M20

0,1 - 4 mmol/L $K_{S4.3}$ — S:4.3

Säure / Indikator

DE

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
Alka-M-Photometer	Tablette / 100	513210BT
Alka-M-Photometer	Tablette / 250	513211BT

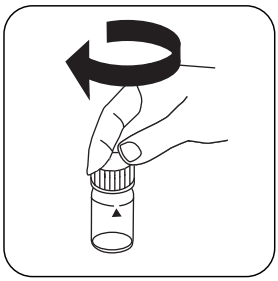
Anmerkungen

1. Die Begriffe Alkalität-m, m-Wert, Gesamtalkalität und Säurekapazität $K_{S4.3}$ sind identisch.
2. Die exakte Einhaltung des Probevolumens von 10 ml ist für die Genauigkeit des Analysenergebnisses entscheidend.

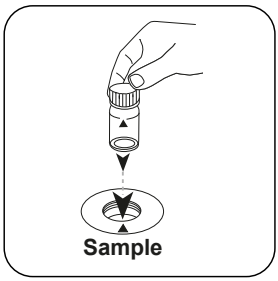
Durchführung der Bestimmung Säurekapazität $K_{S4.3}$ mit Tablette

Die Methode im Gerät auswählen.

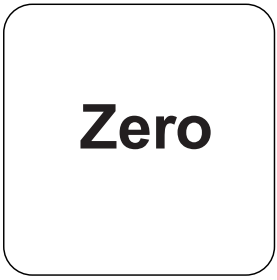
24-mm-Küvette mit **10 mL Probe** füllen.



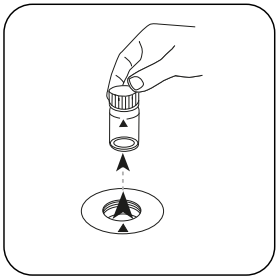
Küvette(n) verschließen.



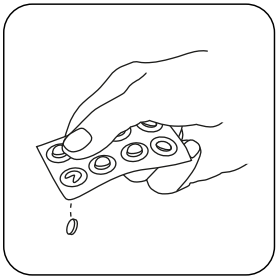
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



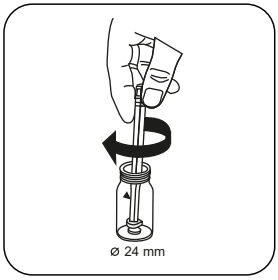
Taste **ZERO** drücken.



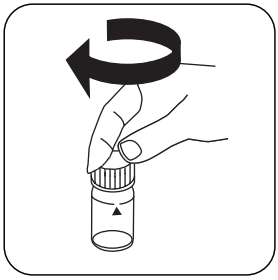
Küvette aus dem Messschacht nehmen.



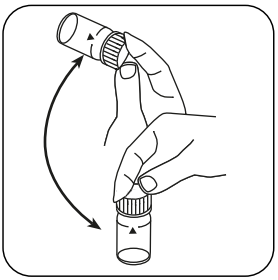
Eine **ALKA-M-PHOTOMETER Tablette** zugeben.



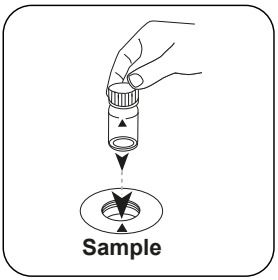
Tablette(n) unter leichter Drehung zerdrücken.



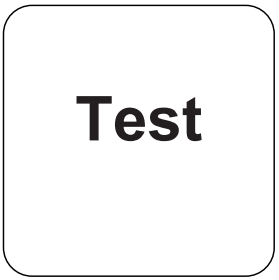
Küvette(n) verschließen.



Tablette(n) durch Umschwenken lösen.



Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



Taste **TEST** (XD: **START**) drücken.

In der Anzeige erscheint das Ergebnis als Säurekapazität $K_{S4.3}$.

Chemische Methode

Säure / Indikator

Appendix

Abgeleitet von
DIN 38409 - H 7-2

Chlor T M100

0,01 - 6,0 mg/L Cl_2 [a] CL6

DPD

DE

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
DPD No.1	Tablette / 100	511050BT
DPD No. 1	Tablette / 250	511051BT
DPD No. 1	Tablette / 500	511052BT
DPD No. 3	Tablette / 100	511080BT
DPD No. 3	Tablette / 250	511081BT
DPD No. 3	Tablette / 500	511082BT
DPD No. 1 High Calcium [e]	Tablette / 100	515740BT
DPD No. 1 High Calcium [e]	Tablette / 250	515741BT
DPD No. 1 High Calcium [e]	Tablette / 500	515742BT
DPD No. 3 High Calcium [e]	Tablette / 100	515730BT
DPD No. 3 High Calcium [e]	Tablette / 250	515731BT
DPD No. 3 High Calcium [e]	Tablette / 500	515732BT
DPD No. 4	Tablette / 100	511220BT
DPD No. 4	Tablette / 250	511221BT
DPD No. 4	Tablette / 500	511222BT
DPD No. 3 Evo	Tablette / 100	511420BT
DPD No. 3 Evo	Tablette / 250	511421BT
DPD No. 3 Evo	Tablette / 500	511422BT
DPD No.4 Evo	Tablette / 100	511970BT
DPD No. 4 Evo	Tablette / 250	511971BT
DPD No. 4 Evo	Tablette / 500	511972BT

Verfügbare Standards

Titel	Verpackungseinheit	Bestell-Nr.
ValidCheck Chlor 1,5 mg/L	1 St.	48105510

Probenahme

1. Bei der Probenvorbereitung muss das Ausgasen von Chlor, z.B. durch Pipettieren und Schütteln, vermieden werden.
2. Die Analyse muss unmittelbar nach der Probenahme erfolgen.

Vorbereitung

1. Reinigung der Küvetten:
   Da viele Haushaltsreiniger (z.B. Geschirrspülmittel) reduzierende Stoffe enthalten, kann es bei der Bestimmung von Chlor zu Minderbefunden kommen. Um diesen Messfehler auszuschließen, sollten die Glasgeräte chlorzehrungsfrei sein. Dazu werden die Glasgeräte für eine Stunde unter Natriumhypochloritlösung (0,1 g/L) aufbewahrt und danach gründlich mit VE-Wasser (Vollentsalztes Wasser) gespült.
2. Für die Einzelbestimmung von freiem Chlor und Gesamtchlor ist es sinnvoll, jeweils einen eigenen Satz Küvetten zu verwenden (siehe EN ISO 7393-2, Abs. 5.3).
3. Die DPD-Farbentwicklung erfolgt bei einem pH-Wert von 6,2 bis 6,5. Die Reagenzien enthalten daher einen Puffer zur pH-Wert Einstellung. Stark alkalische oder saure Wässer müssen jedoch vor der Analyse in einen pH-Bereich zwischen 6 und 7 gebracht werden (mit 0,5 mol/L Schwefelsäure bzw. 1 mol/L Natronlauge).

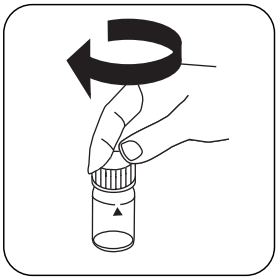
Anmerkungen

1. Evo-Tabletten können alternativ zu der entsprechenden Standard-Tablette verwendet werden (z.B. DPD Nr. 3 Evo anstatt DPD Nr. 3).

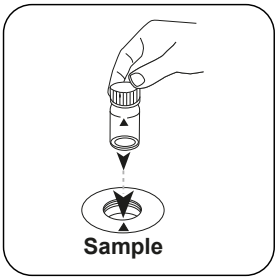
Durchführung der Bestimmung freies Chlor mit Tablette

Die Methode im Gerät auswählen.

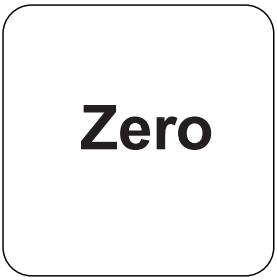
24-mm-Küvette mit **10 mL Probe** füllen.



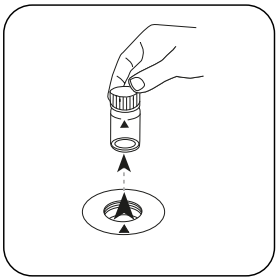
Küvette(n) verschließen.



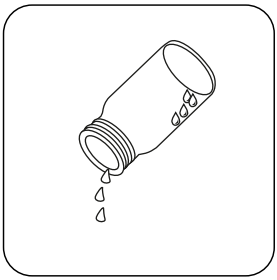
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



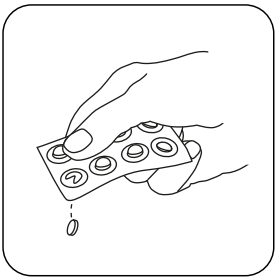
Taste **ZERO** drücken.



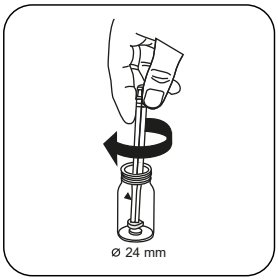
Küvette aus dem Messschacht nehmen.



Die Küvette bis auf einige Tropfen entleeren.

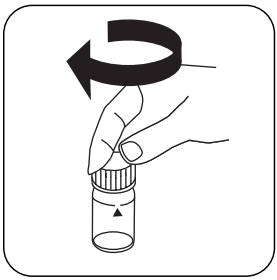


Eine **DPD No. 1 Tablette** zugeben.

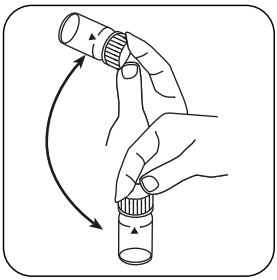


Tablette(n) unter leichter Drehung zerdrücken.

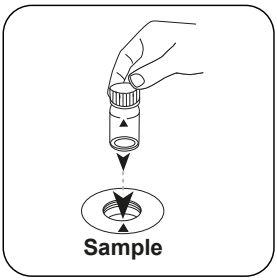
Küvette bis zur **10-mL-Marke** mit der **Probe** auffüllen.



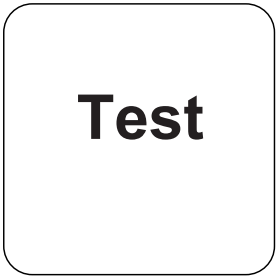
Küvette(n) verschließen.



Tablette(n) durch Umschwenken lösen.



Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



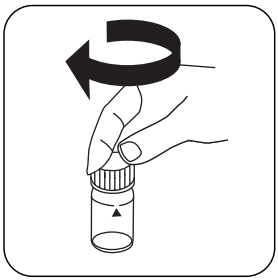
Taste **TEST** (XD: **START**) drücken.

In der Anzeige erscheint das Ergebnis in mg/L freies Chlor.

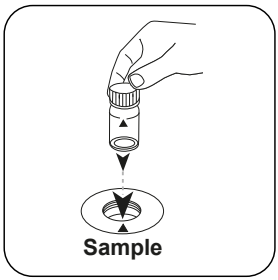
Durchführung der Bestimmung gesamt Chlor mit Tablette

Die Methode im Gerät auswählen.

24-mm-Küvette mit **10 mL Probe** füllen.

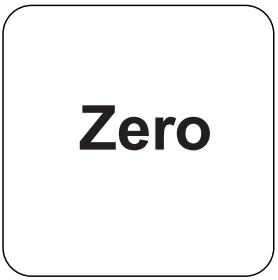


Küvette(n) verschließen.

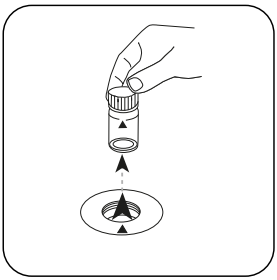


Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

DE

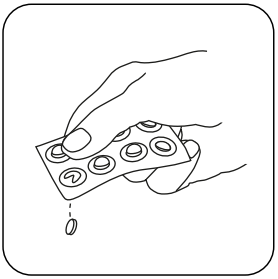


Taste **ZERO** drücken.

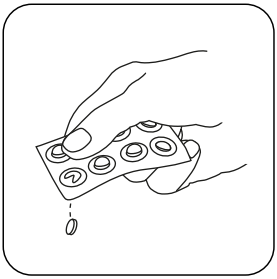


Küvette aus dem Messschacht nehmen.

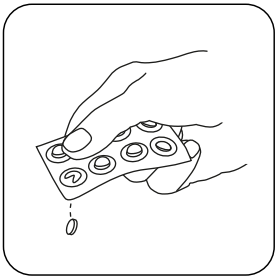
Die Küvette bis auf einige Tropfen entleeren.



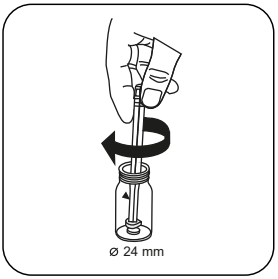
Eine **DPD No. 1 Tablette** zugeben.



Eine **DPD No. 3 Tablette** zugeben.

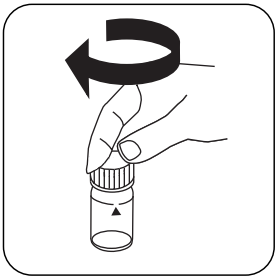


Alternativ zur DPD Nr. 1 und Nr. 3 Tablette kann eine DPD Nr. 4 Tablette zugegeben werden.

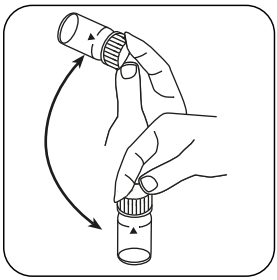


Tablette(n) unter leichter Drehung zerdrücken.

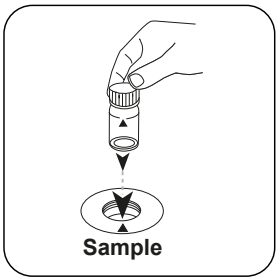
Küvette bis zur **10-mL-Marke** mit der **Probe** auffüllen.



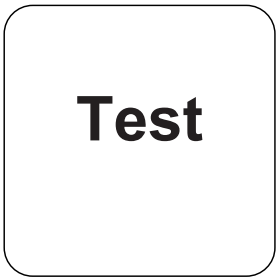
Küvette(n) verschließen.



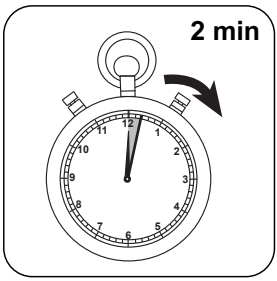
Tablette(n) durch Umschwenken lösen.



Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



Taste **TEST** (XD: **START**) drücken.



2 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

In der Anzeige erscheint das Ergebnis in mg/L Gesamtchlor.

Chemische Methode

DPD

Appendix

DE

Störungen

Permanente Störungen

- Alle in den Proben vorhandenen Oxidationsmittel reagieren wie Chlor, was zu Mehrbefunden führt.

Ausschließbare Störungen

- Störungen durch Kupfer und Eisen(III) sind durch EDTA zu beseitigen.
- Bei Proben mit hohem Calciumgehalt* und/oder hoher Leitfähigkeit* kann es bei der Verwendung der Reagenztabletten zu einer Eintrübung der Probe und damit verbundener Fehlmessung kommen. In diesem Fall sind alternativ die Reagenztablette DPD No. 1 High Calcium und die Reagenztablette DPD No. 3 High Calcium zu verwenden.
  *exakte Werte können nicht angegeben werden, da die Entstehung einer Trübung von Art und Zusammensetzung des Probenwassers abhängt.
- Konzentrationen über 10 mg/L Chlor, bei Verwendung von Tabletten, können zu Ergebnissen innerhalb des Messbereichs bis hin zu 0 mg/L führen. Bei einer zu hohen Chlorkonzentration muss die Probe mit chlorfreiem Wasser verdünnt werden. 10 mL der verdünnten Probe werden mit Reagenz versetzt und die Messung wiederholt (Plausibilitätstest).

Störung	Stört ab / [mg/L]
CrO_4^{2-}	0.01
MnO_2	0.01

Methodenvalidierung

Nachweisgrenze	0.02 mg/L
Bestimmungsgrenze	0.06 mg/L
Messbereichsende	6 mg/L
Empfindlichkeit	2.05 mg/L / Abs
Vertrauensbereich	0.04 mg/L
Verfahrensstandardabweichung	0.019 mg/L
Verfahrensvariationskoeffizient	0.87 %

Konform

EN ISO 7393-2

[a] Bestimmung von frei, gebunden, gesamt möglich | [e] Hilfsreagenz, alternativ zur DPD No. 1 / No. 3 bei Eintrübungen der Probe durch hohen Calciumionengehalt und/oder hohe Leitfähigkeit

Chlor L M101

0,02 - 4,0 mg/L Cl_2 [a)] CL6

DPD

DE

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
DPD 1 Pufferlösung, blaue Flasche	15 mL	471010
DPD 1 Pufferlösung	100 mL	471011
DPD 1 Pufferlösung im 6-er Pack	1 St.	471016
DPD 1 Reagenzlösung, grüne Flasche	15 mL	471020
DPD 1 Reagenzlösung	100 mL	471021
DPD 1 Reagenzlösung im 6-er Pack	1 St.	471026
DPD 3 Lösung, rote Flasche	15 mL	471030
DPD 3 Lösung	100 mL	471031
DPD 3 Lösung im 6-er Pack	1 St.	471036
DPD Reagenzien Set	1 St.	471056

Verfügbare Standards

Titel	Verpackungseinheit	Bestell-Nr.
ValidCheck Chlor 1,5 mg/L	1 St.	48105510

Probenahme

1. Bei der Probenvorbereitung muss das Ausgasen von Chlor, z.B. durch Pipettieren und Schütteln, vermieden werden.
2. Die Analyse muss unmittelbar nach der Probenahme erfolgen.

Vorbereitung

1. Reinigung der Küvetten:
   Da viele Haushaltsreiniger (z.B. Geschirrspülmittel) reduzierende Stoffe enthalten, kann es bei der Bestimmung von Chlor zu Minderbefunden kommen. Um diesen Messfehler auszuschließen, sollten die Glasgeräte chlorzehrungsfrei sein. Dazu werden die Glasgeräte für eine Stunde unter Natriumhypochloritlösung (0,1 g/L) aufbewahrt und danach gründlich mit VE-Wasser (Vollentsalztes Wasser) gespült.
2. Für die Einzelbestimmung von freiem Chlor und Gesamtchlor ist es sinnvoll, jeweils einen eigenen Satz Küvetten zu verwenden (siehe EN ISO 7393-2, Abs. 5.3).
3. Die DPD-Farbentwicklung erfolgt bei einem pH-Wert von 6,2 bis 6,5. Die Reagenzien enthalten daher einen Puffer zur pH-Wert Einstellung. Stark alkalische oder saure Wässer müssen jedoch vor der Analyse in einen pH-Bereich zwischen 6 und 7 gebracht werden (mit 0,5 mol/l Schwefelsäure bzw. 1 mol/l Natronlauge).

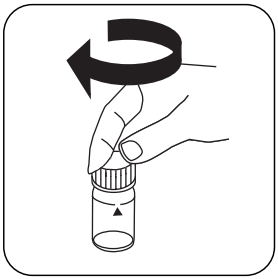
Anmerkungen

1. Nach Gebrauch sind die Tropfflaschen mit der jeweils gleichfarbigen Schraubkappe sofort wieder zu verschließen.
2. Den Reagenziensatz bei +6 °C bis +10 °C kühl lagern.

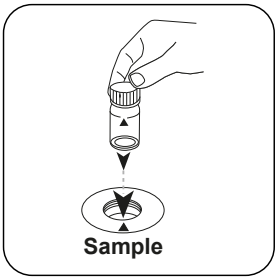
Durchführung der Bestimmung freies Chlor mit Flüssigreagenz

Die Methode im Gerät auswählen.

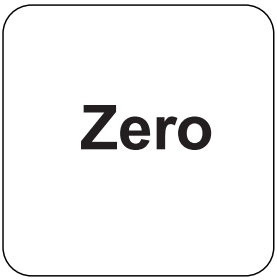
24-mm-Küvette mit **10 mL Probe** füllen.



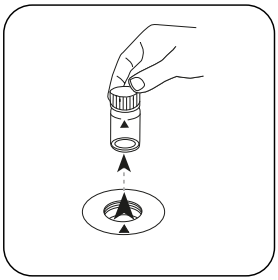
Küvette(n) verschließen.



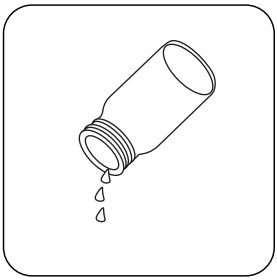
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



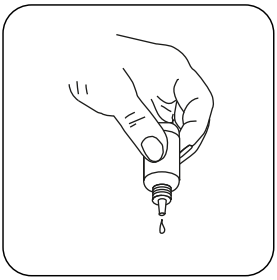
Taste **ZERO** drücken.



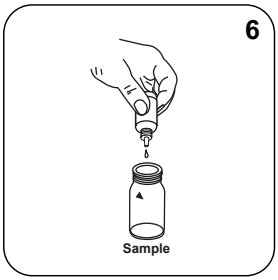
Küvette aus dem Messschacht nehmen.



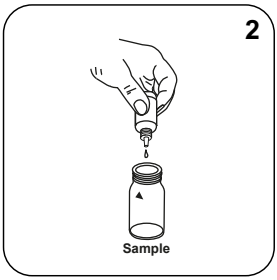
Küvette entleeren.



Die Tropfflaschen senkrecht halten und durch langsames Drücken gleich große Tropfen zugeben.

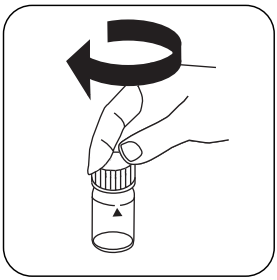


6 Tropfen DPD 1 Puffer-Lösung in die **Probenküvette** geben.

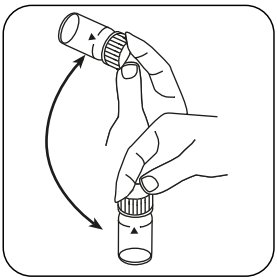


2 Tropfen DPD 1 Reagenz-Lösung in die **Probenküvette** geben.

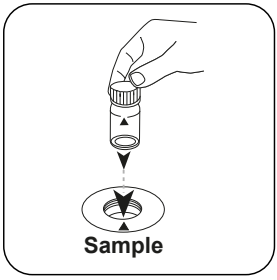
Küvette bis zur **10-mL-Marke** mit der **Probe** auffüllen.



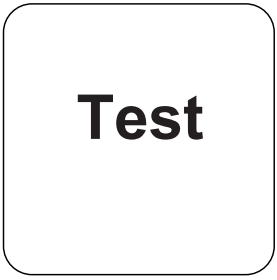
Küvette(n) verschließen.



Inhalt durch Umschwenken mischen.



Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



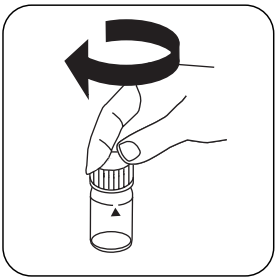
Taste **TEST** (XD: **START**) drücken.

In der Anzeige erscheint das Ergebnis in mg/L freies Chlor.

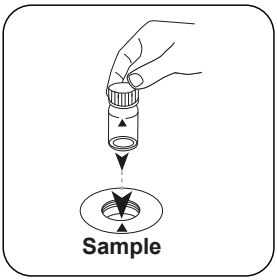
Durchführung der Bestimmung gesamtes Chlor mit Flüssigreagenz

Die Methode im Gerät auswählen.

24-mm-Küvette mit **10 mL Probe** füllen.

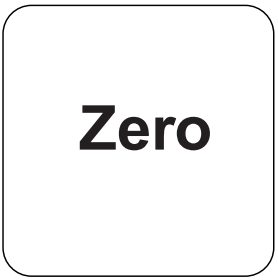


Küvette(n) verschließen.

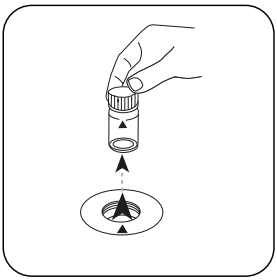


Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

DE

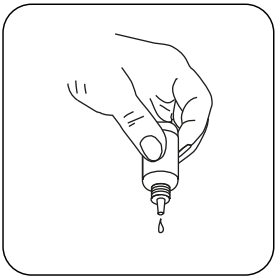


Taste **ZERO** drücken.

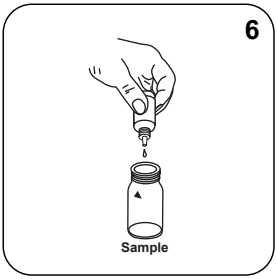


Küvette aus dem Messschacht nehmen.

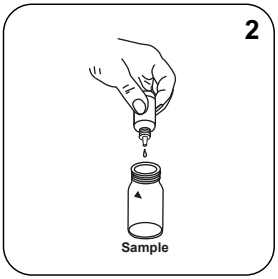
Küvette entleeren.



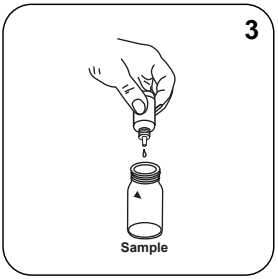
Die Tropfflaschen senkrecht halten und durch langsames Drücken gleich große Tropfen zugeben.



6 Tropfen DPD 1 Puffer-Lösung in die **Probenküvette** geben.

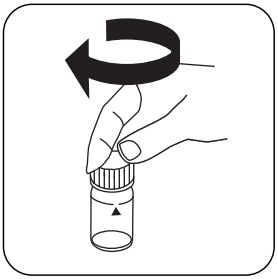


2 Tropfen DPD 1 Reagenz-Lösung in die **Probenküvette** geben.

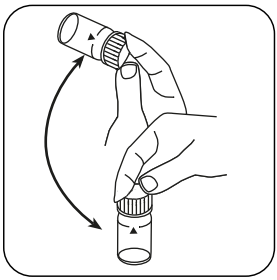


3 Tropfen DPD 3 Lösung in die **Probenküvette** geben.

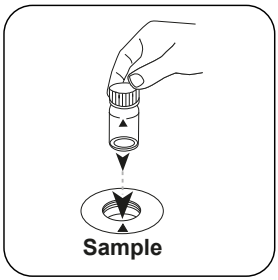
Küvette bis zur **10-mL-Marke** mit der **Probe** auffüllen.



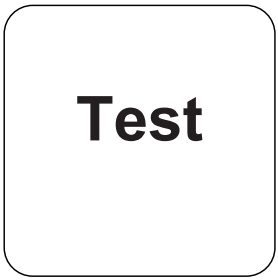
Küvette(n) verschließen.



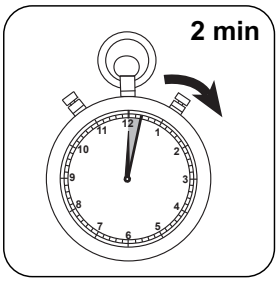
Inhalt durch Umschwenken mischen.



Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



Taste **TEST** (XD: **START**) drücken.



2 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

In der Anzeige erscheint das Ergebnis in mg/L Gesamtchlor.

Chemische Methode

DPD

Appendix

DE

Störungen

Permanente Störungen

- Alle in den Proben vorhandenen Oxidationsmittel reagieren wie Chlor, was zu Mehrbefunden führt.

Ausschließbare Störungen

- Störungen durch Kupfer und Eisen(III) sind durch EDTA zu beseitigen.
- Konzentrationen über 4 mg/L Chlor, bei Verwendung von Flüssigreagenzien, können zu Ergebnissen innerhalb des Messbereichs bis hin zu 0 mg/L führen. In diesem Fall muss die Probe mit chlorfreiem Wasser verdünnt werden. 10 ml der verdünnten Probe werden mit Reagenz versetzt und die Messung wiederholt (Plausibilitätstest).

Störung	Stört ab / [mg/L]
CrO_4^{2-}	0,01
MnO_2	0,01

Konform

EN ISO 7393-2

[a)] Bestimmung von frei, gebunden, gesamt möglich

Chlor HR T M103

0,1 - 10 mg/L Cl_2 [a] CL10

DPD

DE

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
DPD No. 1 HR	Tablette / 100	511500BT
DPD No. 1 HR	Tablette / 250	511501BT
DPD No. 1 HR	Tablette / 500	511502BT
DPD No.3 HREvo	Tablette / 100	511920BT
DPD No. 3 HREvo	Tablette / 250	511921BT
DPD No. 3 HREvo	Tablette / 500	511922BT
DPD No. 3 HR	Tablette / 100	511590BT
DPD No. 3 HR	Tablette / 250	511591BT
DPD No. 3 HR	Tablette / 500	511592BT
Set DPD No. 1 HR/No. 3 HR [#]	je 100	517791BT
Set DPD No. 1 HR/No. 3 HR [#]	je 250	517792BT
DPD No. 1 High Calcium [e]	Tablette / 100	515740BT
DPD No. 1 High Calcium [e]	Tablette / 250	515741BT
DPD No. 1 High Calcium [e]	Tablette / 500	515742BT
DPD No. 3 High Calcium [e]	Tablette / 100	515730BT
DPD No. 3 High Calcium [e]	Tablette / 250	515731BT
DPD No. 3 High Calcium [e]	Tablette / 500	515732BT

Probenahme

1. Bei der Probenvorbereitung muss das Ausgasen von Chlor, z.B. durch Pipettieren und Schütteln, vermieden werden.
2. Die Analyse muss unmittelbar nach der Probenahme erfolgen.

Vorbereitung

1. Reinigung der Küvetten:
   Da viele Haushaltsreiniger (z.B. Geschirrspülmittel) reduzierende Stoffe enthalten, kann es bei der Bestimmung von Chlor zu Minderbefunden kommen. Um diesen Messfehler auszuschließen, sollten die Glasgeräte chlorzehrungsfrei sein. Dazu werden die Glasgeräte für eine Stunde unter Natriumhypochloritlösung (0,1 g/L) aufbewahrt und danach gründlich mit VE-Wasser (Vollentsalztes Wasser) gespült.
2. Für die Einzelbestimmung von freiem Chlor und Gesamtchlor ist es sinnvoll, jeweils einen eigenen Satz Küvetten zu verwenden (siehe EN ISO 7393-2, Abs. 5.3).
3. Die DPD-Farbentwicklung erfolgt bei einem pH-Wert von 6,2 bis 6,5. Die Reagenzien enthalten daher einen Puffer zur pH-Wert Einstellung. Stark alkalische oder saure Wässer müssen jedoch vor der Analyse in einen pH-Bereich zwischen 6 und 7 gebracht werden (mit 0,5 mol/L Schwefelsäure bzw. 1 mol/L Natronlauge).

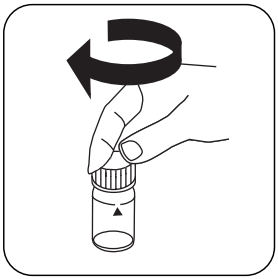
Anmerkungen

1. Evo-Tabletten können alternativ zu der entsprechenden Standard-Tablette verwendet werden (z.B. DPD Nr. 3 Evo anstatt DPD Nr. 3).

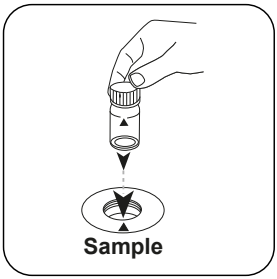
Durchführung der Bestimmung freies Chlor HR mit Tablette

Die Methode im Gerät auswählen.

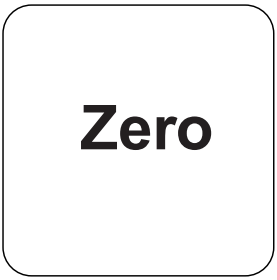
24-mm-Küvette mit **10 mL Probe** füllen.



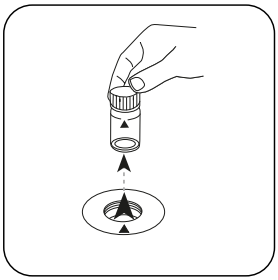
Küvette(n) verschließen.



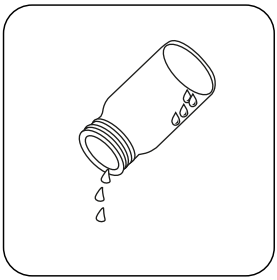
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



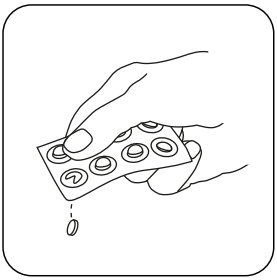
Taste **ZERO** drücken.



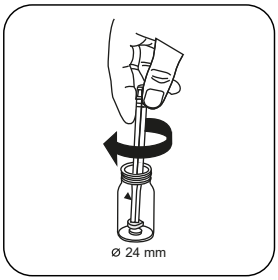
Küvette aus dem Messschacht nehmen.



Die Küvette bis auf einige Tropfen entleeren.

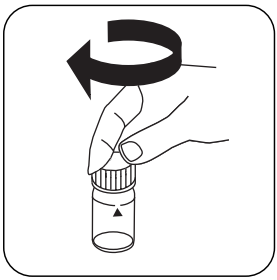


Eine **DPD No. 1 HR Tablette** zugeben.

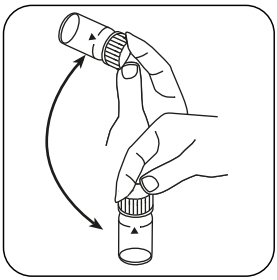


Tablette(n) unter leichter Drehung zerdrücken.

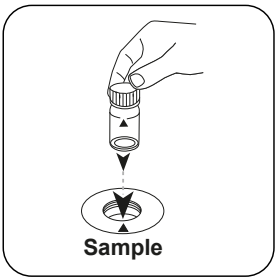
Küvette bis zur **10-mL-Marke** mit der **Probe** auffüllen.



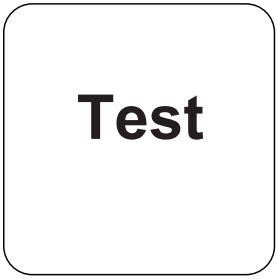
Küvette(n) verschließen.



Tablette(n) durch Umschwenken lösen.



Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



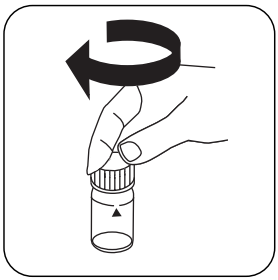
Taste **TEST** (XD: **START**) drücken.

In der Anzeige erscheint das Ergebnis in mg/L freies Chlor.

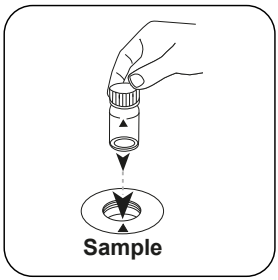
Durchführung der Bestimmung gesamtes Chlor HR mit Tablette

Die Methode im Gerät auswählen.

24-mm-Küvette mit **10 mL Probe** füllen.



Küvette(n) verschließen.



Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

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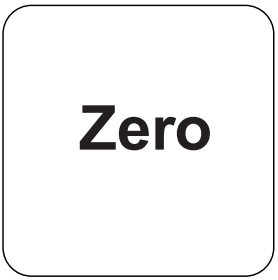
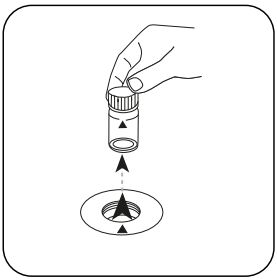
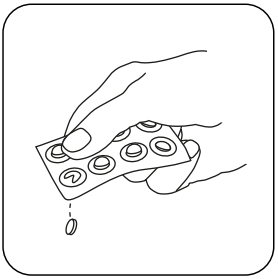


Taste **ZERO** drücken.

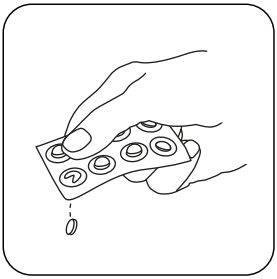


Küvette aus dem Messschacht nehmen.

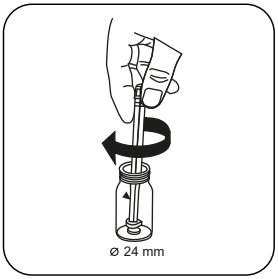
Die Küvette bis auf einige Tropfen entleeren.



Eine **DPD No. 1 HR Tablette** zugeben.

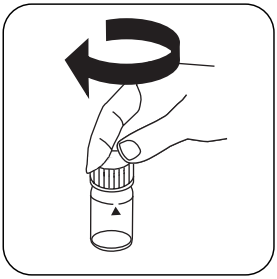


Eine **DPD No. 3 HR Tablette** zugeben.

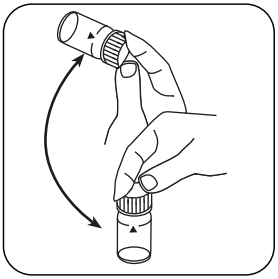


Tablette(n) unter leichter Drehung zerdrücken.

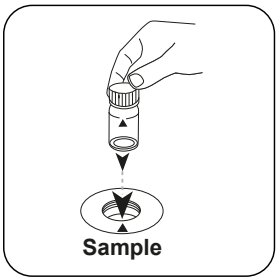
Küvette bis zur **10-mL-Marke** mit der **Probe** auffüllen.



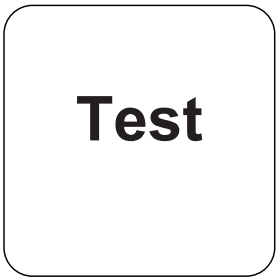
Küvette(n) verschließen.



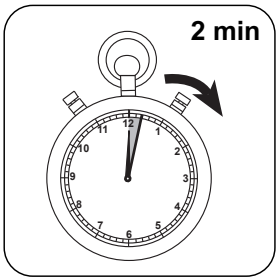
Tablette(n) durch Umschwenken lösen.



Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



Taste **TEST** (XD: **START**) drücken.



2 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

In der Anzeige erscheint das Ergebnis in mg/L Gesamtchlor.

Chemische Methode

DPD

Appendix

DE

Störungen

Permanente Störungen

- Alle in den Proben vorhandenen Oxidationsmittel reagieren wie Chlor, was zu Mehrbefunden führt.

Ausschließbare Störungen

- Störungen durch Kupfer und Eisen(III) sind durch EDTA zu beseitigen.
- Bei Proben mit hohem Calciumgehalt* und/oder hoher Leitfähigkeit* kann es bei der Verwendung der Reagenztabletten zu einer Eintrübung der Probe und damit verbundener Fehlmessung kommen.In diesem Fall sind alternativ die Reagenztablette DPD No. 1 High Calcium und die Reagenztablette DPD No. 3 High Calcium zu verwenden.
  *exakte Werte können nicht angegeben werden, da die Entstehung einer Trübung von Art und Zusammensetzung des Probenwassers abhängt.

Konform

EN ISO 7393-2

[a)] Bestimmung von frei, gebunden, gesamt möglich | [e)] Hilfsreagenz, alternativ zur DPD No. 1 / No. 3 bei Eintrübungen der Probe durch hohen Calciumionengehalt und/oder hohe Leitfähigkeit | # inklusive Rührstab

pH-Wert T **M330**

6,5 - 8,4 pH **PH**

Phenolrot

DE

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
Phenol Red Photometer	Tablette / 100	511770BT
Phenol Red Photometer	Tablette / 250	511771BT
Phenol Red Photometer	Tablette / 500	511772BT

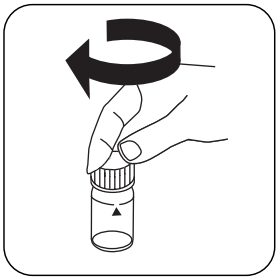
Anmerkungen

1. Für die photometrische pH-Wert Bestimmung sind nur PHENOL RED-Tabletten mit schwarzem Folienaufdruck zu verwenden, die mit dem Begriff PHOTOMETER gekennzeichnet sind.

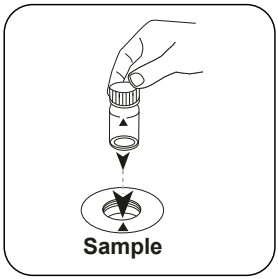
Durchführung der Bestimmung pH-Wert mit Tablette

Die Methode im Gerät auswählen.

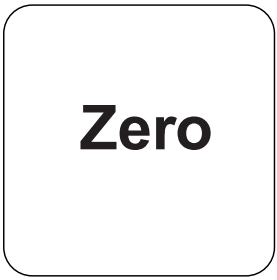
24-mm-Küvette mit **10 mL Probe** füllen.



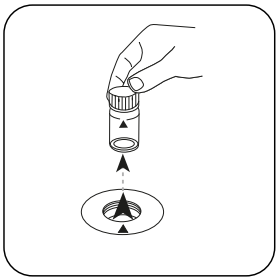
Küvette(n) verschließen.



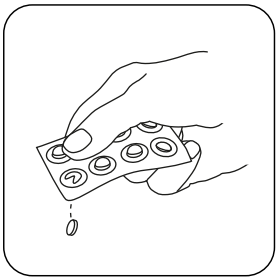
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



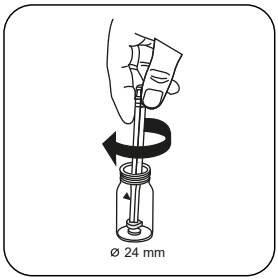
Taste **ZERO** drücken.



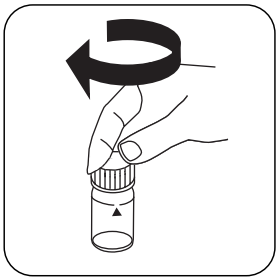
Küvette aus dem Messschacht nehmen.



Eine **PHENOL RED PHOTOMETER Tablette** zugeben.

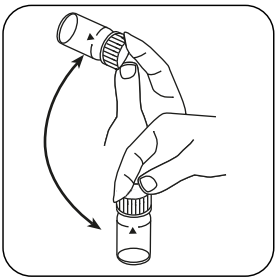


Tablette(n) unter leichter Drehung zerdrücken.

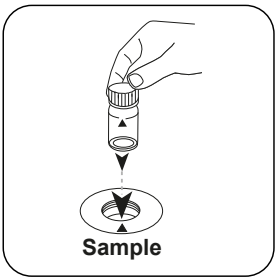


Küvette(n) verschließen.

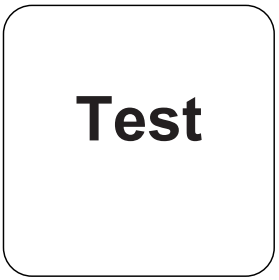
DE



Tablette(n) durch Umschwenken lösen.



Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



Taste **TEST** (XD: **START**) drücken.

In der Anzeige erscheint das Ergebnis als pH-Wert.

Chemische Methode

Phenolrot

Appendix

Störungen

Permanente Störungen

1. Wasserproben mit geringer Carbonathärte* können falsche pH-Werte ergeben. *$K_{S4,3}$ < 0,7 mmol/l ≙ Gesamtalkalität < 35 mg/L $CaCO_3$.

Ausschließbare Störungen

1. pH-Werte unter 6,5 und über 8,4 können zu Ergebnissen innerhalb des Messbereiches führen. Es wird ein Plausibilitätstest (pH-Meter) empfohlen.
2. Salzfehler:
   Bei Salzgehalten bis 2 g/L ist kein nennenswerter Salzfehler aufgrund des Salzgehaltes der Reagenztablette zu erwarten. Bei höheren Salzgehalten sind die Messwerte wie folgt zu korrigieren:

Salzgehalt der Probe in g/L	30 (Meerwasser)	60	120	180
Korrektur	-0,15[1)]	-0,21[2)]	-0,26[2)]	-0,29[2)]

[1)] nach Kolthoff (1922)
[2)] nach Parson und Douglas (1926)

Literaturverweise

Colorimetric Chemical Analytical Methods, 9th Edition, London

pH-Wert L M331

6,5 - 8,4 pH PH

Phenolrot

DE

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
Phenolrot Lösung	15 mL	471040
Phenolrot Lösung	100 mL	471041
Phenolrot Lösung im -6er Pack	1 St.	471046

Vorbereitung

1. Auf Grund unterschiedlicher Tropfengröße kann das Messergebnis größere Abweichungen als bei Verwendung von Tabletten aufweisen.
   Bei Verwendung einer Pipette (0,18 ml entsprechen 6 Tropfen) kann diese Abweichung minimiert werden.

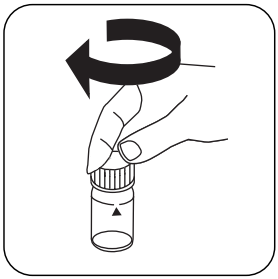
Anmerkungen

1. Nach Gebrauch ist die Trofflasche mit der gleichfarbigen Schraubkappe sofort wieder zu verschließen.
2. Das Reagenz bei +6 °C bis +10 °C kühl lagern.

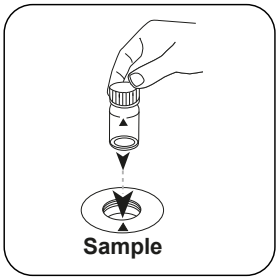
Durchführung der Bestimmung pH-Wert mit Flüssigreagenz

Die Methode im Gerät auswählen.

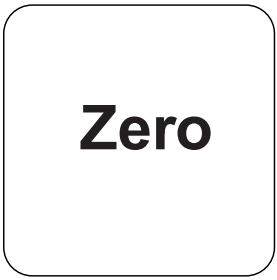
24-mm-Küvette mit **10 mL Probe** füllen.



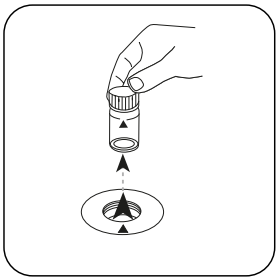
Küvette(n) verschließen.



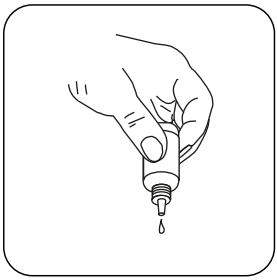
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



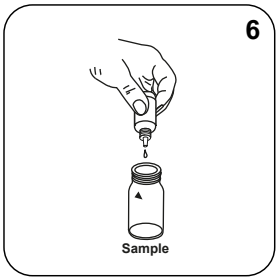
Taste **ZERO** drücken.



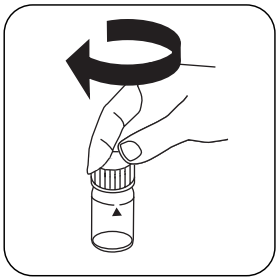
Küvette aus dem Messschacht nehmen.



Die Tropfflaschen senkrecht halten und durch langsames Drücken gleich große Tropfen zugeben.

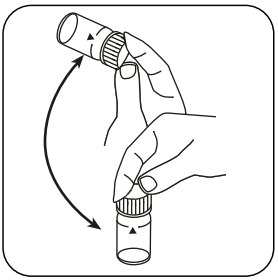


6 Tropfen PHENOL Red-Lösung in die **Probenküvette** geben.

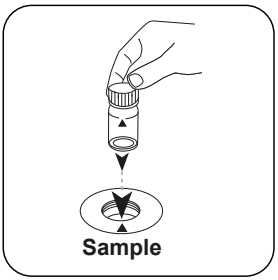


Küvette(n) verschließen.

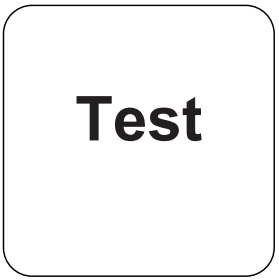
DE



Inhalt durch Umschwenken mischen.



Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



Taste **TEST** (XD: **START**) drücken.

In der Anzeige erscheint das Ergebnis als pH-Wert.

Chemische Methode

Phenolrot

Appendix

Störungen

Ausschließbare Störungen

1. Salzfehler: Korrektur des Messwertes (durchschnittliche Werte) für Proben mit einem Salzgehalt von:

2.

Salzgehalt der Probe	Korrektur
30 g/L (Meerwasser)	-0,15[1)]
60 g/L	-0,21[2)]
120 g/L	-0,26[2)]
180 g/L	-0,29[2)]
[1)] nach Kolthoff (1922)	[2)] nach Parson und Douglas (1926)

3. Bei der Untersuchung von gechlortem Wasser kann der vorhandene Restchlorgehalt die Farbreaktion des Flüssigreagenzes beeinflussen. Dies wird verhindert, indem ein kleiner Kristall Natriumthiosulfat ($Na_2S_2O_3 \cdot 5\ H_2O$) in die Probelösung gegeben wird, bevor die PHENOL RED-Lösung zugesetzt wird.

Literaturverweise

Colorimetric Chemical Analytical Methods, 9th Edition, London

Harnstoff T M390

0,1 - 2,5 mg/L Urea Ur1

Indophenol / Urease

DE

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
UREA Reagenz 1	15 mL	459300
UREA Reagenz 2	10 mL	459400
Ammonia No. 1	Tablette / 100	512580BT
Ammonia No. 1	Tablette / 250	512581BT
Ammonia No. 2	Tablette / 100	512590BT
Ammonia No. 2	Tablette / 250	512591BT
Set Ammonia No. 1/No. 2#	je 100	517611BT
Set Ammonia No. 1/No. 2#	je 250	517612BT
Ammonium Konditionierpulver	Pulver / 26 g	460170
Urea Pretreat (eliminiert die Störung von freiem Chlor bis zu 2 mg/l)	Tablette / 100	516110BT
UREA Reagenzien Set	1 Satz	517800BT

Vorbereitung

1. Die Probentemperatur sollte zwischen 20 °C und 30 °C liegen.
2. Die Analyse spätestens eine Stunde nach der Probennahme durchführen.
3. Bei der Analyse von Meerwasserproben muss vor Zugabe der Ammonia No. 1 Tablette zwei Messlöffel Ammonium Konditionierungs-Pulver zur Probe gegeben und durch Schwenken aufgelöst werden.

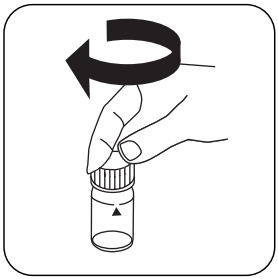
Anmerkungen

1. Die AMMONIA No. 1 Tablette löst sich erst vollständig nach Zugabe der AMMONIA No. 2 Tablette auf.
2. Ammonium und Chloramine werden bei der Harnstoffbestimmung miterfasst.

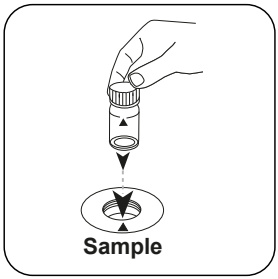
Durchführung der Bestimmung Harnstoff mit Tablette und Flüssigreagenz

Die Methode im Gerät auswählen.

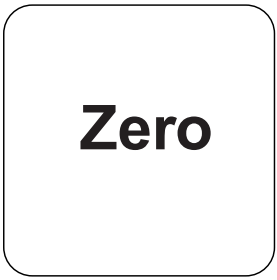
24-mm-Küvette mit **10 mL Probe** füllen.



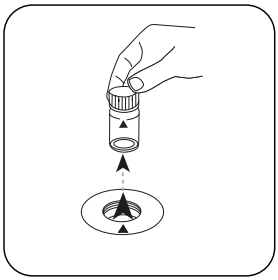
Küvette(n) verschließen.



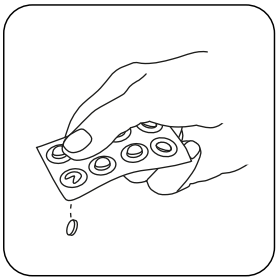
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



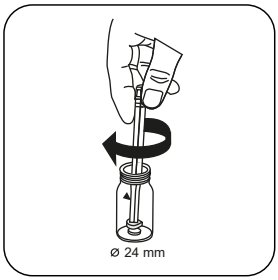
Taste **ZERO** drücken.



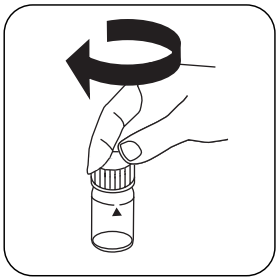
Küvette aus dem Messschacht nehmen.



Bei Anwesenheit von freiem Chlor (HOCl) **eine UREA PRETREAT Tablette** zugeben.

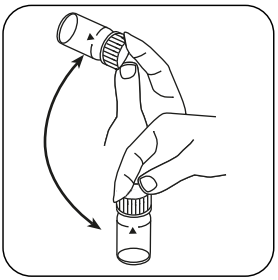


Tablette(n) unter leichter Drehung zerdrücken.

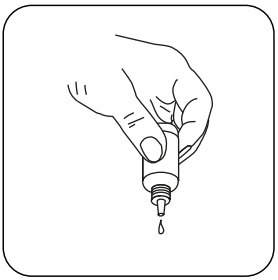


Küvette(n) verschließen.

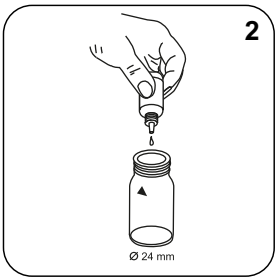
DE



Tablette(n) durch Umschwenken lösen.

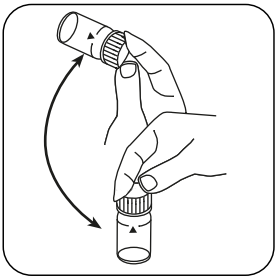


Die Tropfflaschen senkrecht halten und durch langsames Drücken gleich große Tropfen zugeben.

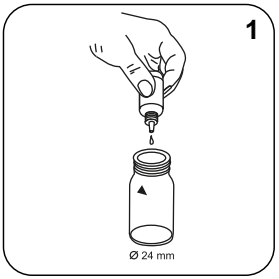


2 Tropfen Urea Reagenz 1 zugeben.

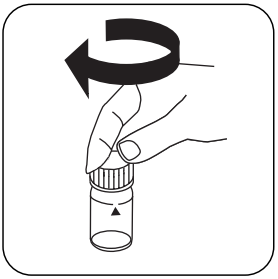
Küvette(n) verschließen.



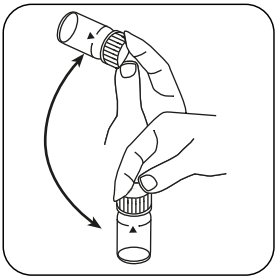
Inhalt durch Umschwenken mischen.



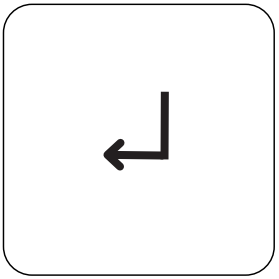
1 Tropfen Urea Reagenz 2 zugeben.



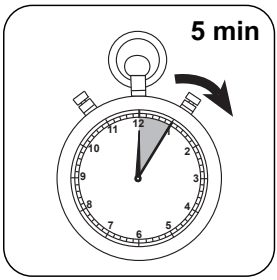
Küvette(n) verschließen.



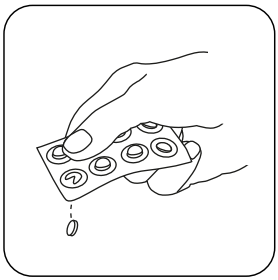
Inhalt durch Umschwenken mischen.



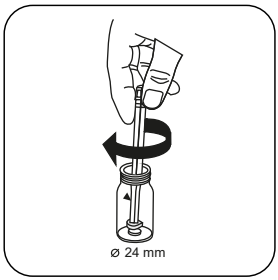
Taste **ENTER** drücken.



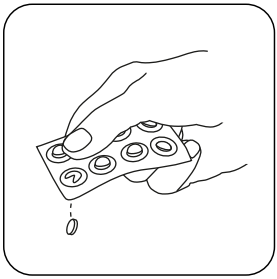
5 Minute(n) Reaktionszeit abwarten.



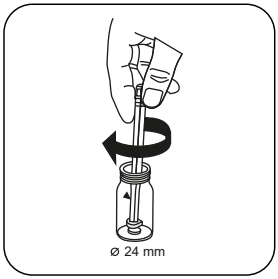
Eine **AMMONIA No.1 Tablette** zugeben.



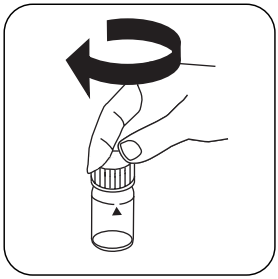
Tablette(n) unter leichter Drehung zerdrücken.



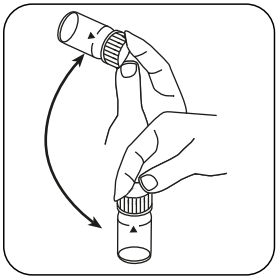
Eine **AMMONIA No.2 Tablette** zugeben.



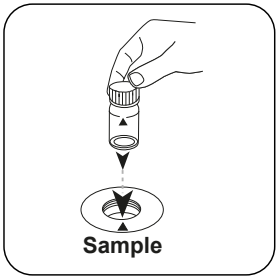
Tablette(n) unter leichter Drehung zerdrücken.



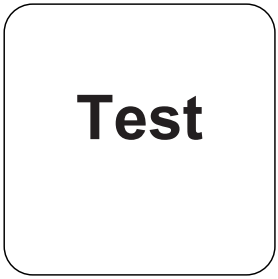
Küvette(n) verschließen.



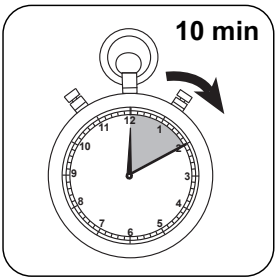
Tablette(n) durch Umschwenken lösen.



Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



Taste **TEST** (XD: **START**) drücken.



DE

10 Minute(n)
Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

In der Anzeige erscheint das Ergebnis in mg/L Harnstoff.

Chemische Methode

Indophenol / Urease

Appendix

Störungen

Permanente Störungen

- Konzentrationen über 2 mg/L Harnstoff können zu Ergebnissen innerhalb des Messbereiches führen. In diesem Fall ist die Wasserprobe mit harnstofffreiem Wasser zu verdünnen und die Messung zu wiederholen (Plausibilitätstest).

Ausschließbare Störungen

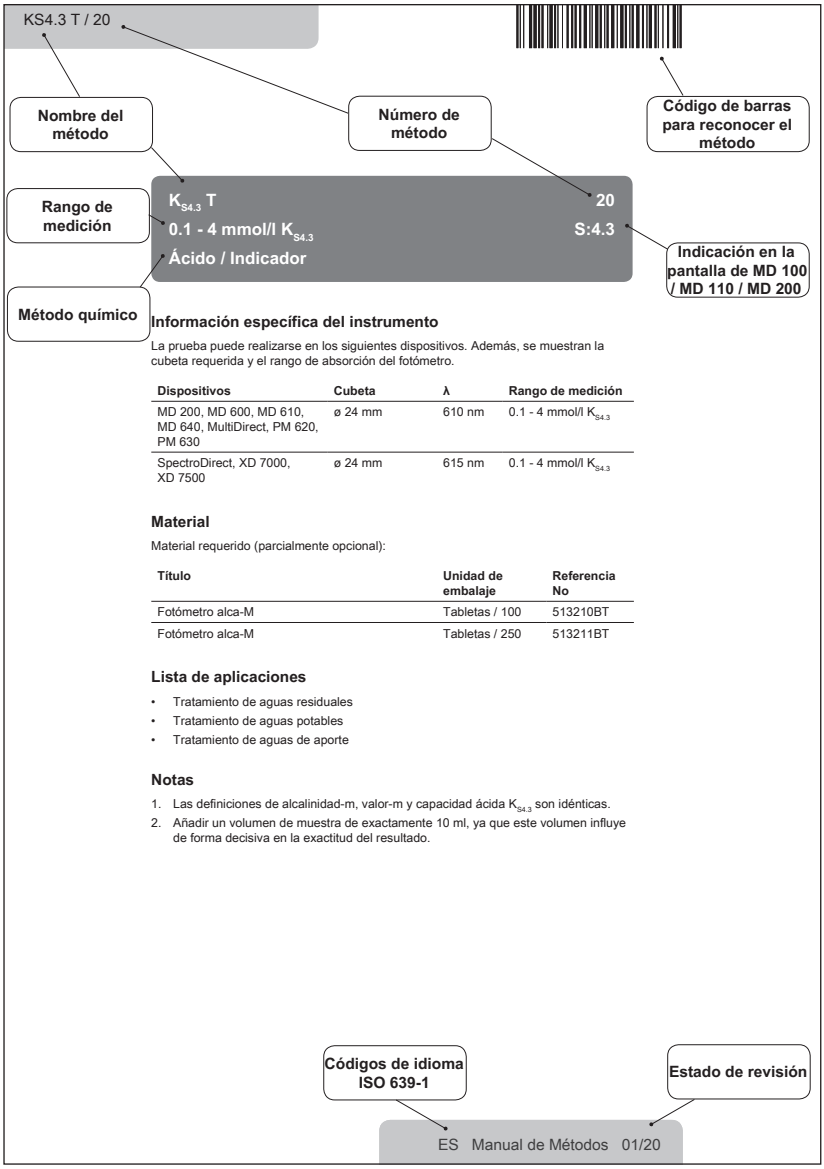
- Eine UREA PRETREAT Tablette eliminiert die Störung von freiem Chlor bis zu 2 mg/L (zwei Tabletten bis zu 4 mg/L, drei Tabletten bis zu 6 mg/L).

Störung	Stört ab / [mg/L]
Cl_2	2

Literaturverweise

R.J. Creno, R.E. Wenk, P. Bohling, Automated Micromeasurement of Urea Using Urease and the Berthelot Reaction, American Journal of Clinical Pathology (1970), 54 (6), p. 828-832

inklusive Rührstab



Información específica del instrumento

La prueba puede realizarse en los siguientes dispositivos. Además, se muestran la cubeta requerida y el rango de absorción del fotómetro.

Dispositivos	Cubeta	λ	Rango de medición
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630	ø 24 mm	610 nm	0.1 - 4 mmol/l $K_{S4.3}$
SpectroDirect, XD 7000, XD 7500	ø 24 mm	615 nm	0.1 - 4 mmol/l $K_{S4.3}$

Material

Material requerido (parcialmente opcional):

Título	Unidad de embalaje	Referencia No
Fotómetro alca-M	Tabletas / 100	513210BT
Fotómetro alca-M	Tabletas / 250	513211BT

Lista de aplicaciones

- Tratamiento de aguas residuales
- Tratamiento de aguas potables
- Tratamiento de aguas de aporte

Notas

1. Las definiciones de alcalinidad-m, valor-m y capacidad ácida $K_{S4.3}$ son idénticas.
2. Añadir un volumen de muestra de exactamente 10 ml, ya que este volumen influye de forma decisiva en la exactitud del resultado.

Realización de la determinación

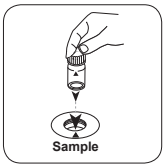
Ejecución de la determinación Capacidad ácida $K_{S4.3}$ con tableta

Seleccionar el método en el aparato.

Para este método no es necesario realizar medición CERO en los aparatos siguientes:
XD 7000, XD 7500

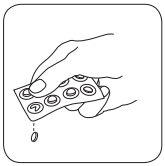
Llenar la cubeta de 24 mm con **10 ml de muestra** .

Cerrar la(s) cubeta(s).

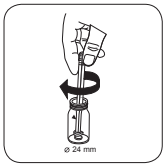


Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

• • •



Añadir **tableta ALKA-M-PHOTOMETER**.



Triturar la(s) tableta(s) girando ligeramente.

Cerrar la(s) cubeta(s).

$K_{S4.3}$ T — M20

0.1 - 4 mmol/L $K_{S4.3}$ — S:4.3

Ácido / Indicador

ES

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Fotómetro alca-M	Tabletas / 100	513210BT
Fotómetro alca-M	Tabletas / 250	513211BT

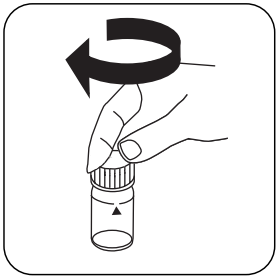
Notas

1. Las definiciones de alcalinidad-m, valor-m y capacidad ácida $K_{S4.3}$ son idénticas.
2. Añadir un volumen de muestra de exactamente 10 ml, ya que este volumen influye de forma decisiva en la exactitud del resultado.

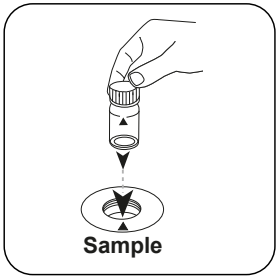
Ejecución de la determinación Capacidad ácida $K_{S4.3}$ con tableta

Seleccionar el método en el aparato.

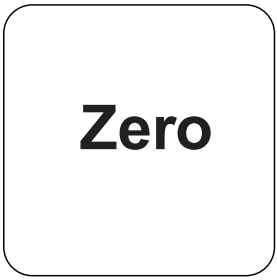
Llenar la cubeta de 24 mm con **10 mL de muestra** .



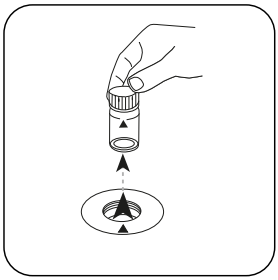
Cerrar la(s) cubeta(s).



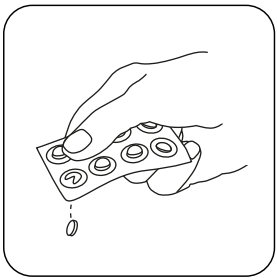
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



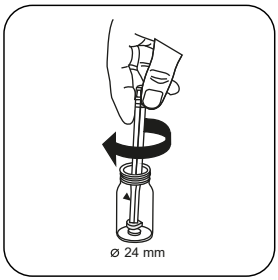
Pulsar la tecla **ZERO**.



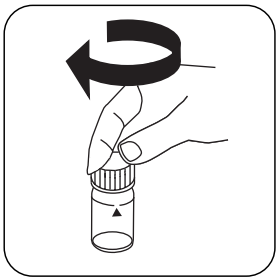
Extraer la cubeta del compartimiento de medición.



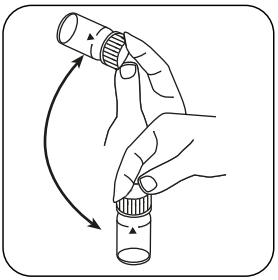
Añadir **tableta ALKA-M-PHOTOMETER**.



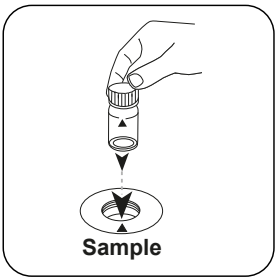
Triturar la(s) tableta(s) girando ligeramente.



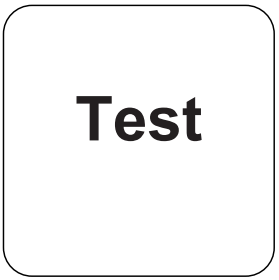
Cerrar la(s) cubeta(s).



Disolver la(s) tableta(s) girando.



Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



Pulsar la tecla **TEST** (XD: **START**).

A continuación se visualizará el resultado como capacidad ácida $K_{S4.3}$.

Método químico

Ácido / Indicador

Apéndice

Derivado de

DIN 38409 - H 7-2

Cloro T M100

0.01 - 6.0 mg/L Cl_2 [a] CL6

DPD

ES

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
DPD nº1	Tabletas / 100	511050BT
DPD nº 1	Tabletas / 250	511051BT
DPD nº 1	Tabletas / 500	511052BT
DPD nº 3	Tabletas / 100	511080BT
DPD nº 3	Tabletas / 250	511081BT
DPD nº 3	Tabletas / 500	511082BT
DPD nº 1 High Calcium [e]	Tabletas / 100	515740BT
DPD nº 1 High Calcium [e]	Tabletas / 250	515741BT
DPD nº 1 High Calcium [e]	Tabletas / 500	515742BT
DPD nº 3 High Calcium [e]	Tabletas / 100	515730BT
DPD nº 3 High Calcium [e]	Tabletas / 250	515731BT
DPD nº 3 High Calcium [e]	Tabletas / 500	515732BT
DPD nº 4	Tabletas / 100	511220BT
DPD nº 4	Tabletas / 250	511221BT
DPD nº 4	Tabletas / 500	511222BT
DPD nº 3 Evo	Tabletas / 100	511420BT
DPD nº 3 Evo	Tabletas / 250	511421BT
DPD nº 3 Evo	Tabletas / 500	511422BT
DPD nº4 Evo	Tabletas / 100	511970BT
DPD nº 4 Evo	Tabletas / 250	511971BT
DPD nº 4 Evo	Tabletas / 500	511972BT

Standards disponibles

Título	Unidad de embalaje	No. de referencia
ValidCheck cloro 1,5 mg/l	1 Cantidad	48105510

Muestreo

1. Evitar durante la preparación de la muestra la desgasificación de cloro, p. ej., al pipetar o agitar.
2. La determinación se ha de realizar inmediatamente después de la toma de la muestra.

Preparación

1. Limpieza de las cubetas:
   Muchos productos de limpieza (p. ej., detergentes de lavavajillas) poseen componentes reductores, que pueden reducir los resultados en la determinación del cloro. Para evitar estas alteraciones, los aparatos de vidrio deben estar exentos de componentes corrosivos al cloro. Para ello, deberá sumergir los aparatos de vidrio durante una hora en una solución de hipoclorito sódico (0,1 g/L), enjuagándolos minuciosamente a continuación con agua desionizada.
2. Para la determinación individual de cloro libre y cloro total se recomienda utilizar siempre los mismos sets de cubetas respectivamente (véase EN ISO 7393-2, párrafo 5.3).
3. El desarrollo coloreo por DPD se efectúa entre un valor de pH de 6,2 - 6,5. Por ello poseen las tabletas un tampón para la graduación del valor de pH. Sin embargo, las muestras acuosas muy ácidas o muy básicas se deberán neutralizar a un valor de pH entre 6 y 7 antes de realizar el análisis (con 0,5 mol/L de ácido sulfúrico o 1 mol/L de hidróxido sódico).

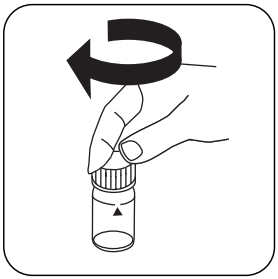
Notas

1. Las tabletas Evo pueden utilizarse como alternativa a la tableta estándar correspondiente (por ejemplo, DPD nº 3 Evo en lugar de DPD nº 3).

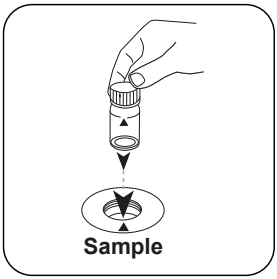
Ejecución de la determinación Cloro libre con tableta

Seleccionar el método en el aparato.

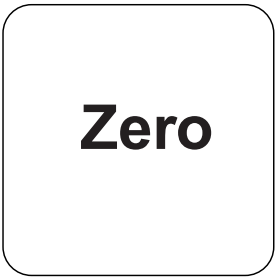
Llenar la cubeta de 24 mm con **10 mL de muestra** .



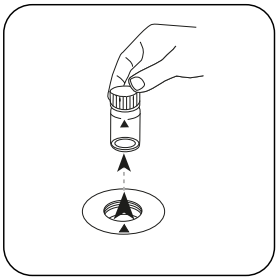
Cerrar la(s) cubeta(s).



Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

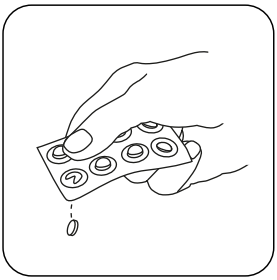


Pulsar la tecla **ZERO**.

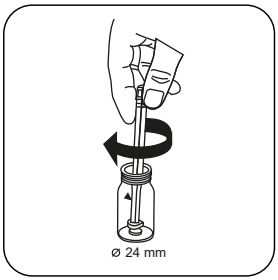


Extraer la cubeta del compartimiento de medición.

Vaciar la cubeta excepto algunas gotas.

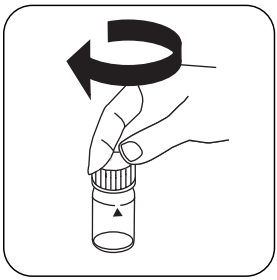


Añadir **tableta DPD No. 1**.

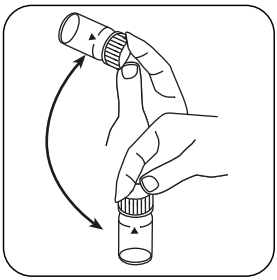


Triturar la(s) tableta(s) girando ligeramente.

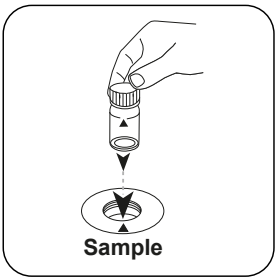
Llenar la cubeta con la **muestra** hasta la **marca de 10 mL** .



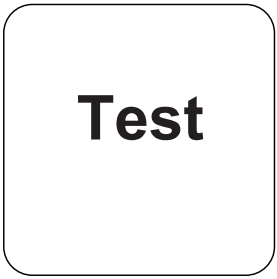
Cerrar la(s) cubeta(s).



Disolver la(s) tableta(s) girando.



Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



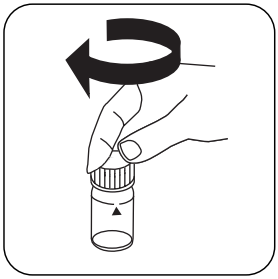
Pulsar la tecla **TEST** (XD: **START**).

A continuación se visualizará el resultado en mg/L Cloro libre.

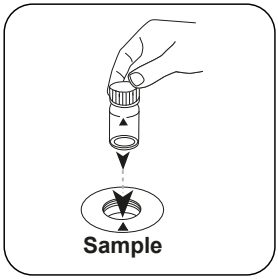
Ejecución de la determinación Cloro total con tableta

Seleccionar el método en el aparato.

Llenar la cubeta de 24 mm con **10 mL de muestra** .

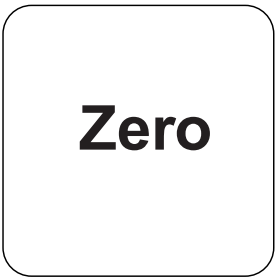


Cerrar la(s) cubeta(s).

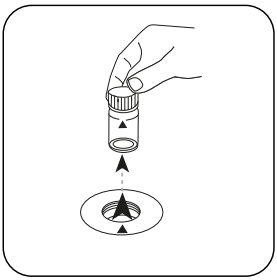


Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

ES

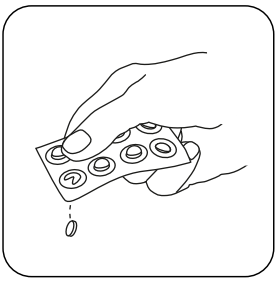


Pulsar la tecla **ZERO**.

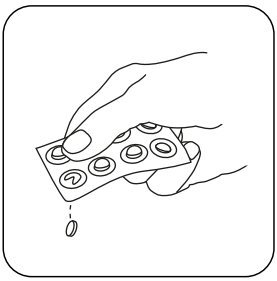


Extraer la cubeta del compartimiento de medición.

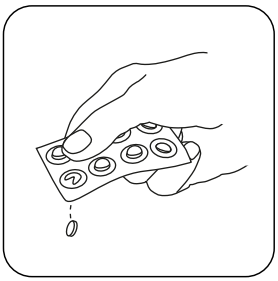
Vaciar la cubeta excepto algunas gotas.



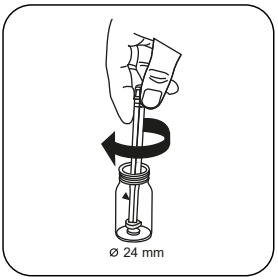
Añadir **tableta DPD No. 1**.



Añadir **tableta DPD No. 3**.

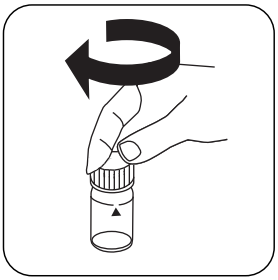


Alternativa a la tableta DPD No 1 y No 3, se puede agregar una tableta DPD No. 4.

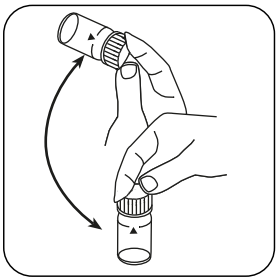


Triturar la(s) tableta(s) girando ligeramente.

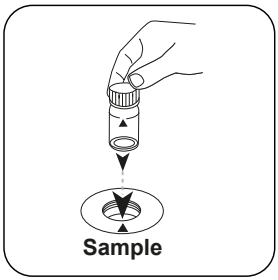
Llenar la cubeta con la **muestra** hasta la **marca de 10 mL** .



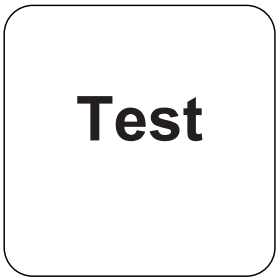
Cerrar la(s) cubeta(s).



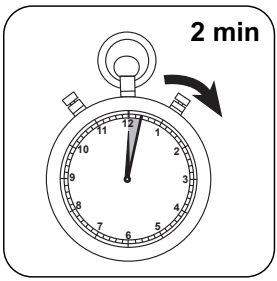
Disolver la(s) tableta(s) girando.



Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



Pulsar la tecla **TEST** (XD: **START**).



Esperar **2 minutos como periodo de reacción**.

Finalizado el periodo de reacción se realizará la determinación automáticamente.

A continuación se visualizará el resultado en mg/L Cloro total.

Método químico

DPD

Apéndice

ES

Interferencia

Interferencias persistentes

- Todos los elementos oxidantes existentes en la muestra reaccionan como el cloro, lo que produce un resultado más elevado.

Interferencias extraibles

- Las perturbaciones debido a cobre y hierro (III) deben suprimirse mediante EDTA.
- En las muestras con una elevada concentración de iones de calcio* y/o alta conductividad*, se puede producir un enturbiamiento de la muestra con el uso de las tabletas de reactivo, alterando el resultado. En este caso, utilizar alternativamente la tableta reactiva DPD nº 1 High Calcium y la tableta reactiva DPD nº 3 High Calcium. *no se pueden dar valores exactos, ya que la aparición de enturbiamiento dependerá del tipo y composición de la muestra.
- Las concentraciones de cloro mayores a 10 mg/L, cuando se usan tabletas pueden conducir a resultados de dentro del campo de medición hasta 0 mg/L. Con una concentración de cloro alta, se deberá diluir la muestra con agua sin cloro. Se mezclan 10 mL de muestra diluida con reactivo y se repite la medición (prueba de plausibilidad).

Interferencia	de / [mg/L]
CrO_4^{2-}	0.01
MnO_2	0.01

Validación del método

Límite de detección	0.02 mg/L
Límite de determinación	0.06 mg/L
Límite del rango de medición	6 mg/L
Sensibilidad	2.05 mg/L / Abs
Intervalo de confianza	0.04 mg/L
Desviación estándar	0.019 mg/L
Coeficiente de variación	0.87 %

Conforme a

EN ISO 7393-2

[a] Posible determinación de libre, combinado, total | [e] Reactivo auxiliar, alternativo a DPD No.1/3 en enturbiamientos de la prueba debido a concentraciones elevadas de calcio y/o elevada conductividad

Cloro L M101

0.02 - 4.0 mg/L Cl_2 [a)] CL6

DPD

ES

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Solución de tampón DPD 1, frasco azul	15 mL	471010
Solución de tampón DPD 1	100 mL	471011
Solución de tampón DPD 1 en pack de 6	1 Cantidad	471016
Solución reactiva DPD 1, frasco verde	15 mL	471020
Solución de reactivo DPD 1	100 mL	471021
Solución reactiva DPD 1 en pack de 6	1 Cantidad	471026
Solución DPD 3, frasco rojo	15 mL	471030
Solución DPD 3	100 mL	471031
Solución DPD 3 en pack de 6	1 Cantidad	471036
Juego de reactivos para DPD	1 Cantidad	471056

Standards disponibles

Título	Unidad de embalaje	No. de referencia
ValidCheck cloro 1,5 mg/l	1 Cantidad	48105510

Muestreo

1. Evitar durante la preparación de la muestra la desgasificación de cloro, p. ej., al pipetar o agitar.
2. La determinación se ha de realizar inmediatamente después de la toma de la muestra.

Preparación

1. Limpieza de las cubetas:
   Muchos productos de limpieza (p. ej., detergentes de lavavajillas) poseen componentes reductores, que pueden reducir los resultados en la determinación del cloro. Para evitar estas alteraciones, los aparatos de vidrio deben estar exentos de componentes corrosivos al cloro. Para ello, deberá sumergir los aparatos de vidrio durante una hora en una solución de hipoclorito sódico (0,1 g/L), enjuagándolos minuciosamente a continuación con agua desionizada.
2. Para la determinación individual de cloro libre y cloro total se recomienda utilizar siempre los mismos sets de cubetas respectivamente (véase EN ISO 7393-2, párrafo 5.3).
3. El desarrollo coloreo por DPD se efectúa entre un valor de pH de 6,2 - 6,5. Por ello poseen las tabletas un tampón para la graduación del valor de pH. Sin embargo, las muestras acuosas muy ácidas o muy básicas se deberán neutralizar a un valor de pH entre 6 y 7 antes de realizar el análisis (con 0,5 mol/l de ácido sulfúrico o 1 mol/l de hidróxido sódico).

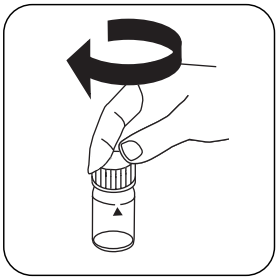
Notas

1. Después de usarlas, las botellas cuentagotas deben cerrarse de nuevo inmediatamente con la tapa roscada del mismo color, respectivamente.
2. Guardar el set reactivo a una temperatura entre +6 °C y +10 °C.

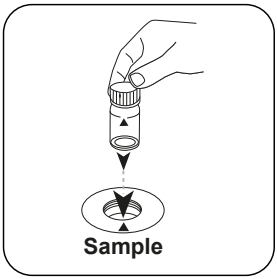
Ejecución de la determinación Cloro libre con reactivos líquidos

Seleccionar el método en el aparato.

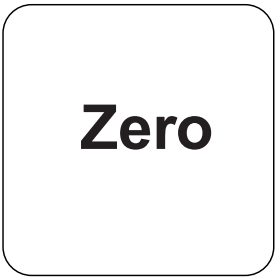
Llenar la cubeta de 24 mm con **10 mL de muestra** .



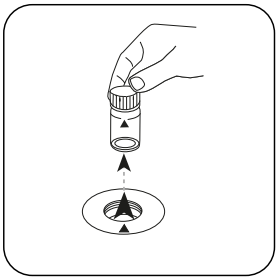
Cerrar la(s) cubeta(s).



Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

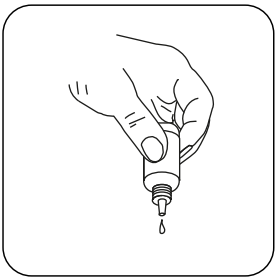


Pulsar la tecla **ZERO**.

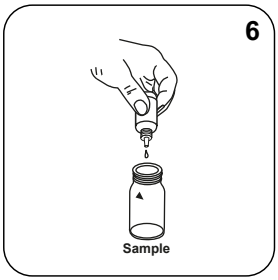


Extraer la cubeta del compartimiento de medición.

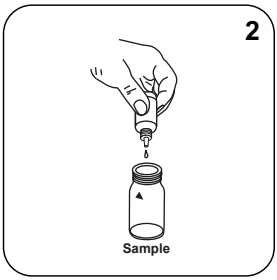
Vaciar la cubeta.



Mantener la botella cuentagotas vertical y añadir gotas del mismo tamaño presionando lentamente.

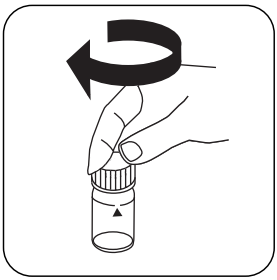


Añadir **6 gotas de DPD 1 Buffer Solution** en la cubeta con la muestra.

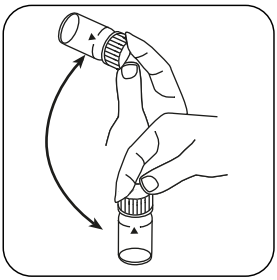


Añadir **2 gotas de DPD 1 Reagent Solution** en la cubeta con la muestra.

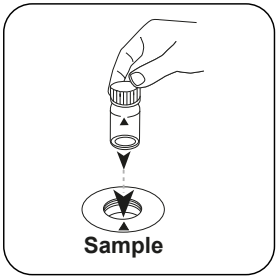
Llenar la cubeta con la **muestra** hasta la **marca de 10 mL** .



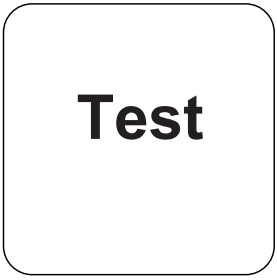
Cerrar la(s) cubeta(s).



Mezclar el contenido girando.



Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



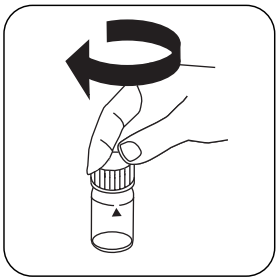
Pulsar la tecla **TEST** (XD: **START**).

A continuación se visualizará el resultado en mg/L Cloro libre.

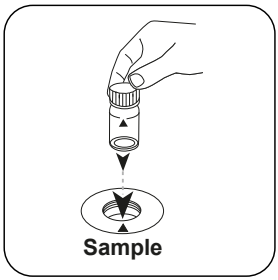
Ejecución de la determinación Cloro total con reactivos líquidos

Seleccionar el método en el aparato.

Llenar la cubeta de 24 mm con **10 mL de muestra** .

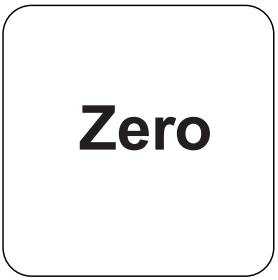


Cerrar la(s) cubeta(s).

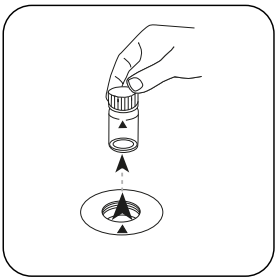


Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

ES

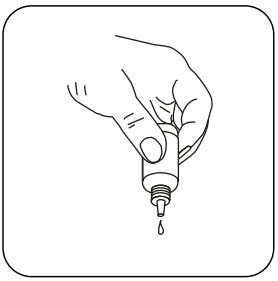


Pulsar la tecla **ZERO**.

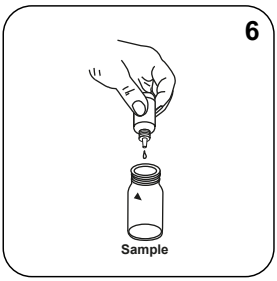


Extraer la cubeta del compartimiento de medición.

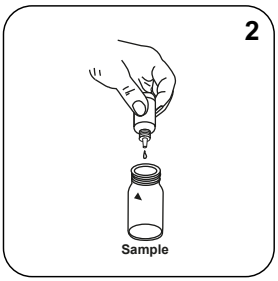
Vaciar la cubeta.



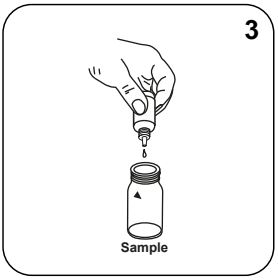
Mantener la botella cuentagotas vertical y añadir gotas del mismo tamaño presionando lentamente.



Añadir **6 gotas de DPD 1 Buffer Solution** en la cubeta con la muestra.

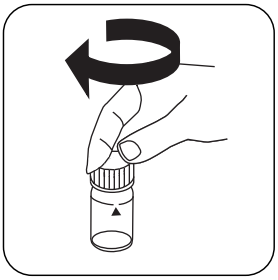


Añadir **2 gotas de DPD 1 Reagent Solution** en la cubeta con la muestra.

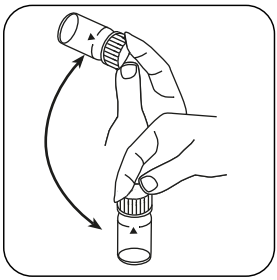


Añadir **3 gotas de DPD 3 Solution** en la cubeta con la muestra.

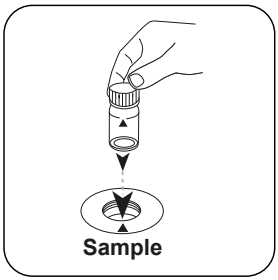
Llenar la cubeta con la **muestra** hasta la **marca de 10 mL** .



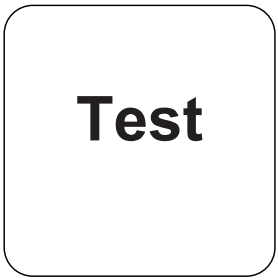
Cerrar la(s) cubeta(s).



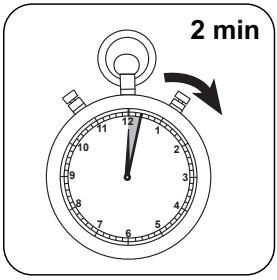
Mezclar el contenido girando.



Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



Pulsar la tecla **TEST** (XD: **START**).



Esperar **2 minutos como periodo de reacción**.

Finalizado el periodo de reacción se realizará la determinación automáticamente.

A continuación se visualizará el resultado en mg/L Cloro total.

Método químico

DPD

Apéndice

ES

Interferencia

Interferencias persistentes

- Todos los elementos oxidantes existentes en la muestra reaccionan como el cloro, lo que produce un resultado más elevado.

Interferencias extraibles

- Las perturbaciones debido a cobre y hierro (III) deben suprimirse mediante EDTA.
- Las concentraciones de cloro mayores a 4 mg/L, cuando se usan reactivos líquidos pueden conducir a resultados de dentro del campo de medición hasta 0 mg/L. En este caso, se deberá diluir la muestra con agua sin cloro. Se mezclan 10 ml de muestra diluida con reactivo y se repite la medición (prueba de plausibilidad).

Interferencia	de / [mg/L]
CrO_4^{2-}	0,01
MnO_2	0,01

Conforme a

EN ISO 7393-2

[a)] Posible determinación de libre, combinado, total

Cloro HR T M103

0.1 - 10 mg/L Cl_2 [a] CL10

DPD

ES

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
DPD nº 1 HR	Tabletas / 100	511500BT
DPD nº 1 HR	Tabletas / 250	511501BT
DPD nº 1 HR	Tabletas / 500	511502BT
DPD nº3 HR Evo	Tabletas / 100	511920BT
DPD nº 3 HR Evo	Tabletas / 250	511921BT
DPD nº 3 HR Evo	Tabletas / 500	511922BT
DPD nº 3 HR	Tabletas / 100	511590BT
DPD nº 3 HR	Tabletas / 250	511591BT
DPD nº 3 HR	Tabletas / 500	511592BT
Juego DPD nº 1 HR/nº 3 HR [#]	100 cada	517791BT
Juego DPD nº 1 HR/nº 3 HR [#]	250 cada	517792BT
DPD nº 1 High Calcium [e]	Tabletas / 100	515740BT
DPD nº 1 High Calcium [e]	Tabletas / 250	515741BT
DPD nº 1 High Calcium [e]	Tabletas / 500	515742BT
DPD nº 3 High Calcium [e]	Tabletas / 100	515730BT
DPD nº 3 High Calcium [e]	Tabletas / 250	515731BT
DPD nº 3 High Calcium [e]	Tabletas / 500	515732BT

Muestreo

1. Evitar durante la preparación de la muestra la desgasificación de cloro, p. ej., al pipetar o agitar.
2. La determinación se ha de realizar inmediatamente después de la toma de la muestra.

Preparación

1. Limpieza de las cubetas:
   Muchos productos de limpieza (p. ej., detergentes de lavavajillas) poseen componentes reductores, que pueden reducir los resultados en la determinación del cloro. Para evitar estas alteraciones, los aparatos de vidrio deben estar exentos de componentes corrosivos al cloro. Para ello, deberá sumergir los aparatos de vidrio durante una hora en una solución de hipoclorito sódico (0,1 g/L), enjuagándolos minuciosamente a continuación con agua desionizada.
2. Para la determinación individual de cloro libre y cloro total se recomienda utilizar siempre los mismos sets de cubetas respectivamente (véase EN ISO 7393-2, párrafo 5.3).
3. El desarrollo coloreo por DPD se efectúa entre un valor de pH de 6,2 - 6,5. Por ello poseen las tabletas un tampón para la graduación del valor de pH. Sin embargo, las muestras acuosas muy ácidas o muy básicas se deberán neutralizar a un valor de pH entre 6 y 7 antes de realizar el análisis (con 0,5 mol/L de ácido sulfúrico o 1 mol/L de hidróxido sódico).

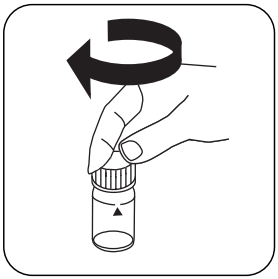
Notas

1. Las tabletas Evo pueden utilizarse como alternativa a la tableta estándar correspondiente (por ejemplo, DPD nº 3 Evo en lugar de DPD nº 3).

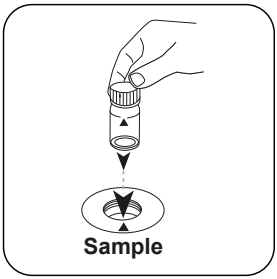
Ejecución de la determinación Cloro HR libre con tableta

Seleccionar el método en el aparato.

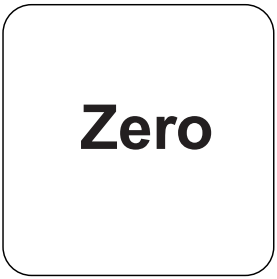
Llenar la cubeta de 24 mm con **10 mL de muestra** .



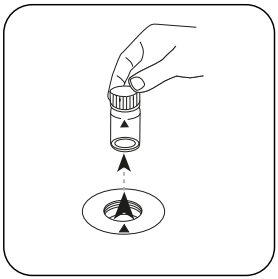
Cerrar la(s) cubeta(s).



Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

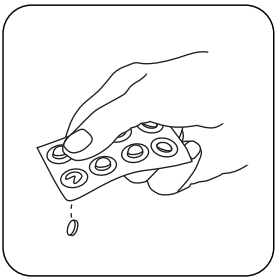


Pulsar la tecla **ZERO**.

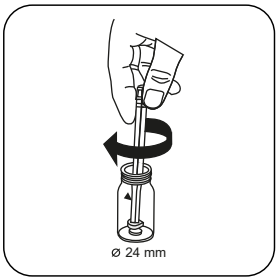


Extraer la cubeta del compartimiento de medición.

Vaciar la cubeta excepto algunas gotas.

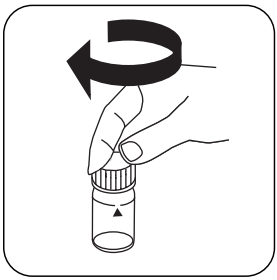


Añadir **tableta DPD No. 1 HR** .

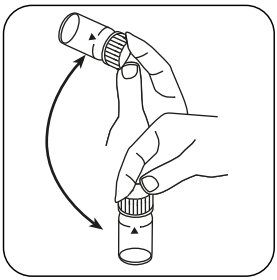


Triturar la(s) tableta(s) girando ligeramente.

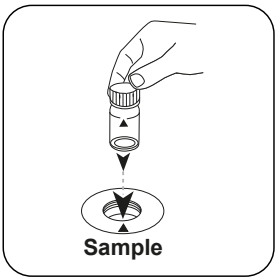
Llenar la cubeta con la **muestra** hasta la **marca de 10 mL** .



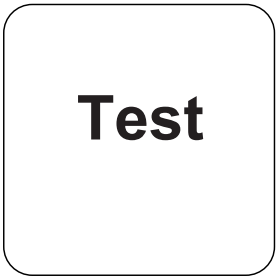
Cerrar la(s) cubeta(s).



Disolver la(s) tableta(s) girando.



Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



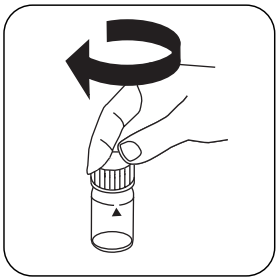
Pulsar la tecla **TEST** (XD: **START**).

A continuación se visualizará el resultado en mg/L Cloro libre.

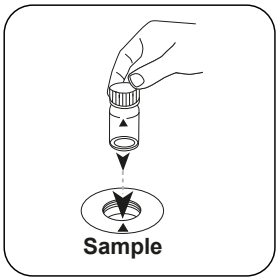
Ejecución de la determinación Cloro HR total con tableta

Seleccionar el método en el aparato.

Llenar la cubeta de 24 mm con **10 mL de muestra** .

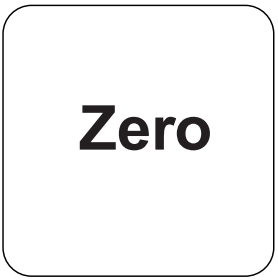


Cerrar la(s) cubeta(s).

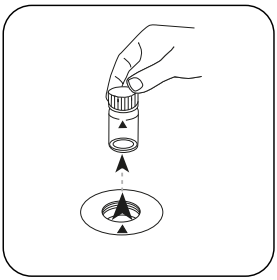


Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

ES

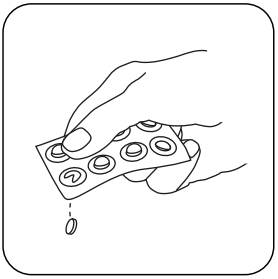


Pulsar la tecla **ZERO**.

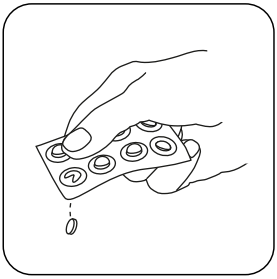


Extraer la cubeta del compartimiento de medición.

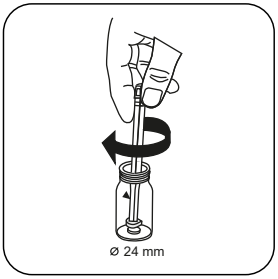
Vaciar la cubeta excepto algunas gotas.



Añadir **tableta DPD No. 1 HR** .



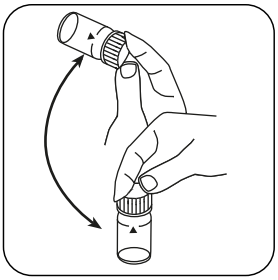
Añadir **tableta DPD No. 3 HR** .



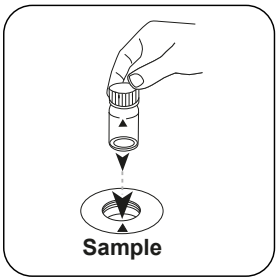
Triturar la(s) tableta(s) girando ligeramente.

Llenar la cubeta con la **muestra** hasta la **marca de 10 mL** .

Cerrar la(s) cubeta(s).



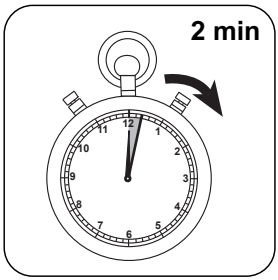
Disolver la(s) tableta(s) girando.



Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

Test

Pulsar la tecla **TEST** (XD: **START**).



Esperar **2 minutos como periodo de reacción**.

Finalizado el periodo de reacción se realizará la determinación automáticamente.

A continuación se visualizará el resultado en mg/L Cloro total.

Método químico

DPD

Apéndice

ES

Interferencia

Interferencias persistentes

- Todos los elementos oxidantes existentes en la muestra reaccionan como el cloro, lo que produce un resultado más elevado.

Interferencias extraibles

- Las perturbaciones debido a cobre y hierro (III) deben suprimirse mediante EDTA.
- En las muestras con una elevada concentración de iones de calcio* y/o alta conductividad*, se puede producir un enturbiamiento de la muestra con el uso de las tabletas de reactivo, alterando el resultado. En este caso, utilizar alternativamente la tableta reactiva DPD nº 1 High Calcium y la tableta reactiva DPD nº 3 High Calcium. *no se pueden dar valores exactos, ya que la aparición de enturbiamiento dependerá del tipo y composición de la muestra.

Conforme a

EN ISO 7393-2

[a)] Posible determinación de libre, combinado, total | [e)] Reactivo auxiliar, alternativo a DPD No.1/3 en enturbiamientos de la prueba debido a concentraciones elevadas de calcio y/o elevada conductividad

Valor de pH T M330

6.5 - 8.4 pH PH

Rojo de fenol

ES

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Rojo de fenol fotómetro	Tabletas / 100	511770BT
Rojo de fenol fotómetro	Tabletas / 250	511771BT
Rojo de fenol fotómetro	Tabletas / 500	511772BT

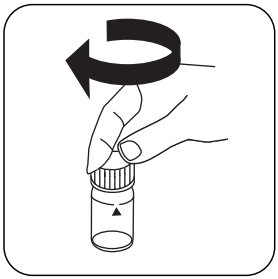
Notas

1. Para la determinación fotométrica del valor de pH solo deben usarse tabletas PHENOL RED selladas en una lámina negra con la palabra adicional PHOTOMETER.

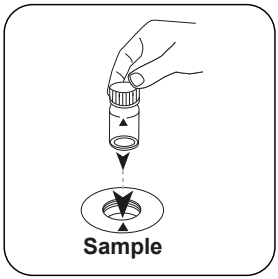
Ejecución de la determinación Valor de pH con tableta

Seleccionar el método en el aparato.

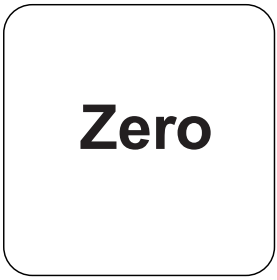
Llenar la cubeta de 24 mm con **10 mL de muestra** .



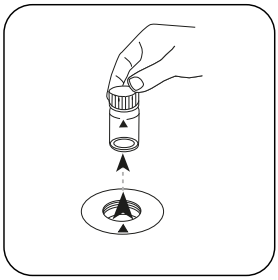
Cerrar la(s) cubeta(s).



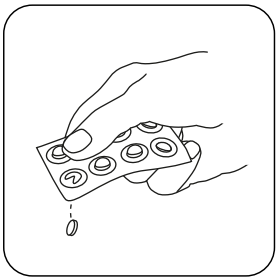
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



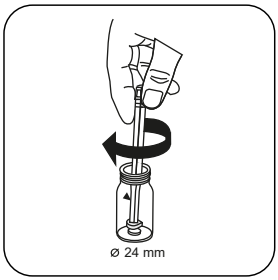
Pulsar la tecla **ZERO**.



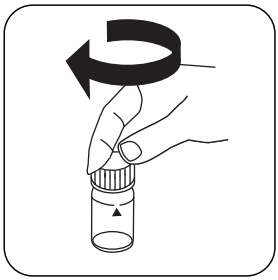
Extraer la cubeta del compartimiento de medición.



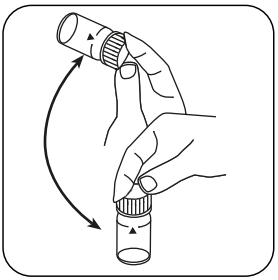
Añadir **tableta PHENOL RED PHOTOMETER**.



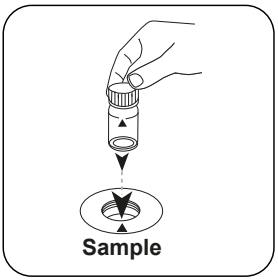
Triturar la(s) tableta(s) girando ligeramente.



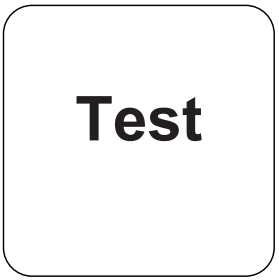
Cerrar la(s) cubeta(s).



Disolver la(s) tableta(s) girando.



Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



Pulsar la tecla **TEST** (XD: **START**).

A continuación se visualizará el resultado como valor de pH.

Método químico

Rojo de fenol

Apéndice

Interferencia

Interferencias persistentes

1. Las muestras de agua con baja dureza de carbonato* pueden entregar valores de pH falsos.
   *$K_{S4,3}$ < 0,7 mmol/l ≙ Alcalinidad total < 35 mg/L $CaCO_3$.

Interferencias extraibles

1. Los valores de pH inferiores a 6,5 y superiores a 8,4 pueden conducir a resultados dentro del campo de medición. Se recomienda realizar una prueba de plausibilidad (medidor de pH).
2. Error de sal:
   Con concentraciones de sal de hasta 2 g/L no cabe esperar un error de sal destacable, debido a la concentración de sal de la tableta de reactivo. Cuando las concentraciones de sal son mayores, los valores de medición deben corregirse del modo siguiente:

Concentración salina de la muestra en g/L	30 (agua de mar)	60	120	180
Corrección	-0,15[1)]	-0,21[2)]	-0,26[2)]	-0,29[2)]

[1)] según Kolthoff (1922)
[2)] según Parson y Douglas (1926)

Bibliografía

Colorimetric Chemical Analytical Methods, 9th Edition, London

Valor de pH L M331

6.5 - 8.4 pH PH

Rojo de fenol

ES

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Solución de rojo de fenol	15 mL	471040
Solución de rojo de fenol	100 mL	471041
Solución rojo de fenol en pack de 6	1 Cantidad	471046

Preparación

1. El tamaño de las gotas, al contrario de las tabletas, puede aumentar las desviaciones del resultado.
   Mediante el uso de una pipeta (0,18 ml corresponden a 6 gotas) se pueden minimizar estas desviaciones.

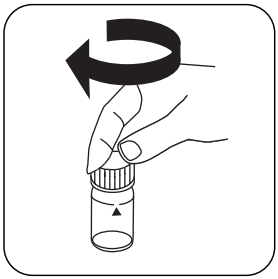
Notas

1. Después de usarla, la botella cuentagotas debe cerrarse de nuevo inmediatamente con la tapa roscada del mismo color.
2. Guardar el reactivo a una temperatura entre +6 °C y +10 °C.

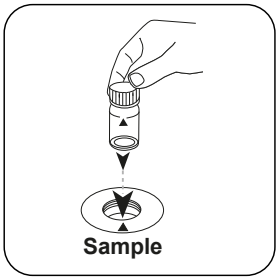
Ejecución de la determinación Valor de pH con reactivos líquidos

Seleccionar el método en el aparato.

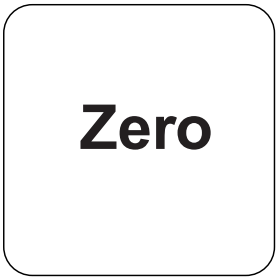
Llenar la cubeta de 24 mm con **10 mL de muestra** .



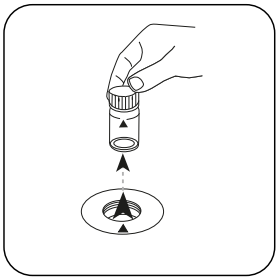
Cerrar la(s) cubeta(s).



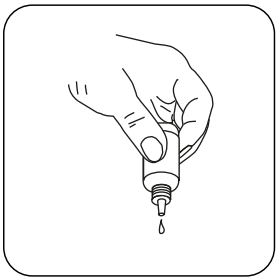
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



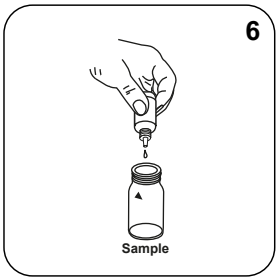
Pulsar la tecla **ZERO**.



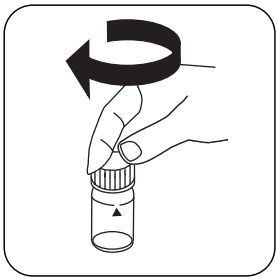
Extraer la cubeta del compartimiento de medición.



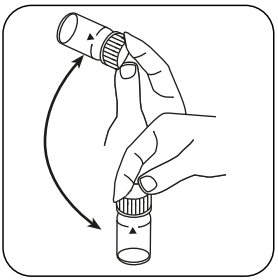
Mantener la botella cuentagotas vertical y añadir gotas del mismo tamaño presionando lentamente.



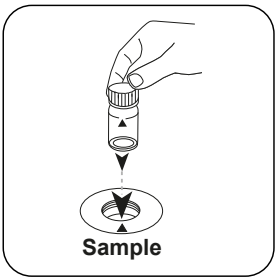
Añadir **6 gotas de PHENOL Red-Lösung** en la cubeta con la muestra.



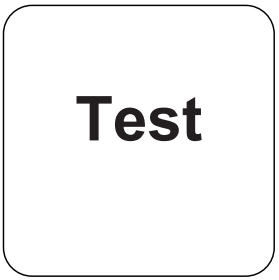
Cerrar la(s) cubeta(s).



Mezclar el contenido girando.



Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



Pulsar la tecla **TEST** (XD: **START**).

A continuación se visualizará el resultado como valor de pH.

Método químico

Rojo de fenol

Apéndice

Interferencia

Interferencias extraibles

1. Error de sal: Corrección de valor analizado (valores medios) para muestras con una concentración salina de:

2.

Concentración salina de la muestra	Corrección
30 g/L (agua de mar)	-0,15[1)]
60 g/L	-0,21[2)]
120 g/L	-0,26[2)]
180 g/L	-0,29[2)]
[1)] según Kolthoff (1922)	[2)] según Parson y Douglas (1926)

3. En la determinación de muestras acuosas cloradas pueden influir los restos de cloro en la reacción colorea del reactivo líquido. Esto puede evitarse añadiendo a la muestra un pequeño cristal de tiosulfato sódico ($Na_2S_2O_3 \cdot 5\ H_2O$), antes de incorporar el reactivo PHENOL RED.

Bibliografía

Colorimetric Chemical Analytical Methods, 9th Edition, London

Urea T M390

0.1 - 2.5 mg/L Urea Ur1

Urease / Indofenol

ES

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Reactivo 1 para UREA	15 mL	459300
UREA Reagent 2-10 ml	10 mL	459400
Amonio nº 1	Tabletas / 100	512580BT
Amonio nº 1	Tabletas / 250	512581BT
Amonio nº 2	Tabletas / 100	512590BT
Amonio nº 2	Tabletas / 250	512591BT
Juego amonio nº 1/nº 2#	100 cada	517611BT
Juego amonio nº 1/nº 2#	250 cada	517612BT
Polvo de acondicionamiento de amonio	Polvos / 26 g	460170
Urea Pretreat (compensates for the interference of free Chlorine up to 2 mg/l)	Tabletas / 100	516110BT
Juego de reactivos para urea	1 Set	517800BT

Preparación

1. La temperatura de la muestra deberá encontrarse entre 20 °C y 30 °C.
2. Realizar la determinación en el plazo máximo de una hora después de la toma de la muestra.
3. En la determinación de muestras marinas, se deberá añadir a la muestra acuosa dos cucharas de polvo acondicionador de amonio, antes de agregar la tableta Ammonia nº 1, disolviéndola mediante agitación.

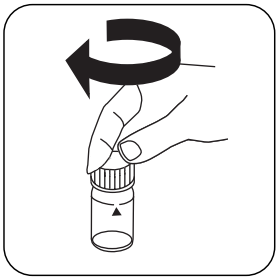
Notas

1. La tableta AMMONIA nº 1 se disolverá completamente una vez añadida la tableta AMMONIA nº 2.
2. En la determinación de ácido úrico se detectarán también amonio y cloroaminas.

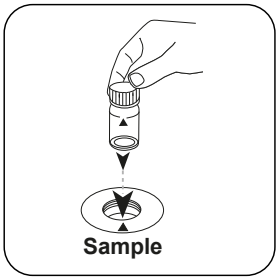
Ejecución de la determinación Urea con tableta y reactivo líquido

Seleccionar el método en el aparato.

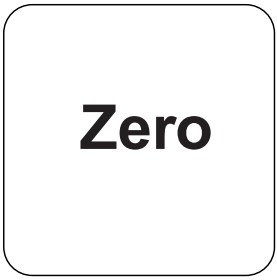
Llenar la cubeta de 24 mm con **10 mL de muestra** .



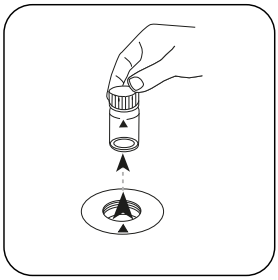
Cerrar la(s) cubeta(s).



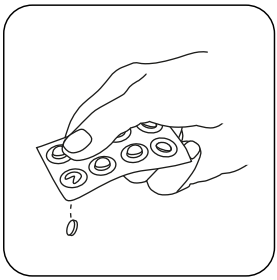
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



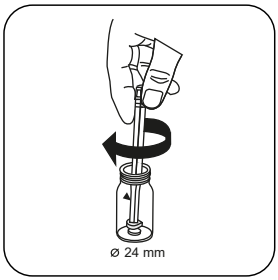
Pulsar la tecla **ZERO**.



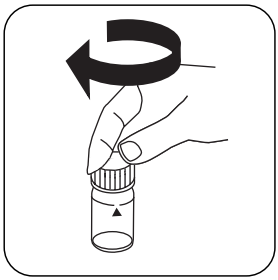
Extraer la cubeta del compartimiento de medición.



Si hay cloro libre (HOCl), añadir **una tableta UREA PRETREAT**.

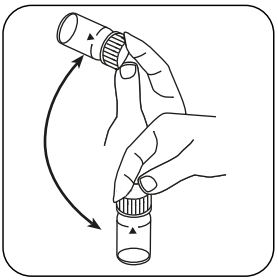


Triturar la(s) tableta(s) girando ligeramente.

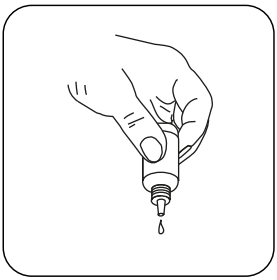


Cerrar la(s) cubeta(s).

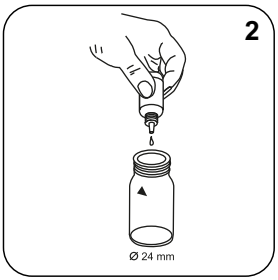
ES



Disolver la(s) tableta(s) girando.

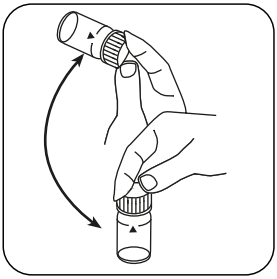


Mantener la botella cuentagotas vertical y añadir gotas del mismo tamaño presionando lentamente.

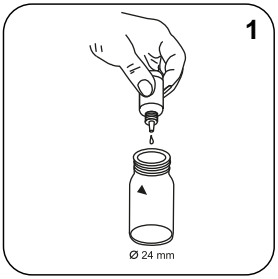


Añadir **2 gotas de Urea Reagenz 1**.

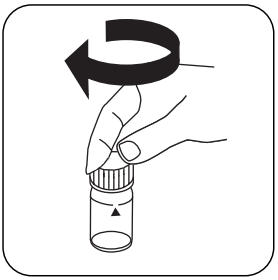
Cerrar la(s) cubeta(s).



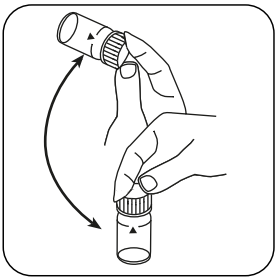
Mezclar el contenido girando.



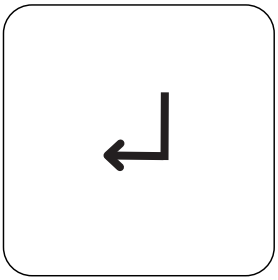
Añadir **1 gotas de Urea Reagenz 2**.



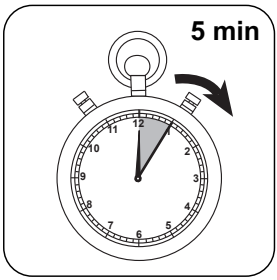
Cerrar la(s) cubeta(s).



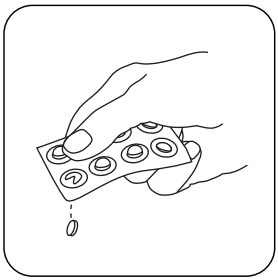
Mezclar el contenido girando.



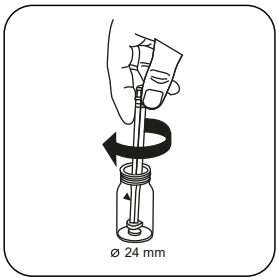
Pulsar la tecla **ENTER**.



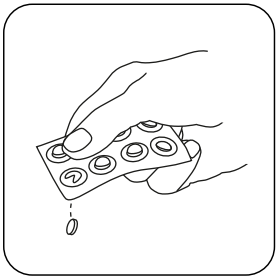
Esperar **5 minutos como periodo de reacción**.



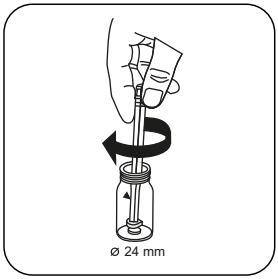
Añadir **tableta AMMONIA No.1**.



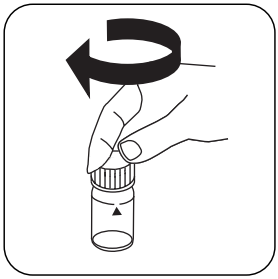
Triturar la(s) tableta(s) girando ligeramente.



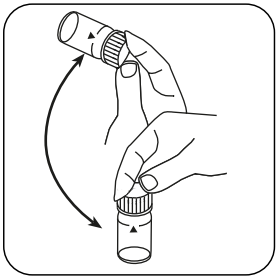
Añadir **tableta AMMONIA No.2**.



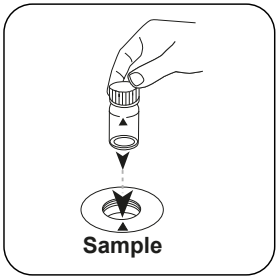
Triturar la(s) tableta(s) girando ligeramente.



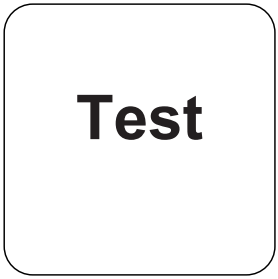
Cerrar la(s) cubeta(s).



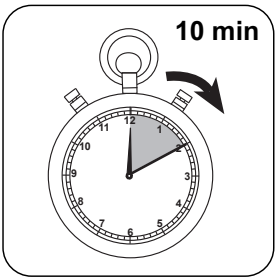
Disolver la(s) tableta(s) girando.



Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



Pulsar la tecla **TEST** (XD: **START**).



ES

Esperar **10 minutos como periodo de reacción**.

Finalizado el periodo de reacción se realizará la determinación automáticamente.

A continuación se visualizará el resultado en mg/L Urea.

Método químico

Urease / Indofenol

Apéndice

Interferencia

Interferencias persistentes

- Las concentraciones de urea mayores a 2 mg/L pueden conducir a resultados hasta dentro del campo de medición. En este caso, se deberá diluir la muestra con agua libre de cloro y repetirse a continuación el análisis (prueba de plausibilidad).

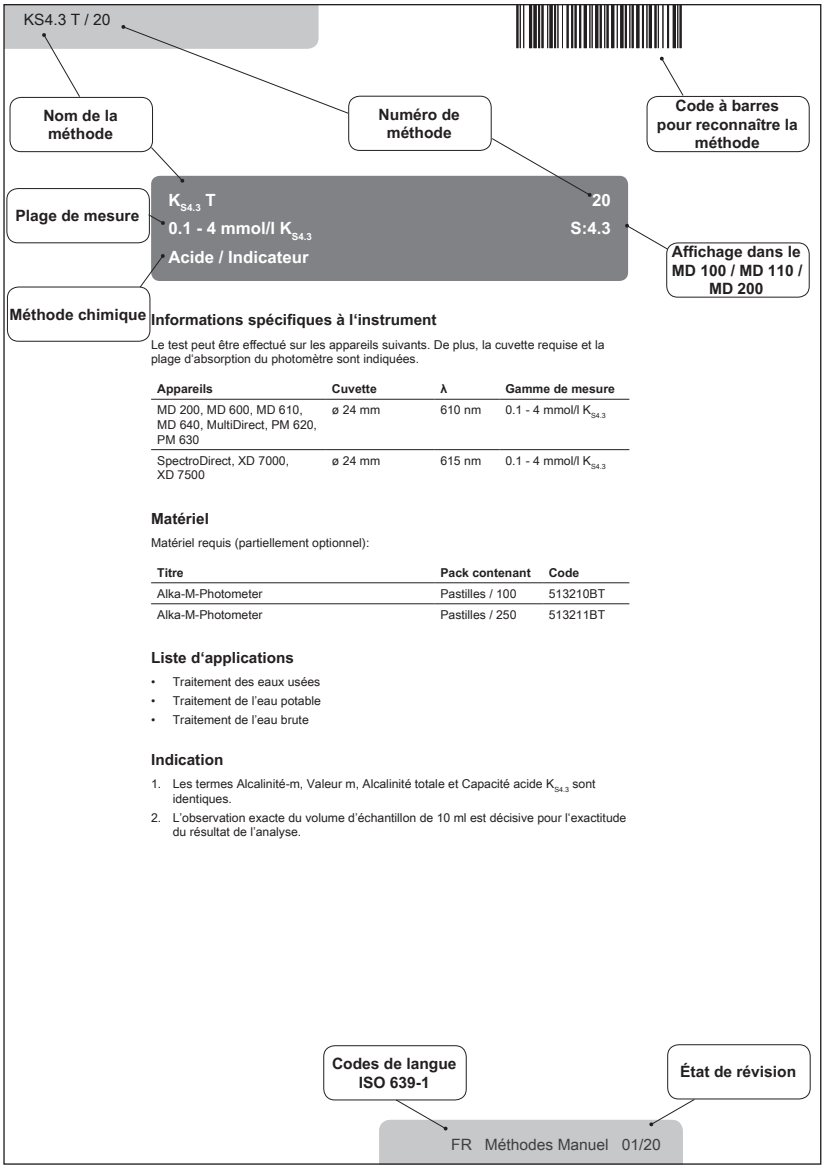
Interferencias extraibles

- Una tableta UREA PRETREAT elimina la perturbación del cloro libre hasta 2 mg/L (dos tabletas hasta 4 mg/L, tres tabletas hasta 6 mg/L).

Interferencia	de / [mg/L]
Cl_2	2

Bibliografía

R.J. Creno, R.E. Wenk, P. Bohling, Automated Micromeasurement of Urea Using Urease and the Berthelot Reaction, American Journal of Clinical Pathology (1970), 54 (6), p. 828-832


KS4.3 T / 20
Nom de la méthode
Numéro de méthode
Code à barres pour reconnaître la méthode
Plage de mesure
$K_{S4.3}$ T
20
0.1 - 4 mmol/l $K_{S4.3}$
S:4.3
Acide / Indicateur
Affichage dans le MD 100 / MD 110 / MD 200
Méthode chimique
Informations spécifiques à l'instrument
Le test peut être effectué sur les appareils suivants. De plus, la cuvette requise et la plage d'absorption du photomètre sont indiquées.
Appareils | Cuvette | λ | Gamme de mesure
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630 | ø 24 mm | 610 nm | 0.1 - 4 mmol/l $K_{S4.3}$
SpectroDirect, XD 7000, XD 7500 | ø 24 mm | 615 nm | 0.1 - 4 mmol/l $K_{S4.3}$
Matériel
Matériel requis (partiellement optionnel):
Titre | Pack contenant | Code
Alka-M-Photometer | Pastilles / 100 | 513210BT
Alka-M-Photometer | Pastilles / 250 | 513211BT
Liste d'applications
• Traitement des eaux usées
• Traitement de l'eau potable
• Traitement de l'eau brute
Indication
1. Les termes Alcalinité-m, Valeur m, Alcalinité totale et Capacité acide $K_{S4.3}$ sont identiques.
2. L'observation exacte du volume d'échantillon de 10 ml est décisive pour l'exactitude du résultat de l'analyse.
Codes de langue ISO 639-1
État de révision
FR Méthodes Manuel 01/20

Procédure du test

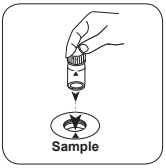
Réalisation de la quantification Capacité acide $K_{S4.3}$ avec pastille

Sélectionnez la méthode sur l'appareil.

Cette méthode ne nécessite aucune mesure du zéro sur les appareils suivants : XD 7000, XD 7500

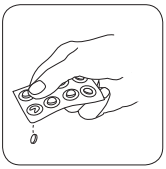
Remplissez une cuvette de 24 mm de **10 ml d'échantillon**.

Fermez la(les) cuvette(s).

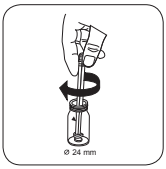


Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.

• • •



Ajoutez une **pastille de ALKA-M-PHOTOMETER**.



Écrasez la(les) pastille(s) en la(les) tournant un peu.

Fermez la(les) cuvette(s).

$K_{S4.3}$ T — M20

0.1 - 4 mmol/L $K_{S4.3}$ — S:4.3

Acide / Indicateur

FR

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
Photomètre Alca-M	Pastilles / 100	513210BT
Photomètre Alca-M	Pastilles / 250	513211BT

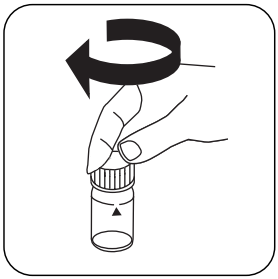
Indication

1. Les termes Alcalinité-m, Valeur m, Alcalinité totale et Capacité acide $K_{S4.3}$ sont identiques.
2. L'observation exacte du volume d'échantillon de 10 ml est décisive pour l'exactitude du résultat de l'analyse.

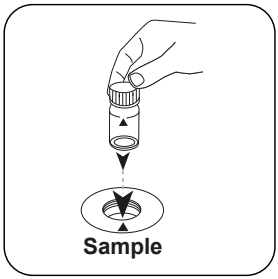
Réalisation de la quantification Capacité acide Ks4,3 avec pastille

Sélectionnez la méthode sur l'appareil.

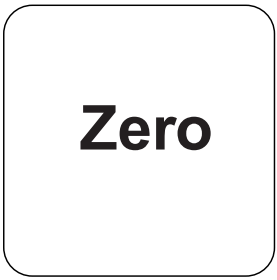
Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



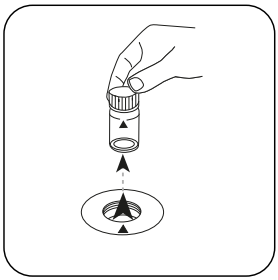
Fermez la(les) cuvette(s).



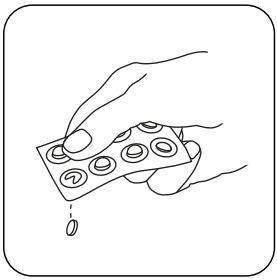
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



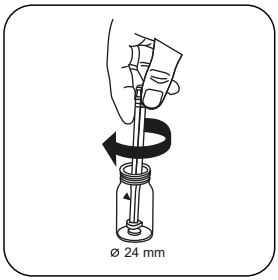
Appuyez sur la touche **ZERO**.



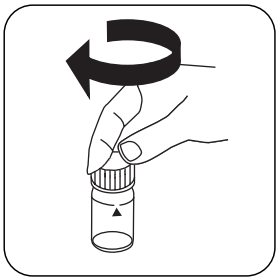
Retirez la cuvette de la chambre de mesure.



Ajoutez une **pastille de ALKA-M-PHOTOMETER**.

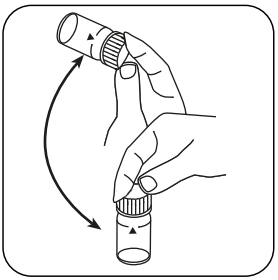


Écrasez la(les) pastille(s) en la(les) tournant un peu.

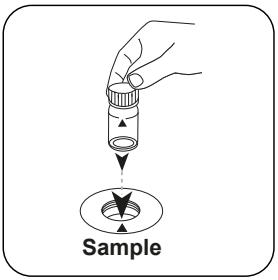


Fermez la(les) cuvette(s).

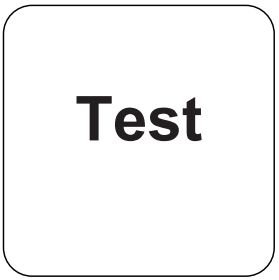
FR



Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



Appuyez sur la touche **TEST** (XD: **START**).

Le résultat s'affiche à l'écran en Capacité d'acide $K_{S4.3}$.

Méthode chimique

Acide / Indicateur

Appendice

Dérivé de
DIN 38409 - H 7-2

Chlore T M100

0.01 - 6.0 mg/L Cl_2 [a] CL6

DPD

FR

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
DPD N°1	Pastilles / 100	511050BT
DPD N° 1	Pastilles / 250	511051BT
DPD N° 1	Pastilles / 500	511052BT
DPD N° 3	Pastilles / 100	511080BT
DPD N° 3	Pastilles / 250	511081BT
DPD N° 3	Pastilles / 500	511082BT
DPD N° 1 High Calcium [e]	Pastilles / 100	515740BT
DPD N° 1 High Calcium [e]	Pastilles / 250	515741BT
DPD N° 1 High Calcium [e]	Pastilles / 500	515742BT
DPD N° 3 High Calcium [e]	Pastilles / 100	515730BT
DPD N° 3 High Calcium [e]	Pastilles / 250	515731BT
DPD N° 3 High Calcium [e]	Pastilles / 500	515732BT
DPD N° 4	Pastilles / 100	511220BT
DPD N° 4	Pastilles / 250	511221BT
DPD N° 4	Pastilles / 500	511222BT
DPD N° 3 Evo	Pastilles / 100	511420BT
DPD N° 3 Evo	Pastilles / 250	511421BT
DPD N° 3 Evo	Pastilles / 500	511422BT
DPD N°4 Evo	Pastilles / 100	511970BT
DPD N° 4 Evo	Pastilles / 250	511971BT
DPD N° 4 Evo	Pastilles / 500	511972BT

Standards disponibles

Titre	Pack contenant	Code
ValidCheck Chlore 1,5 mg/l	1 Pièces	48105510

Échantillonnage

1. Lors de la préparation de l'échantillon, il faudra éviter le dégazage du chrome, par ex. par pipetage ou agitation.
2. L'analyse devra avoir lieu immédiatement après le prélèvement de l'échantillon.

Préparation

1. Nettoyage des cuvettes :
   Beaucoup de produits de nettoyage domestiques (par ex. liquide vaisselle) contenant des agents réducteurs, il est possible que lors de la quantification du chlore, les résultats soient plus bas. Pour exclure ces erreurs, les instruments en verre utilisés devraient être insensibles aux effets du chlore. Pour ce faire, il convient de laisser les instruments en verre pendant une heure dans une solution d'hypochlorite de sodium (0,1 g/L) et de bien les rincer ensuite à l'eau déminéralisée (eau entièrement dessalée).
2. Pour la quantification individuelle du chlore libre et du chlore total, il est recommandé d'utiliser à chaque fois un nouveau lot de cuvettes (voir EN ISO 7393-2, § 5.3).
3. La coloration due au DPD a lieu à un pH compris entre 6,2 et 6,5. C'est pourquoi, les réactifs contiennent un tampon pour l'ajustage du pH. Avant l'analyse, les eaux fortement alcalines ou acides devraient être cependant ajustées sur un pH compris entre 6 et 7 (avec 0,5 mol/L d'acide sulfurique ou 1 mol/L de soude caustique).

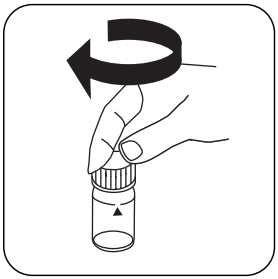
Indication

1. Les pastilles Evo peuvent être utilisées en remplacement de la pastille standard correspondante (par exemple, DPD n° 3 Evo au lieu de DPD n° 3).

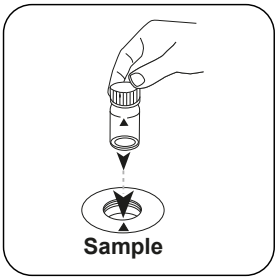
Réalisation de la quantification Chlore libre avec pastilles

Sélectionnez la méthode sur l'appareil.

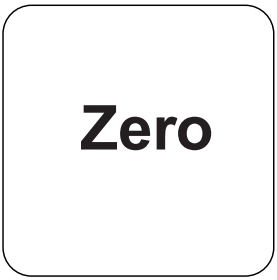
Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



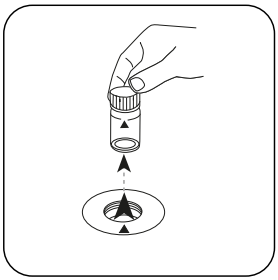
Fermez la(les) cuvette(s).



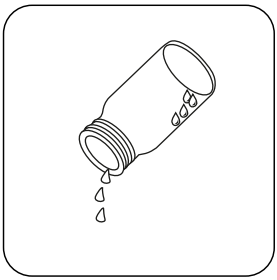
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



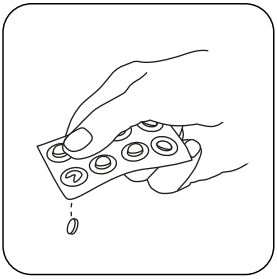
Appuyez sur la touche **ZERO**.



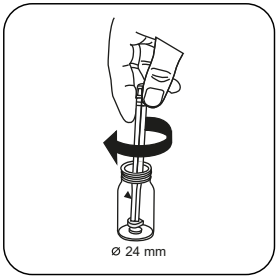
Retirez la cuvette de la chambre de mesure.



Videz pratiquement la cuvette en y laissant quelques gouttes.

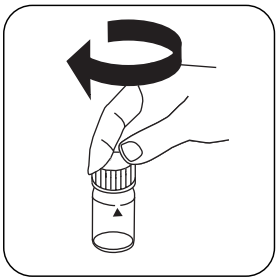


Ajoutez une **pastille de DPD No. 1**.

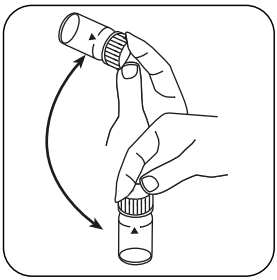


Écrasez la(les) pastille(s) en la(les) tournant un peu.

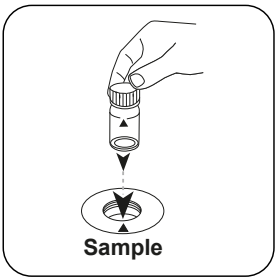
Remplissez la cuvette jusqu'au **repère de 10 mL** en y versant l'**échantillon**.



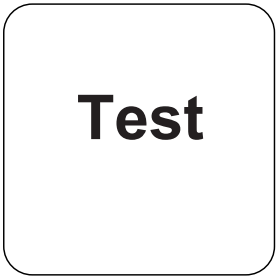
Fermez la(les) cuvette(s).



Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



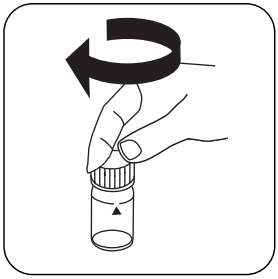
Appuyez sur la touche **TEST** (XD: **START**).

Le résultat s'affiche à l'écran en mg/L chlore libre.

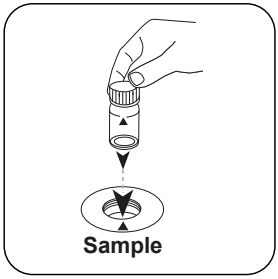
Réalisation de la quantification Chlore total avec pastilles

Sélectionnez la méthode sur l'appareil.

Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



Fermez la(les) cuvette(s).



Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.

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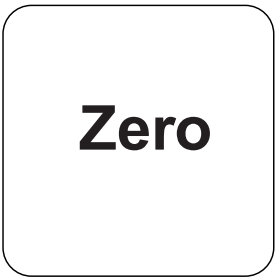
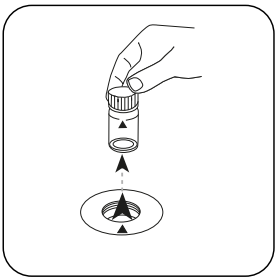
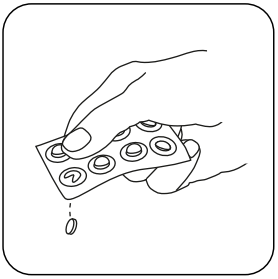


Appuyez sur la touche **ZERO**.

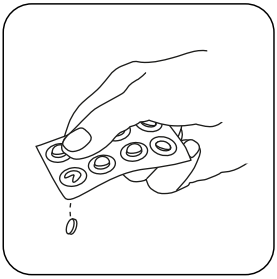


Retirez la cuvette de la chambre de mesure.

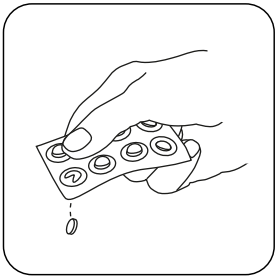
Videz pratiquement la cuvette en y laissant quelques gouttes.



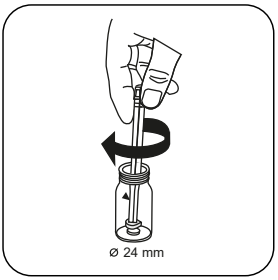
Ajoutez une **pastille de DPD No. 1**.



Ajoutez une **pastille de DPD No. 3**.

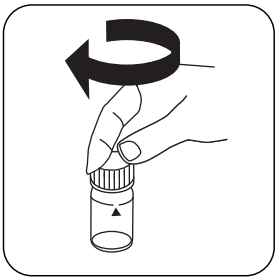


En alternative aux comprimés DPD n ° 1 et n ° 3, un comprimé DPD n ° 4 peut être ajouté.

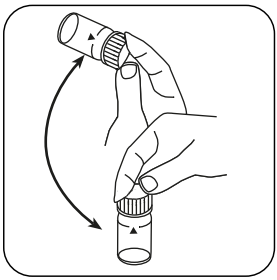


Écrasez la(les) pastille(s) en la(les) tournant un peu.

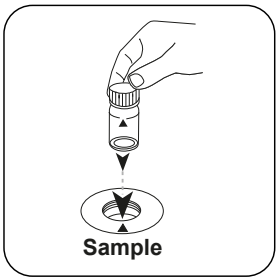
Remplissez la cuvette jusqu'au **repère de 10 mL** en y versant l'**échantillon**.



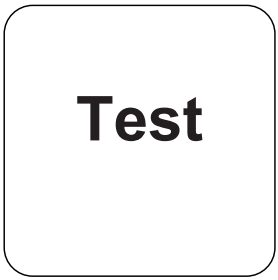
Fermez la(les) cuvette(s).



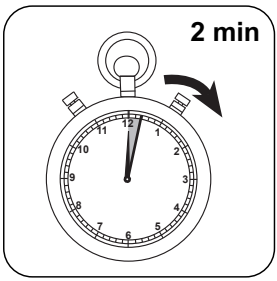
Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



Appuyez sur la touche **TEST** (XD: **START**).



Attendez la fin du **temps de réaction de 2 minute(s)** .

À l'issue du temps de réaction, la mesure est effectuée automatiquement.

Le résultat s'affiche à l'écran en mg/L chlore total.

Méthode chimique

DPD

Appendice

FR

Interférences

Interférences persistantes

- Les agents oxydants contenus dans les échantillons réagissent tous comme le chlore, ce qui entraîne des résultats plus élevés.

Interférences exclues

- Les perturbations causées par le cuivre et le fer (III) seront éliminées par EDTA.
- Dans le cas des échantillons à haute concentration en calcium* et/ou conductibilité élevée*, l'utilisation des pastilles de réactif peut causer des turbidités et donc fausser les résultats. Utilisez alors la pastille de réactif DPD N° 1 High Calcium et la pastille de réactif DPD N° 3 High Calcium.
  *Nous ne pouvons fournir de valeurs exactes, l'apparition d'une turbidité dépendant du type et de la composition de l'eau d'échantillonnage.
- Les concentrations de chlore supérieures à 10 mg/L peuvent donner des résultats dans la plage de mesure allant jusqu'à 0 mg/L en utilisant des pastilles. En cas de concentration trop élevée de chlore, diluez l'échantillon à l'eau déchlorée. Le réactif est ajouté à 10 mL d'échantillon dilué. Ensuite, la mesure est répétée (test de plausibilité).

Interférences	de / [mg/L]
CrO_4^{2-}	0.01
MnO_2	0.01

Méthode Validation

Limite de détection	0.02 mg/L
Limite de détermination	0.06 mg/L
Fin de la gamme de mesure	6 mg/L
Sensibilité	2.05 mg/L / Abs
Intervalle de confiance	0.04 mg/L
Déviation standard	0.019 mg/L
Coefficient de variation	0.87 %

Conformité

EN ISO 7393-2

[a]Détermination du libre, combiné et total | [e]autre réactif, utilisé à la place de DPD No.1/3 en cas de turbidité dans l'échantillon d'eau due à une concentration élevée de calcium et/ou une conductivité élevée

Chlore L M101

0.02 - 4.0 mg/L Cl_2 [a] CL6

DPD

FR

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
DPD 1 solution tampon, flacon bleu	15 mL	471010
DPD 1 solution tampon	100 mL	471011
Solution tampon DPD 1 dans un lot de 6	1 Pièces	471016
DPD 1 solution de réactif, flacon vert	15 mL	471020
DPD 1 solution de réactif	100 mL	471021
Solution de réactif DPD 1 dans un lot de 6	1 Pièces	471026
DPD 3 solution, flacon rouge	15 mL	471030
DPD 3 solution	100 mL	471031
Solution DPD 3 dans un lot de 6	1 Pièces	471036
Kit de réactifs DPD	1 Pièces	471056

Standards disponibles

Titre	Pack contenant	Code
ValidCheck Chlore 1,5 mg/l	1 Pièces	48105510

Échantillonnage

1. Lors de la préparation de l’échantillon, il faudra éviter le dégazage du chrome, par ex. par pipetage ou agitation.
2. L'analyse devra avoir lieu immédiatement après le prélèvement de l'échantillon.

Préparation

1. Nettoyage des cuvettes :
   Beaucoup de produits de nettoyage domestiques (par ex. liquide vaisselle) contenant des agents réducteurs, il est possible que lors de la quantification du chlore, les résultats soient plus bas. Pour exclure ces erreurs, les instruments en verre utilisés devraient être insensibles aux effets du chlore. Pour ce faire, il convient de laisser les instruments en verre pendant une heure dans une solution d'hypochlorite de sodium (0,1 g/L) et de bien les rincer ensuite à l'eau déminéralisée (eau entièrement dessalée).
2. Pour la quantification individuelle du chlore libre et du chlore total, il est recommandé d'utiliser à chaque fois un nouveau lot de cuvettes (voir EN ISO 7393-2, § 5.3).
3. La coloration due au DPD a lieu à un pH compris entre 6,2 et 6,5. C'est pourquoi, les réactifs contiennent un tampon pour l'ajustage du pH. Avant l'analyse, les eaux fortement alcalines ou acides devraient être cependant ajustées sur un pH compris entre 6 et 7 (avec 0,5 mol/l d'acide sulfurique ou 1 mol/l de soude caustique).

Indication

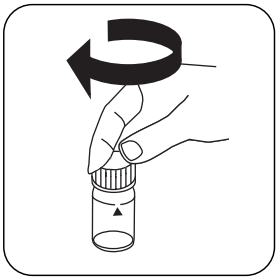
1. Après emploi, refermez immédiatement les flacons compte-goutte en utilisant le capot de même couleur.
2. Conservez le lot de réactif à une température de +6 °C à +10 °C.

Réalisation de la quantification Chlore libre avec réactifs liquides

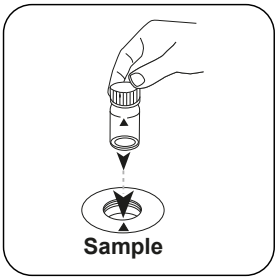
Sélectionnez la méthode sur l'appareil.

FR

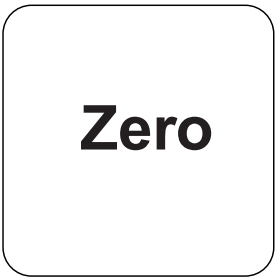
Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



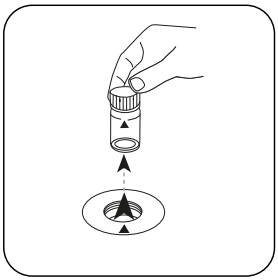
Fermez la(les) cuvette(s).



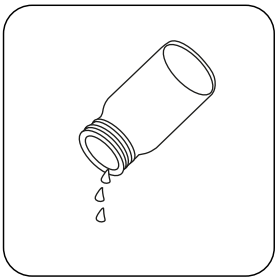
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



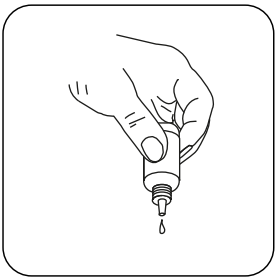
Appuyez sur la touche **ZERO**.



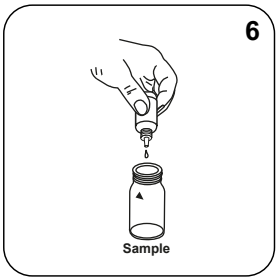
Retirez la cuvette de la chambre de mesure.



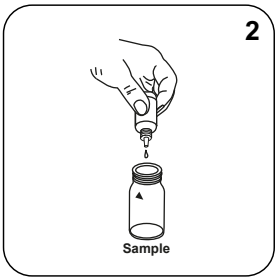
Videz la cuvette.



Tenez les flacons compte-gouttes à la verticale et ajoutez des gouttes uniformes en appuyant lentement.

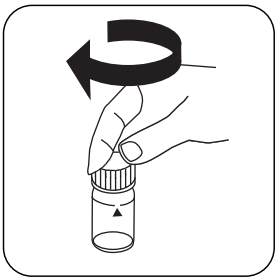


Ajoutez **6 gouttes de DPD 1 Buffer Solution** dans la cuvette réservée à l'échantillon.

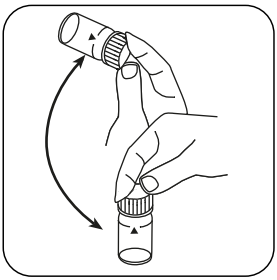


Ajoutez **2 gouttes de DPD 1 Reagent Solution** dans la cuvette réservée à l'échantillon.

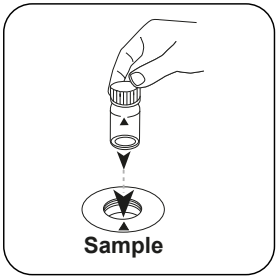
Remplissez la cuvette jusqu'au **repère de 10 mL** en y versant l'**échantillon**.



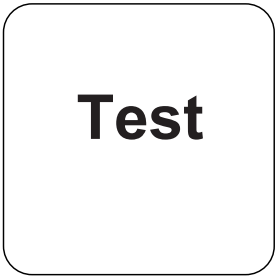
Fermez la(les) cuvette(s).



Mélangez le contenu en mettant le tube plusieurs fois à l'envers puis à l'endroit.



Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



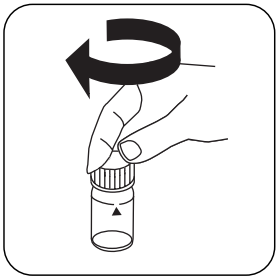
Appuyez sur la touche **TEST** (XD: **START**).

Le résultat s'affiche à l'écran en mg/L chlore libre.

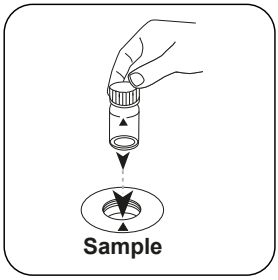
Réalisation de la quantification Chlore total avec réactifs liquides

Sélectionnez la méthode sur l'appareil.

Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



Fermez la(les) cuvette(s).



Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.

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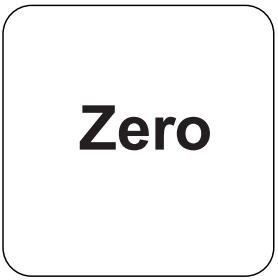
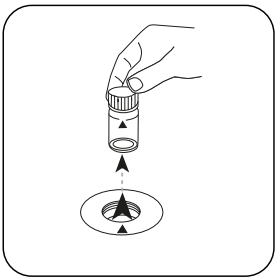
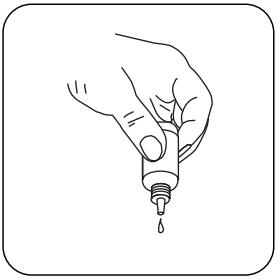


Appuyez sur la touche **ZERO**.

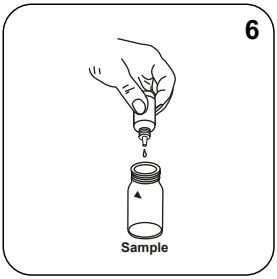


Retirez la cuvette de la chambre de mesure.

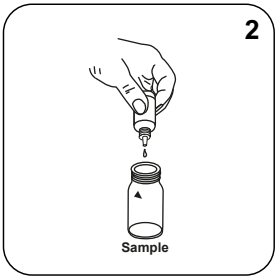
Videz la cuvette.



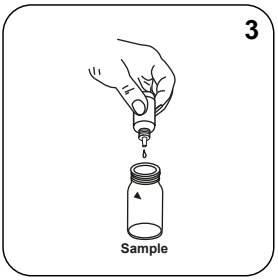
Tenez les flacons compte-goutte à la verticale et ajoutez des gouttes uniformes en appuyant lentement.



Ajoutez **6 gouttes de DPD 1 Buffer Solution** dans la cuvette réservée à l'échantillon.

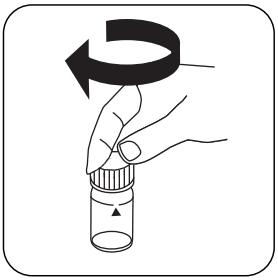


Ajoutez **2 gouttes de DPD 1 Reagent Solution** dans la cuvette réservée à l'échantillon.

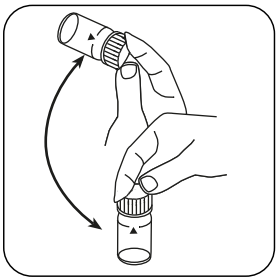


Ajoutez **3 gouttes de DPD 3 Solution** dans la cuvette réservée à l'échantillon.

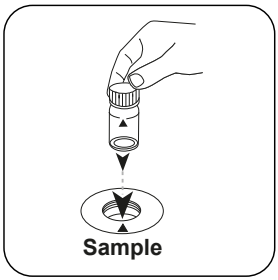
Remplissez la cuvette jusqu'au **repère de 10 mL** en y versant l'**échantillon**.



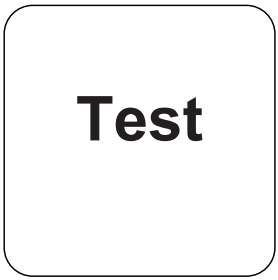
Fermez la(les) cuvette(s).



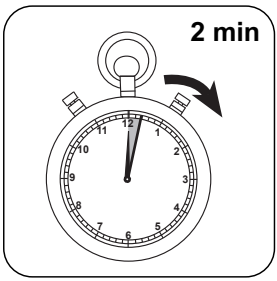
Mélangez le contenu en mettant le tube plusieurs fois à l'envers puis à l'endroit.



Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



Appuyez sur la touche **TEST** (XD: **START**).



Attendez la fin du **temps de réaction de 2 minute(s)** .

À l'issue du temps de réaction, la mesure est effectuée automatiquement.

Le résultat s'affiche à l'écran en mg/L chlore total.

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Méthode chimique

DPD

Appendice

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Interférences

Interférences persistantes

- Les agents oxydants contenus dans les échantillons réagissent tous comme le chlore, ce qui entraîne des résultats plus élevés.

Interférences exclues

- Les perturbations causées par le cuivre et le fer (III) seront éliminées par EDTA.
- Les concentrations de chlore supérieures à 4 mg/L peuvent donner des résultats dans la plage de mesure allant jusqu'à 0 mg/L en utilisant des réactifs liquides. Dans ce cas, diluez l'échantillon à l'eau déchlorée. Le réactif est ajouté à 10 ml d'échantillon dilué. Ensuite, la mesure est répétée (test de plausibilité).

Interférences	de / [mg/L]
CrO_4^{2-}	0,01
MnO_2	0,01

Conformité

EN ISO 7393-2

[a)]Détermination du libre, combiné et total

Chlore HR T M103

0.1 - 10 mg/L Cl_2 [a] CL10

DPD

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Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
DPD N° 1 HR	Pastilles / 100	511500BT
DPD N° 1 HR	Pastilles / 250	511501BT
DPD N° 1 HR	Pastilles / 500	511502BT
DPD N° 3 HR	Pastilles / 100	511590BT
DPD N° 3 HR	Pastilles / 250	511591BT
DPD N° 3 HR	Pastilles / 500	511592BT
Kit DPD N° 1 HR/N° 3 HR [#]	100 chacun	517791BT
Kit DPD N° 1 HR/N° 3 HR [#]	250 chacun	517792BT
DPD N° 1 High Calcium [e]	Pastilles / 100	515740BT
DPD N° 1 High Calcium [e]	Pastilles / 250	515741BT
DPD N° 1 High Calcium [e]	Pastilles / 500	515742BT
DPD N° 3 High Calcium [e]	Pastilles / 100	515730BT
DPD N° 3 High Calcium [e]	Pastilles / 250	515731BT
DPD N° 3 High Calcium [e]	Pastilles / 500	515732BT
DPD N°3 HR Evo	Pastilles / 100	511920BT
DPD N° 3 HR Evo	Pastilles / 250	511921BT
DPD N° 3 HR Evo	Pastilles / 500	511922BT

Échantillonnage

1. Lors de la préparation de l'échantillon, il faudra éviter le dégazage du chrome, par ex. par pipetage ou agitation.
2. L'analyse devra avoir lieu immédiatement après le prélèvement de l'échantillon.

Préparation

1. Nettoyage des cuvettes :
   Beaucoup de produits de nettoyage domestiques (par ex. liquide vaisselle) contenant des agents réducteurs, il est possible que lors de la quantification du chlore, les résultats soient plus bas. Pour exclure ces erreurs, les instruments en verre utilisés devraient être insensibles aux effets du chlore. Pour ce faire, il convient de laisser les instruments en verre pendant une heure dans une solution d'hypochlorite de sodium (0,1 g/L) et de bien les rincer ensuite à l'eau déminéralisée (eau entièrement dessalée).
2. Pour la quantification individuelle du chlore libre et du chlore total, il est recommandé d'utiliser à chaque fois un nouveau lot de cuvettes (voir EN ISO 7393-2, § 5.3).
3. La coloration due au DPD a lieu à un pH compris entre 6,2 et 6,5. C'est pourquoi, les réactifs contiennent un tampon pour l'ajustage du pH. Avant l'analyse, les eaux fortement alcalines ou acides devraient être cependant ajustées sur un pH compris entre 6 et 7 (avec 0,5 mol/L d'acide sulfurique ou 1 mol/L de soude caustique).

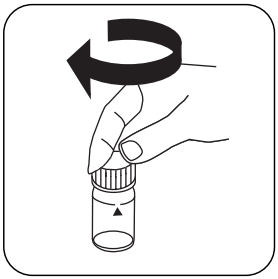
Indication

1. Les pastilles Evo peuvent être utilisées en remplacement de la pastille standard correspondante (par exemple, DPD n° 3 Evo au lieu de DPD n° 3).

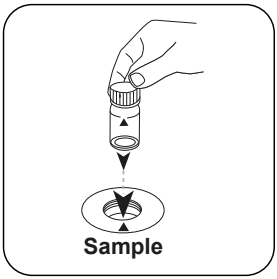
Réalisation de la quantification Chlore HR libre avec pastilles

Sélectionnez la méthode sur l'appareil.

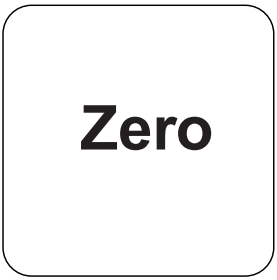
Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



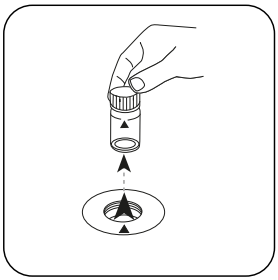
Fermez la(les) cuvette(s).



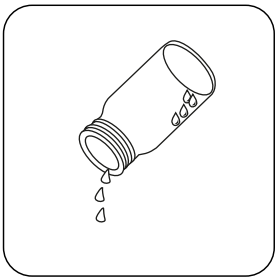
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



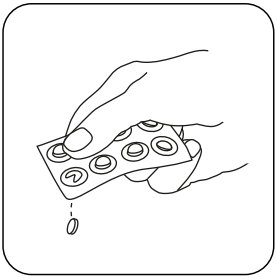
Appuyez sur la touche **ZERO**.



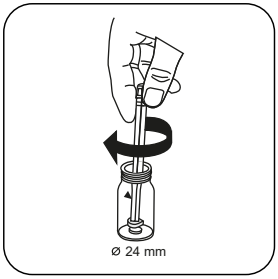
Retirez la cuvette de la chambre de mesure.



Videz pratiquement la cuvette en y laissant quelques gouttes.

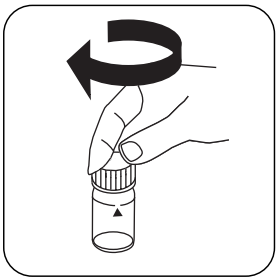


Ajoutez une **pastille de DPD No. 1 HR** .

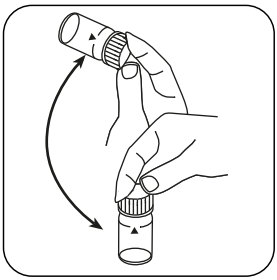


Écrasez la(les) pastille(s) en la(les) tournant un peu.

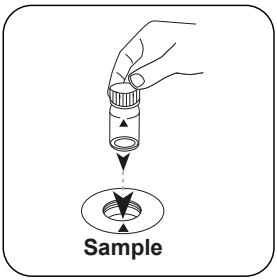
Remplissez la cuvette jusqu'au **repère de 10 mL** en y versant l'**échantillon**.



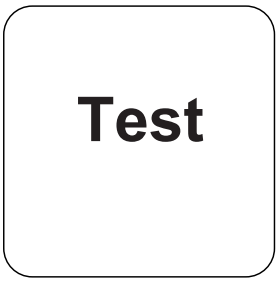
Fermez la(les) cuvette(s).



Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



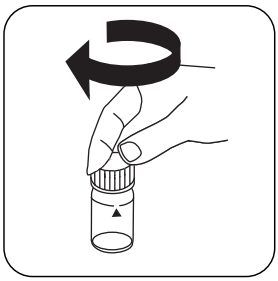
Appuyez sur la touche **TEST** (XD: **START**).

Le résultat s'affiche à l'écran en mg/L chlore libre.

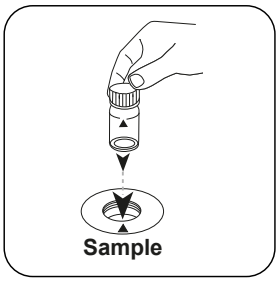
Réalisation de la quantification Chlore HR total avec pastilles

Sélectionnez la méthode sur l'appareil.

Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



Fermez la(les) cuvette(s).



Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.

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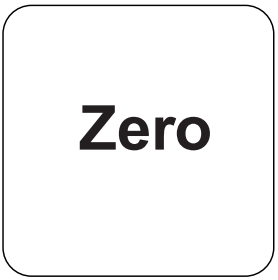
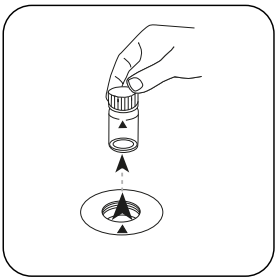
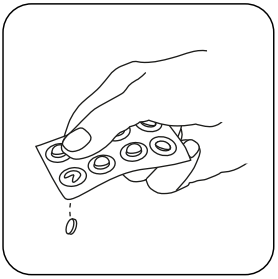


Appuyez sur la touche **ZERO**.

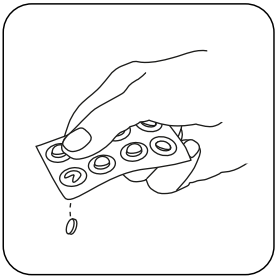


Retirez la cuvette de la chambre de mesure.

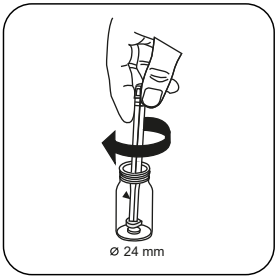
Videz pratiquement la cuvette en y laissant quelques gouttes.



Ajoutez une **pastille de DPD No. 1 HR** .



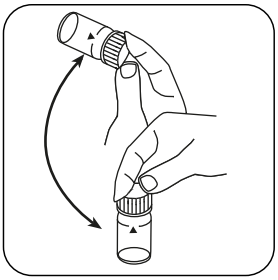
Ajoutez une **pastille de DPD No. 3 HR** .



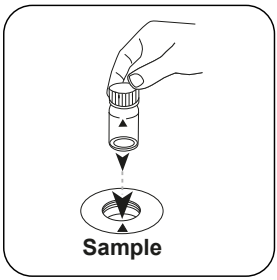
Écrasez la(les) pastille(s) en la(les) tournant un peu.

Remplissez la cuvette jusqu'au **repère de 10 mL** en y versant l'**échantillon**.

Fermez la(les) cuvette(s).



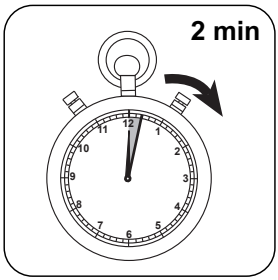
Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.

Test

Appuyez sur la touche **TEST** (XD: **START**).



Attendez la fin du **temps de réaction de 2 minute(s)** .

À l'issue du temps de réaction, la mesure est effectuée automatiquement.

Le résultat s'affiche à l'écran en mg/L chlore total.

Méthode chimique

DPD

Appendice

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Interférences

Interférences persistantes

- Les agents oxydants contenus dans les échantillons réagissent tous comme le chlore, ce qui entraîne des résultats plus élevés.

Interférences exclues

- Les perturbations causées par le cuivre et le fer (III) seront éliminées par EDTA.
- Dans le cas des échantillons à haute concentration en calcium* et/ou conductibilité élevée*, l'utilisation des pastilles de réactif peut causer des turbidités et donc fausser les résultats. Utilisez alors la pastille de réactif DPD N° 1 High Calcium et la pastille de réactif DPD N° 3 High Calcium.
  *Nous ne pouvons fournir de valeurs exactes, l'apparition d'une turbidité dépendant du type et de la composition de l'eau d'échantillonnage.

Conformité

EN ISO 7393-2

[a)]Détermination du libre, combiné et total | [e)]autre réactif, utilisé à la place de DPD No.1/3 en cas de turbidité dans l'échantillon d'eau due à une concentration élevée de calcium et/ou une conductivité élevée | [j)#] agitateur inclus

Valeur du pH T M330

6.5 - 8.4 pH PH

Rouge de phénol

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Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
Rouge de phénol Photomètre	Pastilles / 100	511770BT
Rouge de phénol Photomètre	Pastilles / 250	511771BT
Rouge de phénol Photomètre	Pastilles / 500	511772BT

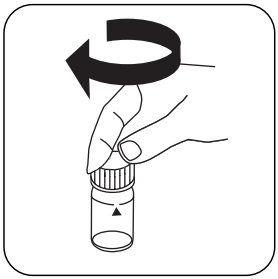
Indication

1. Pour la quantification photométrique du pH, n'utilisez que des pastilles PHENOL RED avec étiquette noire, sur lesquelles le terme PHOTOMER est apposé.

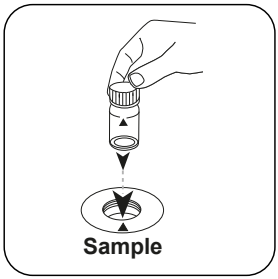
Réalisation de la quantification Valeur du pH avec pastille

Sélectionnez la méthode sur l'appareil.

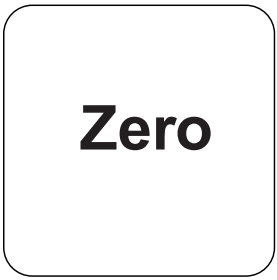
Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



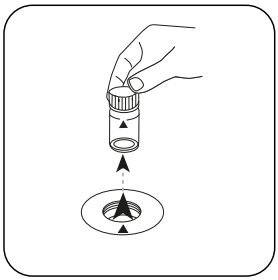
Fermez la(les) cuvette(s).



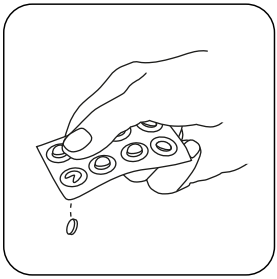
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



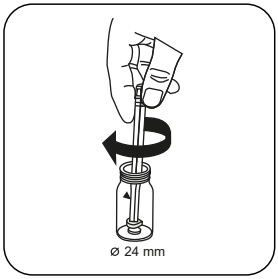
Appuyez sur la touche **ZERO**.



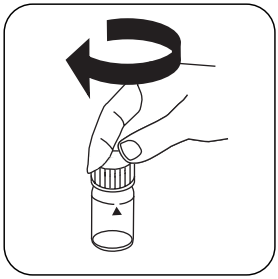
Retirez la cuvette de la chambre de mesure.



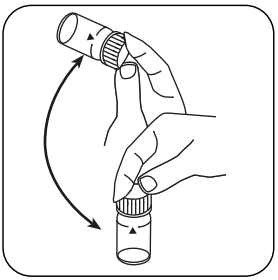
Ajoutez une **pastille de PHENOL RED PHOTOMETER**.



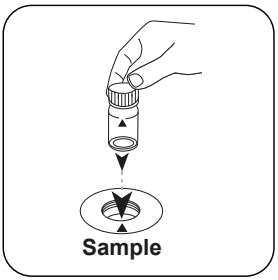
Écrasez la(les) pastille(s) en la(les) tournant un peu.



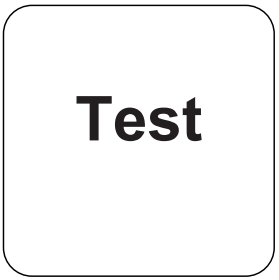
Fermez la(les) cuvette(s).



Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



Appuyez sur la touche **TEST** (XD: **START**).

Le résultat s'affiche à l'écran en valeur du pH.

Méthode chimique

Rouge de phénol

Appendice

Interférences

Interférences persistantes

1. Les échantillons d'eau avec faible dureté carbonatée* peuvent fausser les pH.
   *$K_{S4,3}$ < 0,7 mmol/l ≙ alcalinité totale < 35 mg/L $CaCO_3$.

Interférences exclues

1. Les pH inférieurs à 6,5 et supérieurs à 8,4 peuvent provoquer des résultats dans la plage de mesure. Il est recommandé d'effectuer un test de plausibilité (appareil de mesure du pH).
2. Erreur de sel :
   À des concentrations du sel jusqu'à 2 g/L, il ne faut s'attendre à aucune erreur digne de ce nom en raison de la concentration en sel de la pastille de réactif. À des concentrations supérieures, les valeurs mesurées seront corrigées comme suit :

Concentration en sel de l'échantillon en g/L	30 (eau de mer)	60	120	180
Correction	-0,15[1)]	-0,21[2)]	-0,26[2)]	-0,29[2)]

[1)] selon Kolthoff (1922)
[2)] selon Parson et Douglas (1926)

Bibliographie

Colorimetric Chemical Analytical Methods, 9th Edition, London

Valeur du pH L M331

6.5 - 8.4 pH PH

Rouge de phénol

FR

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
Solution de phénol rouge	15 mL	471040
Solution de phénol rouge	100 mL	471041
Solution de phénol rouge dans un lot de 6	1 Pièces	471046

Préparation

1. En raison des différentes tailles de gouttes, le résultat peut présenter des écarts supérieurs à ceux des pastilles.
   Cet écart peut être réduit à un minimum en utilisant une pipette (0,18 ml correspondent à 6 gouttes).

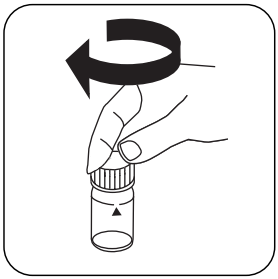
Indication

1. Après emploi, refermez immédiatement le flacon compte-goutte en utilisant le capot de même couleur.
2. Conservez le réactif à une température de +6 °C à +10 °C.

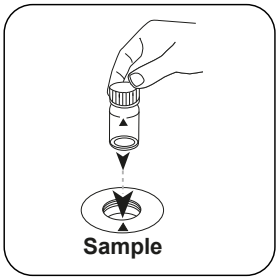
Réalisation de la quantification Valeur du pH avec réactif liquide

Sélectionnez la méthode sur l'appareil.

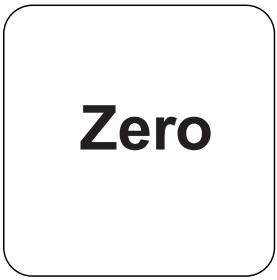
Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



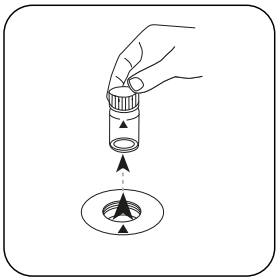
Fermez la(les) cuvette(s).



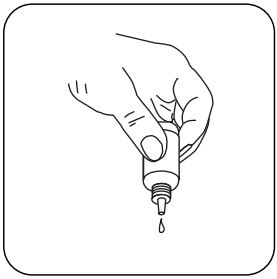
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



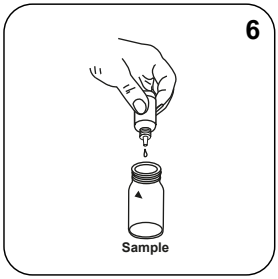
Appuyez sur la touche **ZERO**.



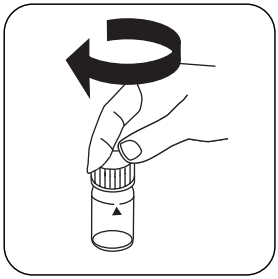
Retirez la cuvette de la chambre de mesure.



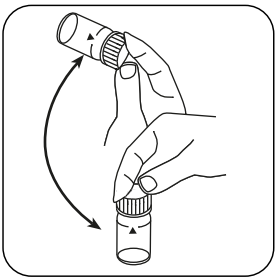
Tenez les flacons compte-goutte à la verticale et ajoutez des gouttes uniformes en appuyant lentement.



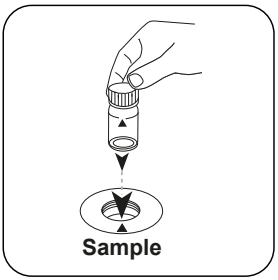
Ajoutez **6 gouttes de PHENOL Red-Lösung** dans la cuvette réservée à l'échantillon.



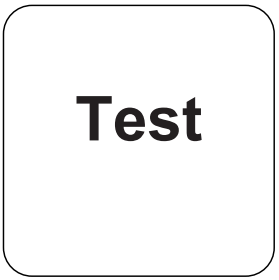
Fermez la(les) cuvette(s).



Mélangez le contenu en mettant le tube plusieurs fois à l'envers puis à l'endroit.



Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



Appuyez sur la touche **TEST** (XD: **START**).

Le résultat s'affiche à l'écran en valeur du pH.

Méthode chimique

Rouge de phénol

Appendice

Interférences

Interférences exclues

1. Erreur de sel : Correction de la mesure du sel (valeurs moyennes) pour les échantillons présentant une concentration en sel de :

2.

Concentration en sel de l'échantillon	Correction
30 g/L (eau de mer)	-0,15[1)]
60 g/L	-0,21[2)]
120 g/L	-0,26[2)]
180 g/L	-0,29[2)]
[1)] selon Kolthoff (1922)	[2)] selon Parson et Douglas (1926)

3. Lors de l'analyse de l'eau chlorée, la concentration résiduelle en chlore peut influencer la coloration du réactif liquide. Ceci est empêché en introduisant un petit cristal de hiosulfate de sodium ($Na_2S_2O_3$·5 H_2O) dans la solution d'échantillonnage avant d'ajouter la solution PHENOL RED.

Bibliographie

Colorimetric Chemical Analytical Methods, 9th Edition, London

Urée T M390

0.1 - 2.5 mg/L Urea Ur1

Indophénol / Uréase

FR

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
UREE Réactif 1	15 mL	459300
UREE Réactif 2	10 mL	459400
Ammoniac N° 1	Pastilles / 100	512580BT
Ammoniac N° 1	Pastilles / 250	512581BT
Ammoniac N° 2	Pastilles / 100	512590BT
Ammoniac N° 2	Pastilles / 250	512591BT
Kit ammoniac N° 1/N° 2#	100 chacun	517611BT
Kit ammoniac N° 1/N° 2#	250 chacun	517612BT
Poudre de conditionnement ammonium	Poudre / 26 g	460170
Traitement préliminaire urée (compensates for the interference of free Chlorine up to 2 mg/l)	Pastilles / 100	516110BT
Kit de réactifs UREE	1 Kit	517800BT

Préparation

1. La température de l'échantillon devrait être comprise entre 20 °C et 30 °C.
2. L'analyse devra avoir lieu au plus tard une heure après le prélèvement de l'échantillon.
3. Lors de l'analyse des échantillons d'eau de mer, il faudra ajouter avant l'apport de la pastille Ammonia N° 1, deux cuillères de mesure de poudre réactive de traitement de l'ammonium à l'échantillon qui sera dissoute en mettant le tube à l'envers puis à l'endroit.

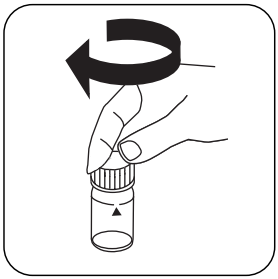
Indication

1. La pastille AMMONIA No. 1 ne se dissout entièrement qu'après avoir ajouté la pastille AMMONIA No. 2.
2. L'ammonium et les chloramines sont également pris en compte lors de la quantification de l'urée.

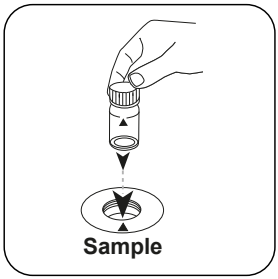
Réalisation de la quantification Urée avec pastille et réactif liquide

Sélectionnez la méthode sur l'appareil.

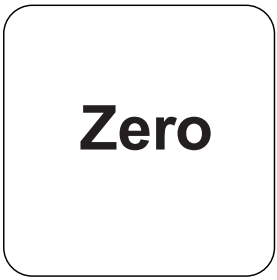
Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



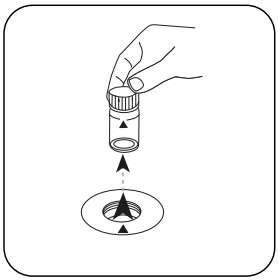
Fermez la(les) cuvette(s).



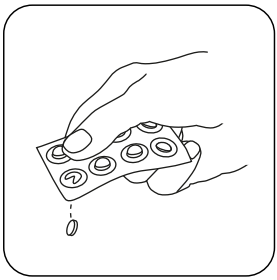
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



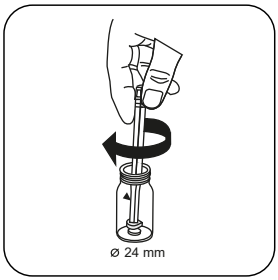
Appuyez sur la touche **ZERO**.



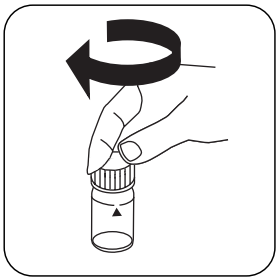
Retirez la cuvette de la chambre de mesure.



En présence de chlore libre (HOCl), ajoutez une **pastille de UREA PRETREAT**.

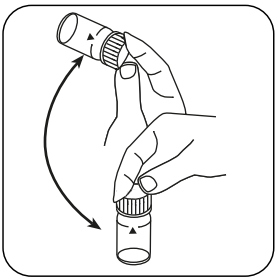


Écrasez la(les) pastille(s) en la(les) tournant un peu.

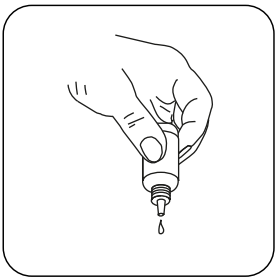


Fermez la(les) cuvette(s).

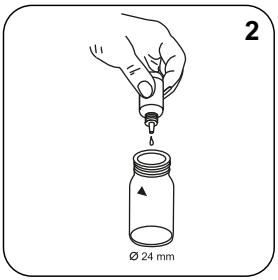
FR



Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.

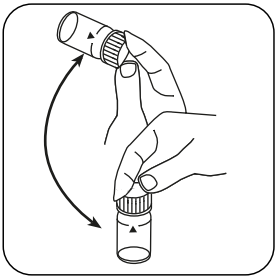


Tenez les flacons compte-goutte à la verticale et ajoutez des gouttes uniformes en appuyant lentement.

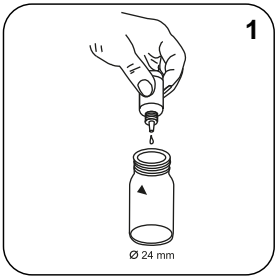


Ajoutez **2 gouttes de Urea Reagenz 1**.

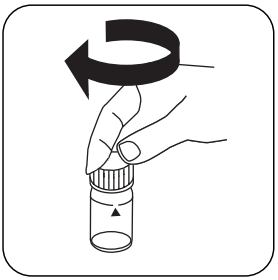
Fermez la(les) cuvette(s).



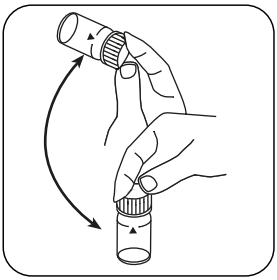
Mélangez le contenu en mettant le tube plusieurs fois à l'envers puis à l'endroit.



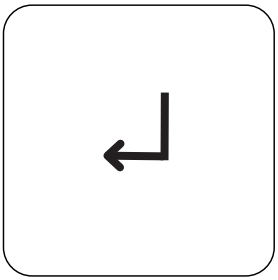
Ajoutez **1 gouttes de Urea Reagenz 2**.



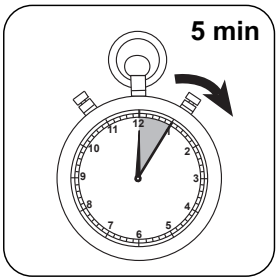
Fermez la(les) cuvette(s).



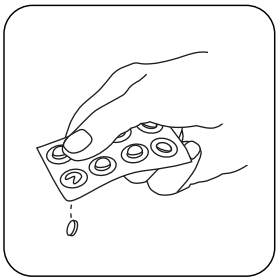
Mélangez le contenu en mettant le tube plusieurs fois à l'envers puis à l'endroit.



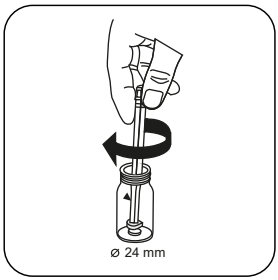
Appuyez sur la touche **ENTER**.



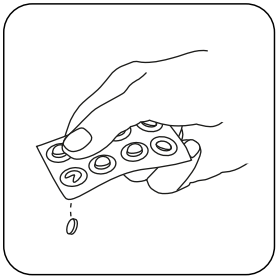
Attendez la fin du **temps de réaction de 5 minute(s)** .



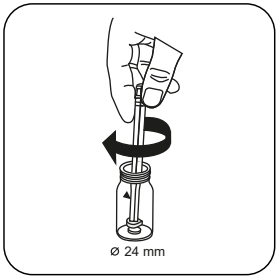
Ajoutez une **pastille de AMMONIA No.1**.



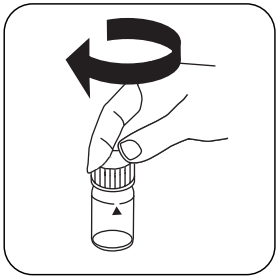
Écrasez la(les) pastille(s) en la(les) tournant un peu.



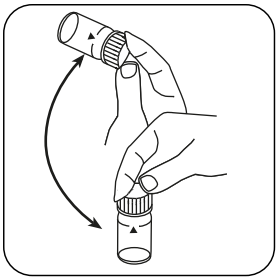
Ajoutez une **pastille de AMMONIA No.2**.



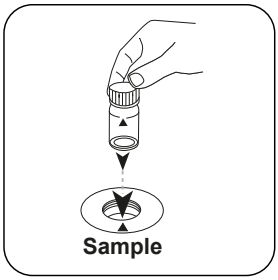
Écrasez la(les) pastille(s) en la(les) tournant un peu.



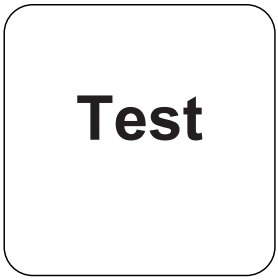
Fermez la(les) cuvette(s).



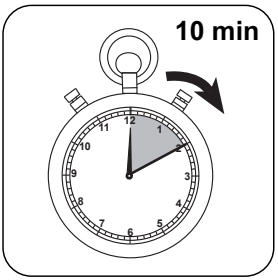
Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



Appuyez sur la touche **TEST** (XD: **START**).



FR

Attendez la fin du
temps de réaction de
10 minute(s) .

À l'issue du temps de réaction, la mesure est effectuée automatiquement.

Le résultat s'affiche à l'écran en mg/L urée.

Méthode chimique

Indophénol / Uréase

Appendice

Interférences

Interférences persistantes

- Les concentrations d'urée supérieures à 2 mg/L peuvent donner des résultats dans la plage de mesure. Dans ce cas, diluez l'échantillon d'eau en utilisant de l'eau exempte d'urée et répétez la mesure (test de plausibilité).

Interférences exclues

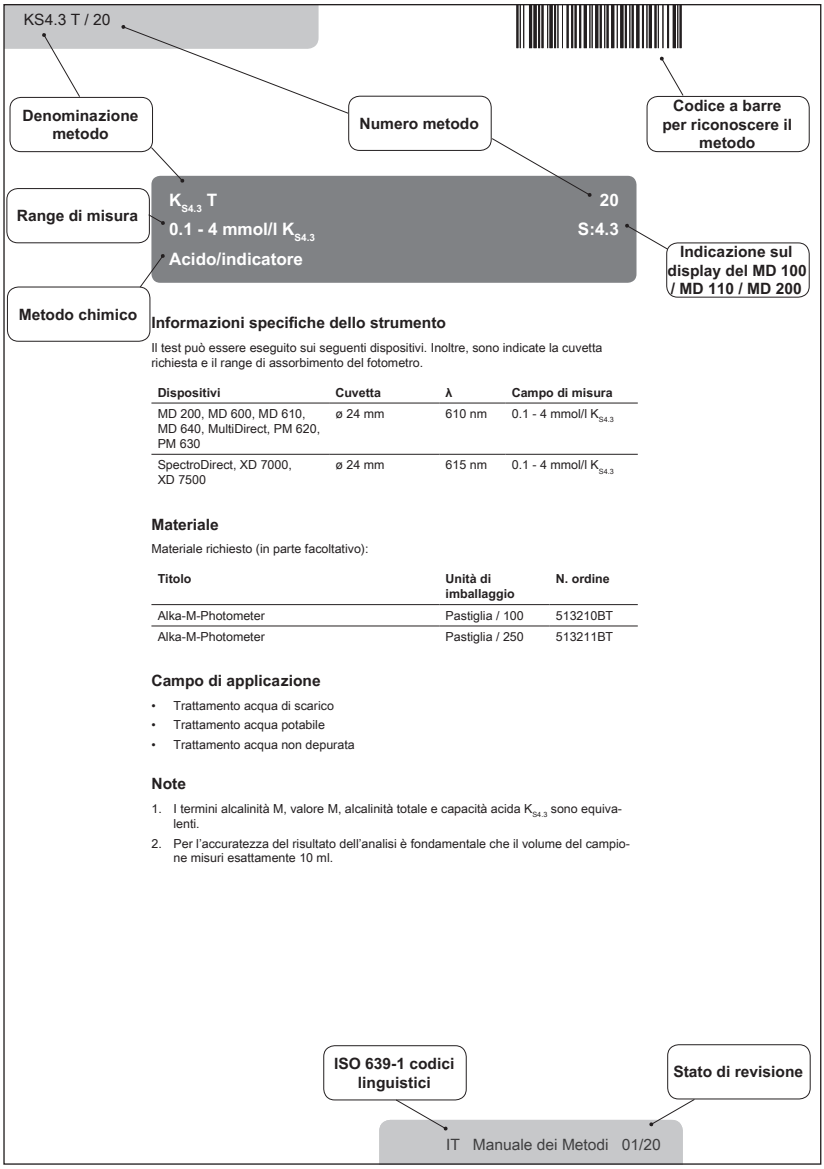
- Une pastille UREA PRETREAT élimine la perturbation causée par le chlore libre jusqu'à 2 mg/L (deux pastilles jusqu'à 4 mg/L, trois pastilles jusqu'à 6 mg/L).

Interférences	de / [mg/L]
Cl_2	2

Bibliographie

R.J. Creno, R.E. Wenk, P. Bohling, Automated Micromeasurement of Urea Using Urease and the Berthelot Reaction, American Journal of Clinical Pathology (1970), 54 (6), p. 828-832

[1] # agitateur inclus


KS4.3 T / 20
Denominazione metodo
Numero metodo
Codice a barre per riconoscere il metodo
Range di misura
$K_{S4.3}$ T
20
0.1 - 4 mmol/l $K_{S4.3}$
S:4.3
Acido/indicatore
Indicazione sul display del MD 100 / MD 110 / MD 200
Metodo chimico
Informazioni specifiche dello strumento
Il test può essere eseguito sui seguenti dispositivi. Inoltre, sono indicate la cuvetta richiesta e il range di assorbimento del fotometro.
Dispositivi | Cuvetta | λ | Campo di misura
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630 | ø 24 mm | 610 nm | 0.1 - 4 mmol/l $K_{S4.3}$
SpectroDirect, XD 7000, XD 7500 | ø 24 mm | 615 nm | 0.1 - 4 mmol/l $K_{S4.3}$
Materiale
Materiale richiesto (in parte facoltativo):
Titolo | Unità di imballaggio | N. ordine
Alka-M-Photometer | Pastiglia / 100 | 513210BT
Alka-M-Photometer | Pastiglia / 250 | 513211BT
Campo di applicazione
• Trattamento acqua di scarico
• Trattamento acqua potabile
• Trattamento acqua non depurata
Note
1. I termini alcalinità M, valore M, alcalinità totale e capacità acida $K_{S4.3}$ sono equivalenti.
2. Per l'accuratezza del risultato dell'analisi è fondamentale che il volume del campione misuri esattamente 10 ml.
ISO 639-1 codici linguistici
Stato di revisione
IT Manuale dei Metodi 01/20

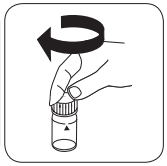
Svolgimento della misurazione

Esecuzione della rilevazione Capacità acida $K_{S4.3}$ con pastiglia

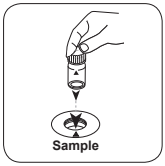
Selezionare il metodo nel dispositivo.

Con i seguenti dispositivi, per questo metodo non è necessario eseguire una misurazione ZERO: XD 7000, XD 7500

Riempire una cuvetta da 24 mm con **10 ml di campione**.



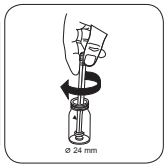
Chiudere la/e cuvetta/e.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

• • •

Aggiungere **una pastiglia ALKA-M-PHOTOMETER**.



Frantumare la/e pastiglia/e con una leggera rotazione.

Chiudere la/e cuvetta/e.

$K_{S4.3}$ T — M20

0.1 - 4 mmol/L $K_{S4.3}$ — S:4.3

Acido/indicatore

IT

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
Alka-M-Photometer	Pastiglia / 100	513210BT
Alka-M-Photometer	Pastiglia / 250	513211BT

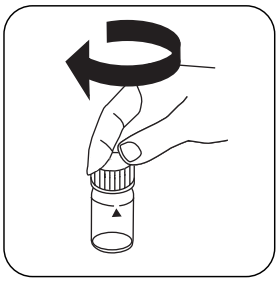
Note

1. I termini alcalinità M, valore M, alcalinità totale e capacità acida $K_{S4.3}$ sono equivalenti.
2. Per l'accuratezza del risultato dell'analisi è fondamentale che il volume del campione misuri esattamente 10 ml.

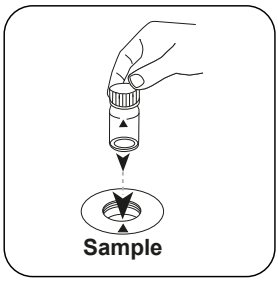
Esecuzione della rilevazione Capacità acida $K_{S4.3}$ con pastiglia

Selezionare il metodo nel dispositivo.

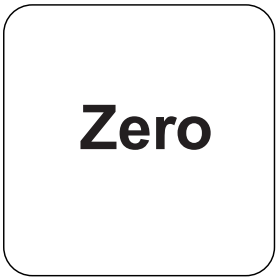
Riempire una cuvetta da 24 mm con **10 mL di campione**.



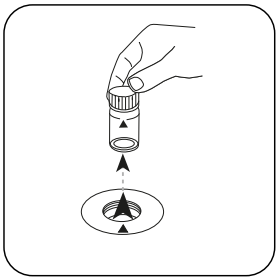
Chiudere la/e cuvetta/e.



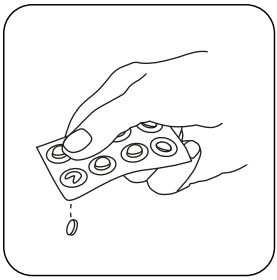
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



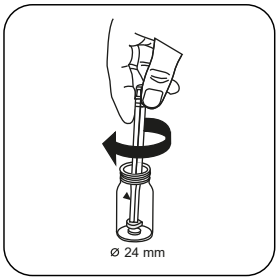
Premere il tasto **ZERO**.



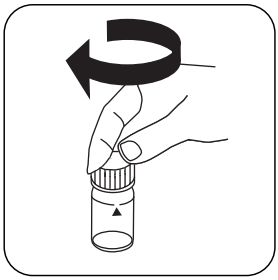
Prelevare la cuvetta dal vano di misurazione.



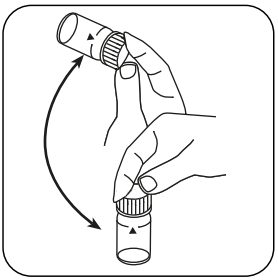
Aggiungere **una pastiglia ALKA-M-PHOTOMETER**.



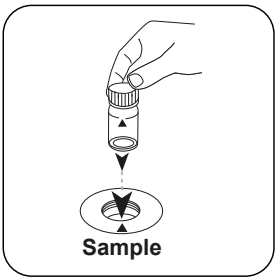
Frantumare la/e pastiglia/e con una leggera rotazione.



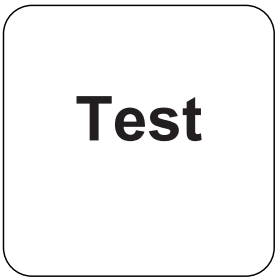
Chiudere la/e cuvetta/e.



Far sciogliere la/e pastiglia/e agitando.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



Premere il tasto **TEST** (XD: **START**).

Sul display compare il risultato come Capacità acida $K_{S4.3}$.

Metodo chimico

Acido/indicatore

Appendice

Derivato di

DIN 38409 - H 7-2

Cloro T M100

0.01 - 6.0 mg/L Cl_2 [a] CL6

DPD

IT

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
DPD No.1	Pastiglia / 100	511050BT
DPD No. 1	Pastiglia / 250	511051BT
DPD No. 1	Pastiglia / 500	511052BT
DPD No. 3	Pastiglia / 100	511080BT
DPD No. 3	Pastiglia / 250	511081BT
DPD No. 3	Pastiglia / 500	511082BT
DPD No. 1 Alto Calcio [e]	Pastiglia / 100	515740BT
DPD No. 1 Alto Calcio [e]	Pastiglia / 250	515741BT
DPD No. 1 Alto Calcio [e]	Pastiglia / 500	515742BT
DPD No. 3 High Calcium [e]	Pastiglia / 100	515730BT
DPD No. 3 High Calcium [e]	Pastiglia / 250	515731BT
DPD No. 3 High Calcium [e]	Pastiglia / 500	515732BT
DPD No. 4	Pastiglia / 100	511220BT
DPD No. 4	Pastiglia / 250	511221BT
DPD No. 4	Pastiglia / 500	511222BT
DPD No. 3 Evo	Pastiglia / 100	511420BT
DPD No. 3 Evo	Pastiglia / 250	511421BT
DPD No. 3 Evo	Pastiglia / 500	511422BT
DPD No.4 Evo	Pastiglia / 100	511970BT
DPD No. 4 Evo	Pastiglia / 250	511971BT
DPD No. 4 Evo	Pastiglia / 500	511972BT

Standards disponibles

Titolo	Unità di imballaggio	N. ordine
ValidCheck Cloro 1,5 mg/l	1 pz.	48105510

Prelievo del campione

1. Nella preparazione del campione occorre evitare la degassificazione del cloro, ad es. utilizzando pipette e agitando.
2. L'analisi deve essere eseguita subito dopo il prelievo del campione.

Preparazione

1. Pulizia delle cuvette:
   Poiché molti detergenti ad uso domestico (ad es. detersivo per piatti) contengono sostanze riducenti, nella rilevazione del cloro si potrebbero ottenere risultati troppo bassi. Per escludere tali errori di misura è necessario che i dispositivi in vetro siano esenti dal consumo di cloro. I dispositivi in vetro inoltre vengono conservati in una soluzione di ipoclorito di sodio (0,1 g/L) per un'ora e successivamente vengono risciacquati abbondantemente con acqua demineralizzata.
2. Per la singola rilevazione del cloro libero e del cloro totale è opportuno utilizzare un apposito kit di cuvette per ciascuna procedura (vedere EN ISO 7393-2, par. 5.3).
3. Lo sviluppo della colorazione del DPD avviene con un valore di pH compreso tra 6,2 e 6,5. I reagenti contengono pertanto un tampone per la regolazione del valore di pH. Le acque fortemente alcaline o acide tuttavia devono essere portate prima dell'analisi entro un range di pH compreso tra 6 e 7 (con 0,5 mol/L di acido solforico o 1 mol/L di liscivia).

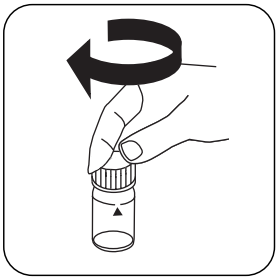
Note

1. Le compresse Evo possono essere utilizzate come alternativa alla corrispondente compressa standard (ad esempio DPD No. 3 Evo invece di DPD No. 3).

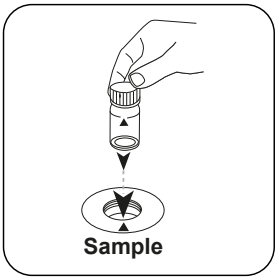
Esecuzione della rilevazione Cloro, libero con compressa

Selezionare il metodo nel dispositivo.

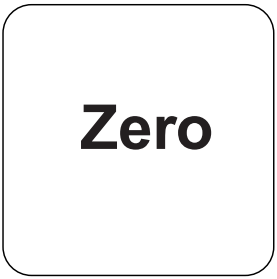
Riempire una cuvetta da 24 mm con **10 mL di campione**.



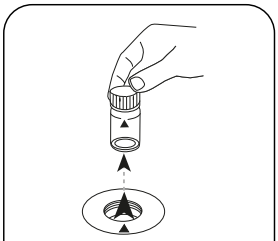
Chiudere la/e cuvetta/e.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

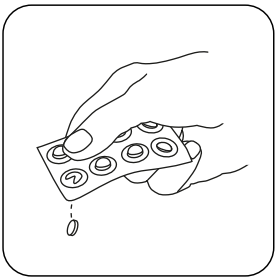


Premere il tasto **ZERO**.

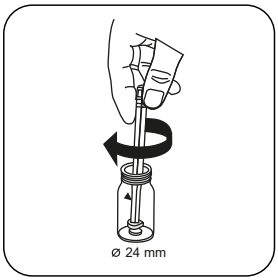


Prelevare la cuvetta dal vano di misurazione.

Svuotare la cuvetta finché non rimangono alcune gocce.

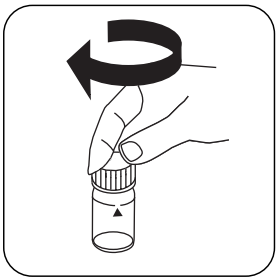


Aggiungere **una pastiglia DPD No. 1**.

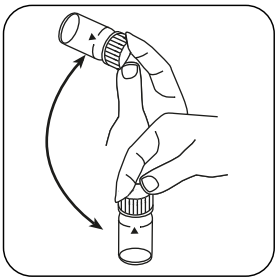


Frantumare la/e pastiglia/e con una leggera rotazione.

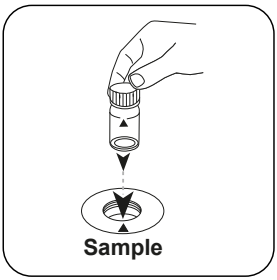
Immettere il **campione** nella cuvetta fino a raggiungere **la tacca dei 10 mL** .



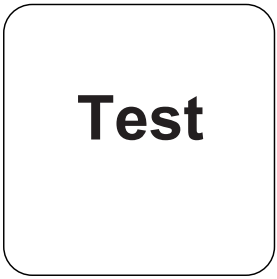
Chiudere la/e cuvetta/e.



Far sciogliere la/e pastiglia/e agitando.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



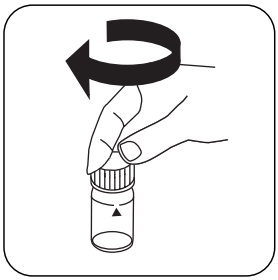
Premere il tasto **TEST** (XD: **START**).

Sul display compare il risultato in mg/L di Cloro libero.

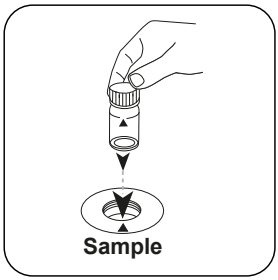
Esecuzione della rilevazione Cloro, totale con compressa

Selezionare il metodo nel dispositivo.

Riempire una cuvetta da 24 mm con **10 mL di campione**.

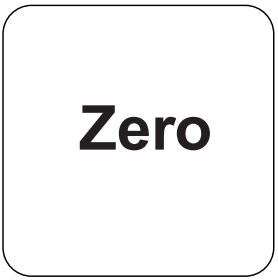


Chiudere la/e cuvetta/e.

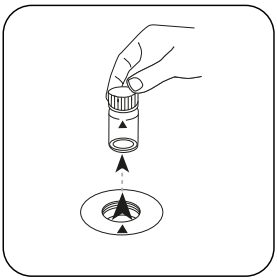


Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

IT

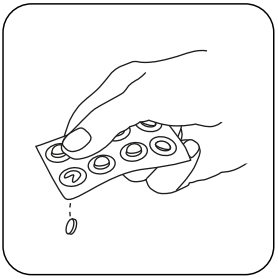


Premere il tasto **ZERO**.

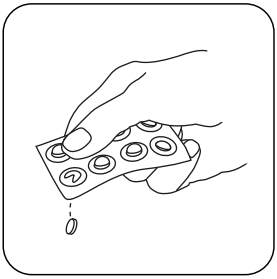


Prelevare la cuvetta dal vano di misurazione.

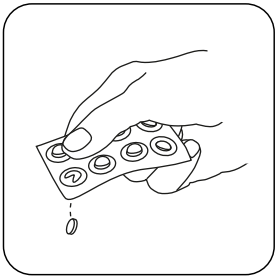
Svuotare la cuvetta finché non rimangono alcune gocce.



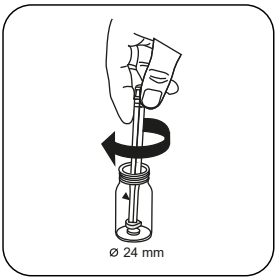
Aggiungere **una pastiglia DPD No. 1**.



Aggiungere **una pastiglia DPD No. 3**.

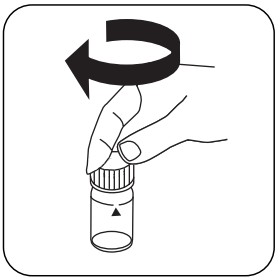


In alternativa al DPD No. 1 e No. 3 tablet, un DPD No. 4 tablet può essere aggiunto.

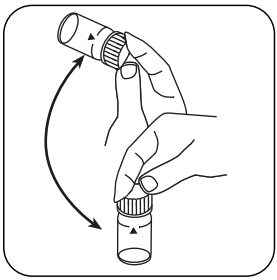


Frantumare la/e pastiglia/e con una leggera rotazione.

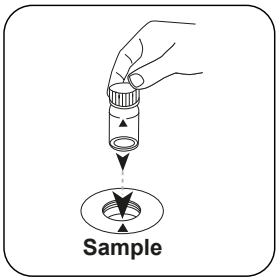
Immettere il **campione** nella cuvetta fino a raggiungere **la tacca dei 10 mL** .



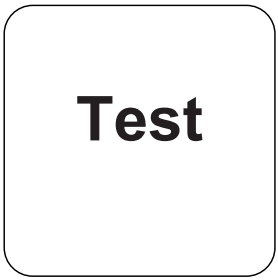
Chiudere la/e cuvetta/e.



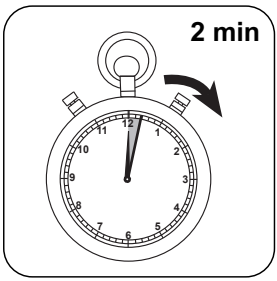
Far sciogliere la/e pastiglia/e agitando.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



Premere il tasto **TEST** (XD: **START**).



Attendere un **tempo di reazione di 2 minuto/i** .

Allo scadere del tempo di reazione viene effettuata automaticamente la misurazione.

Sul display compare il risultato in mg/L di Cloro totale.

Metodo chimico

DPD

Appendice

IT

Interferenze

Interferenze permanenti

- Tutti gli ossidanti presenti nei campioni reagiscono come il cloro dando risultati troppo elevati.

Interferenze escludibili

- Le interferenze da parte di rame e ferro(III) devono essere eliminate con EDTA.
- In caso di campioni con un elevato tenore di calcio* e/o un'elevata conducibilità*, utilizzando le pastiglie di reagenti potrebbe verificarsi un intorbidimento del campione con conseguenti errori di misurazione. In questo caso si possono utilizzare in alternativa la pastiglia di reagente DPD No. 1 High Calcium e la pastiglia di reagente DPD No. 3 High Calcium.
  *Non è possibile indicare i valori esatti in quanto l'intorbidimento dipende dal tipo e dalla composizione dell'acqua campione.
- Se si utilizzano pastiglie, le concentrazioni di cloro maggiori di 10 mg/L possono dare risultati entro il range di misura fino a 0 mg/L. Se la concentrazione di cloro è troppo elevata, il campione deve essere diluito con acqua priva di cloro. 10 mL del campione diluito vengono addizionati con il reagente e la misurazione viene ripetuta (test di plausibilità).

Interferenze	da / [mg/L]
CrO_4^{2-}	0.01
MnO_2	0.01

Validazione metodo

Limite di rilevabilità	0.02 mg/L
Limite di quantificazione	0.06 mg/L
Estremità campo di misura	6 mg/L
Sensibilità	2.05 mg/L / Abs
Intervallo di confidenza	0.04 mg/L
Deviazione standard della procedura	0.019 mg/L
Coefficiente di variazione della procedura	0.87 %

Conforme

EN ISO 7393-2

[a]Determinazione di libero, vincolato, totale possibile | [e]Reagente ausiliario, in alternativa a DPD n. 1 / no 3 in caso di torbidità del campione a causa di alto contenuto di ioni di calcio e / o alta conduttività

Cloro L M101

0.02 - 4.0 mg/L Cl_2 [a] CL6

DPD

IT

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
DPD 1 soluzione tampone, bottiglia blu	15 mL	471010
Soluzione tampone DPD 1	100 mL	471011
DPD 1 Soluzione tampone in confezione da 6	1 pz.	471016
DPD 1 soluzione reagente, bottiglia verde	15 mL	471020
Soluzione reagente DPD 1	100 mL	471021
DPD 1 Soluzione reagente in confezione da 6	1 pz.	471026
DPD 3 soluzione, bottiglia rossa	15 mL	471030
Soluzione DPD 3	100 mL	471031
DPD 3 Soluzione in confezione da 6	1 pz.	471036
Set di reagenti DPD	1 pz.	471056

Standards disponibles

Titolo	Unità di imballaggio	N. ordine
ValidCheck Cloro 1,5 mg/l	1 pz.	48105510

Prelievo del campione

1. Nella preparazione del campione occorre evitare la degassificazione del cloro, ad es. utilizzando pipette e agitando.
2. L'analisi deve essere eseguita subito dopo il prelievo del campione.

Preparazione

1. Pulizia delle cuvette:
   Poiché molti detergenti ad uso domestico (ad es. detersivo per piatti) contengono sostanze riducenti, nella rilevazione del cloro si potrebbero ottenere risultati troppo bassi. Per escludere tali errori di misura è necessario che i dispositivi in vetro siano esenti dal consumo di cloro. I dispositivi in vetro inoltre vengono conservati in una soluzione di ipoclorito di sodio (0,1 g/L) per un'ora e successivamente vengono risciacquati abbondantemente con acqua demineralizzata.
2. Per la singola rilevazione del cloro libero e del cloro totale è opportuno utilizzare un apposito kit di cuvette per ciascuna procedura (vedere EN ISO 7393-2, par. 5.3).
3. Lo sviluppo della colorazione del DPD avviene con un valore di pH compreso tra 6,2 e 6,5. I reagenti contengono pertanto un tampone per la regolazione del valore di pH. Le acque fortemente alcaline o acide tuttavia devono essere portate prima dell'analisi entro un range di pH compreso tra 6 e 7 (con 0,5 mol/l di acido solforico o 1 mol/l di liscivia).

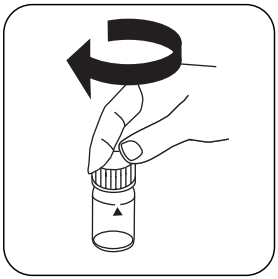
Note

1. Dopo l'uso bisogna richiudere immediatamente le boccette contagocce con i rispettivi tappi dello stesso colore.
2. Conservare al fresco il kit di reagenti a una temperatura compresa tra +6 °C e +10 °C.

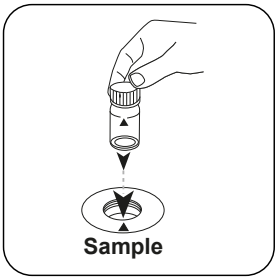
Esecuzione della rilevazione Cloro, libero con reagente liquido

Selezionare il metodo nel dispositivo.

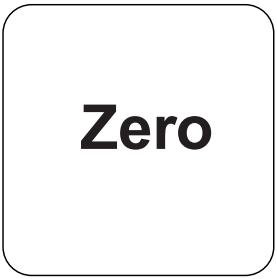
Riempire una cuvetta da 24 mm con **10 mL di campione**.



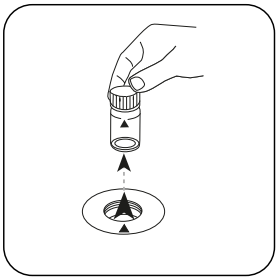
Chiudere la/e cuvetta/e.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

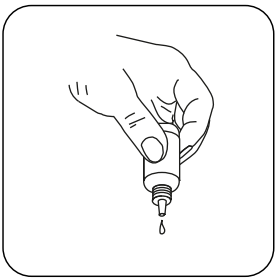


Premere il tasto **ZERO**.

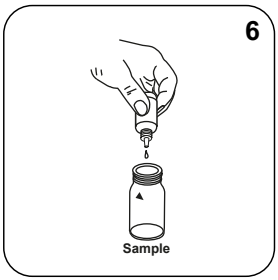


Prelevare la cuvetta dal vano di misurazione.

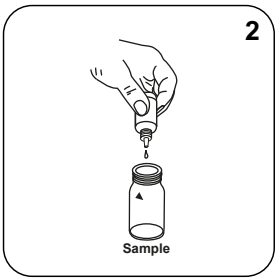
Svuotare la cuvetta.



Tenere le boccette contagocce in posizione verticale e introdurre, premendo lentamente, gocce della stessa dimensione nella cuvetta.

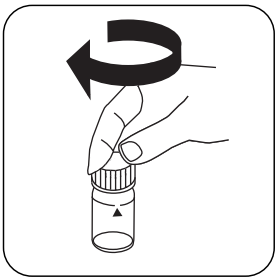


Introdurre **6 gocce di DPD 1 Buffer Solution** nella cuvetta del campione.

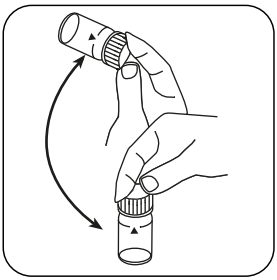


Introdurre **2 gocce di DPD 1 Reagent Solution** nella cuvetta del campione.

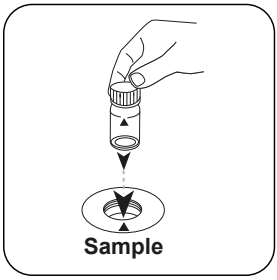
Immettere il **campione** nella cuvetta fino a raggiungere **la tacca dei 10 mL** .



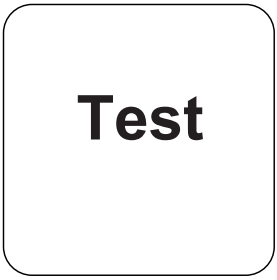
Chiudere la/e cuvetta/e.



Miscelare il contenuto capovolgendo.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



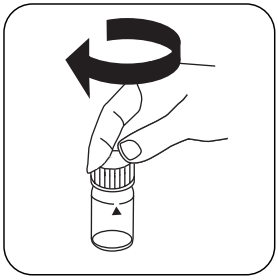
Premere il tasto **TEST** (XD: **START**).

Sul display compare il risultato in mg/L di Cloro libero.

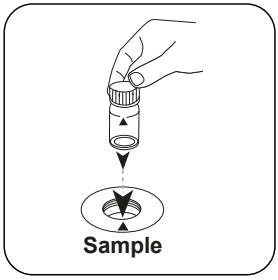
Esecuzione della rilevazione Cloro, totale con reagente liquido

Selezionare il metodo nel dispositivo.

Riempire una cuvetta da 24 mm con **10 mL di campione**.

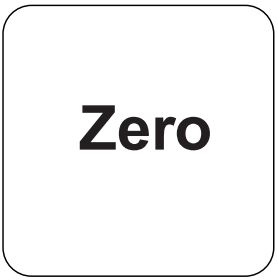


Chiudere la/e cuvetta/e.

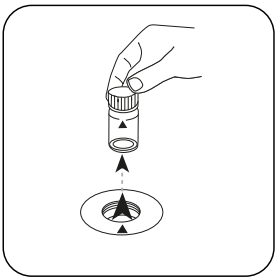


Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

IT

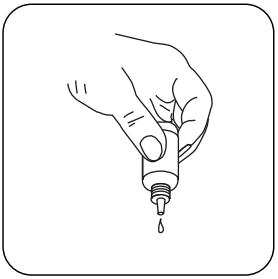


Premere il tasto **ZERO**.

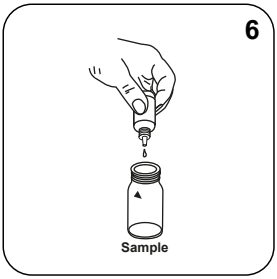


Prelevare la cuvetta dal vano di misurazione.

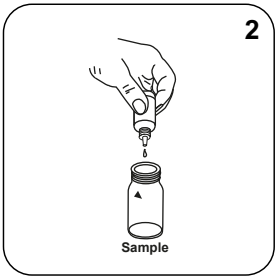
Svuotare la cuvetta.



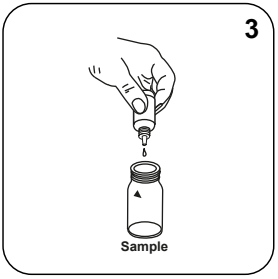
Tenere le boccette contagocce in posizione verticale e introdurre, premendo lentamente, gocce della stessa dimensione nella cuvetta.



Introdurre **6 gocce di DPD 1 Buffer Solution** nella cuvetta del campione.

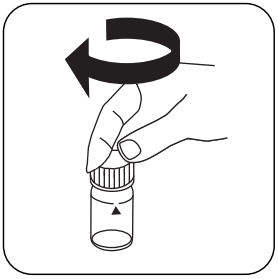


Introdurre **2 gocce di DPD 1 Reagent Solution** nella cuvetta del campione.

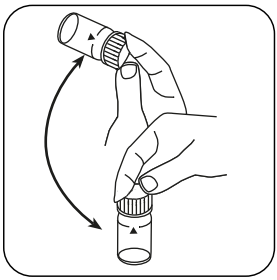


Introdurre **3 gocce di DPD 3 Solution** nella cuvetta del campione.

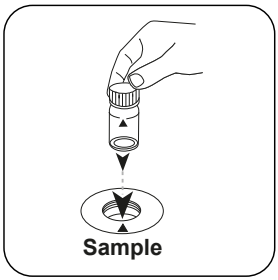
Immettere il **campione** nella cuvetta fino a raggiungere **la tacca dei 10 mL** .



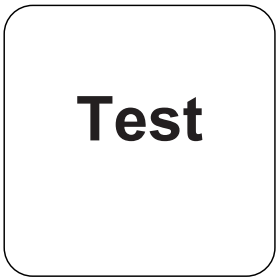
Chiudere la/e cuvetta/e.



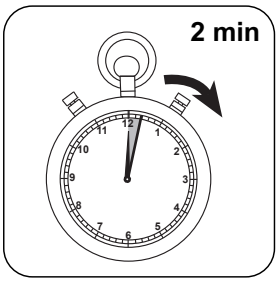
Miscelare il contenuto capovolgendo.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



Premere il tasto **TEST** (XD: **START**).



Attendere un **tempo di reazione di 2 minuto/i** .

Allo scadere del tempo di reazione viene effettuata automaticamente la misurazione.

Sul display compare il risultato in mg/L di Cloro totale.

Metodo chimico

DPD

Appendice

IT

Interferenze

Interferenze permanenti

- Tutti gli ossidanti presenti nei campioni reagiscono come il cloro dando risultati troppo elevati.

Interferenze escludibili

- Le interferenze da parte di rame e ferro(III) devono essere eliminate con EDTA.
- Se si utilizzano reagenti liquidi, le concentrazioni di cloro maggiori di 4 mg/L possono dare risultati entro il range di misura fino a 0 mg/L. In questo caso il campione deve essere diluito con acqua priva di cloro. 10 ml del campione diluito vengono addizionati con il reagente e la misurazione viene ripetuta (test di plausibilità).

Interferenze	da / [mg/L]
CrO_4^{2-}	0,01
MnO_2	0,01

Conforme

EN ISO 7393-2

[a)]Determinazione di libero, vincolato, totale possibile

Cloro HR T M103

0.1 - 10 mg/L Cl_2 [a] CL10

DPD

IT

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
DPD No. 1 HR	Pastiglia / 100	511500BT
DPD No. 1 HR	Pastiglia / 250	511501BT
DPD No. 1 HR	Pastiglia / 500	511502BT
DPD No.3 HR Evo	Pastiglia / 100	511920BT
DPD No. 3 HR Evo	Pastiglia / 250	511921BT
DPD No. 3 HR Evo	Pastiglia / 500	511922BT
DPD No. 3 HR	Pastiglia / 100	511590BT
DPD No. 3 HR	Pastiglia / 250	511591BT
DPD No. 3 HR	Pastiglia / 500	511592BT
Set DPD No. 1 HR/No. 3 HR [#]	ciascuna 100	517791BT
Set DPD No. 1 HR/No. 3 HR [#]	ciascuna 250	517792BT
DPD No. 1 Alto Calcio [e]	Pastiglia / 100	515740BT
DPD No. 1 Alto Calcio [e]	Pastiglia / 250	515741BT
DPD No. 1 Alto Calcio [e]	Pastiglia / 500	515742BT
DPD No. 3 High Calcium [e]	Pastiglia / 100	515730BT
DPD No. 3 High Calcium [e]	Pastiglia / 250	515731BT
DPD No. 3 High Calcium [e]	Pastiglia / 500	515732BT

Prelievo del campione

1. Nella preparazione del campione occorre evitare la degassificazione del cloro, ad es. utilizzando pipette e agitando.
2. L'analisi deve essere eseguita subito dopo il prelievo del campione.

Preparazione

1. Pulizia delle cuvette:
   Poiché molti detergenti ad uso domestico (ad es. detersivo per piatti) contengono sostanze riducenti, nella rilevazione del cloro si potrebbero ottenere risultati troppo bassi. Per escludere tali errori di misura è necessario che i dispositivi in vetro siano esenti dal consumo di cloro. I dispositivi in vetro inoltre vengono conservati in una soluzione di ipoclorito di sodio (0,1 g/L) per un'ora e successivamente vengono risciacquati abbondantemente con acqua demineralizzata.
2. Per la singola rilevazione del cloro libero e del cloro totale è opportuno utilizzare un apposito kit di cuvette per ciascuna procedura (vedere EN ISO 7393-2, par. 5.3).
3. Lo sviluppo della colorazione del DPD avviene con un valore di pH compreso tra 6,2 e 6,5. I reagenti contengono pertanto un tampone per la regolazione del valore di pH. Le acque fortemente alcaline o acide tuttavia devono essere portate prima dell'analisi entro un range di pH compreso tra 6 e 7 (con 0,5 mol/L di acido solforico o 1 mol/L di liscivia).

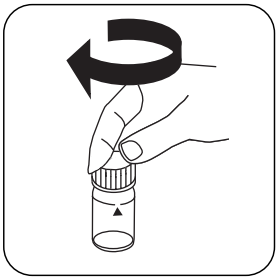
Note

1. Le compresse Evo possono essere utilizzate come alternativa alla corrispondente compressa standard (ad esempio DPD No. 3 Evo invece di DPD No. 3).

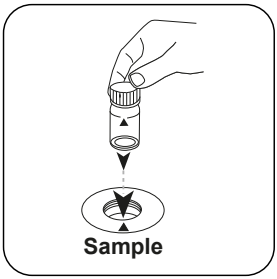
Esecuzione della rilevazione Cloro HR, libero con compressa

Selezionare il metodo nel dispositivo.

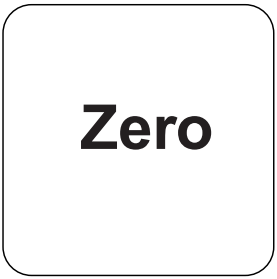
Riempire una cuvetta da 24 mm con **10 mL di campione**.



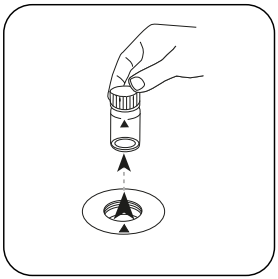
Chiudere la/e cuvetta/e.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

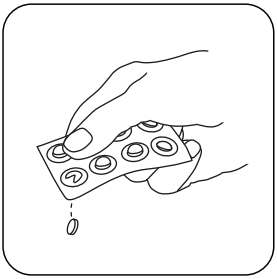


Premere il tasto **ZERO**.

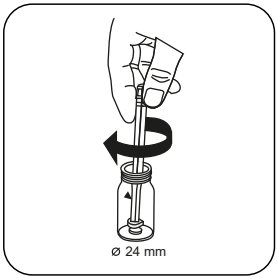


Prelevare la cuvetta dal vano di misurazione.

Svuotare la cuvetta finché non rimangono alcune gocce.

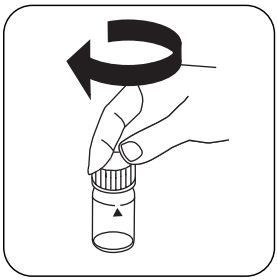


Aggiungere **una pastiglia DPD No. 1 HR** .

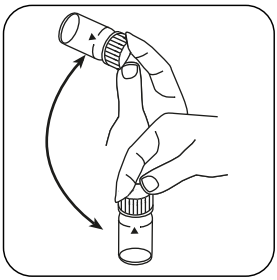


Frantumare la/e pastiglia/e con una leggera rotazione.

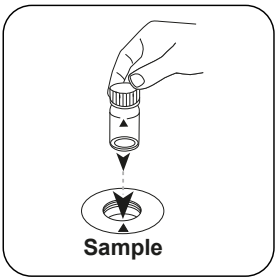
Immettere il **campione** nella cuvetta fino a raggiungere **la tacca dei 10 mL** .



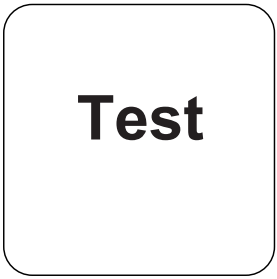
Chiudere la/e cuvetta/e.



Far sciogliere la/e pastiglia/e agitando.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



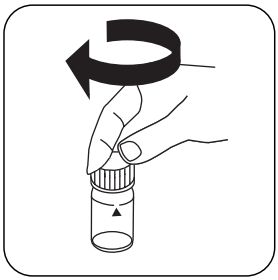
Premere il tasto **TEST** (XD: **START**).

Sul display compare il risultato in mg/L di Cloro libero.

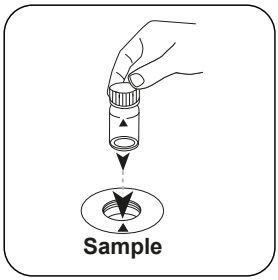
Esecuzione della rilevazione Cloro HR, totale con compressa

Selezionare il metodo nel dispositivo.

Riempire una cuvetta da 24 mm con **10 mL di campione**.

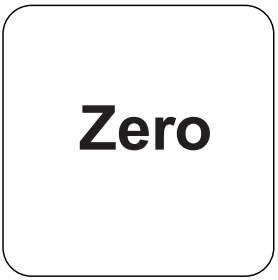


Chiudere la/e cuvetta/e.

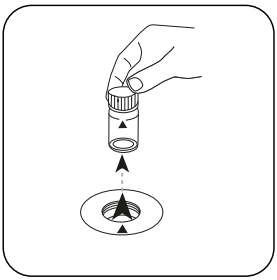


Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

IT

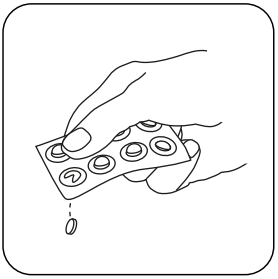


Premere il tasto **ZERO**.

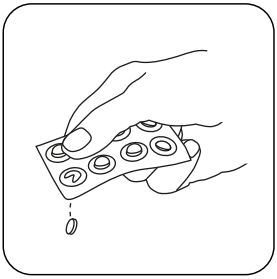


Prelevare la cuvetta dal vano di misurazione.

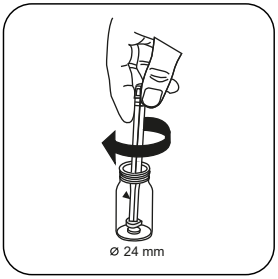
Svuotare la cuvetta finché non rimangono alcune gocce.



Aggiungere **una pastiglia DPD No. 1 HR** .



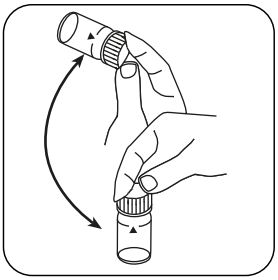
Aggiungere **una pastiglia DPD No. 3 HR** .



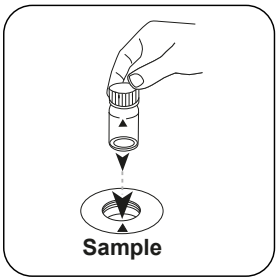
Frantumare la/e pastiglia/e con una leggera rotazione.

Immettere il **campione** nella cuvetta fino a raggiungere **la tacca dei 10 mL** .

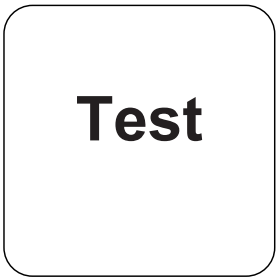
Chiudere la/e cuvetta/e.



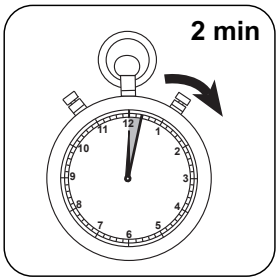
Far sciogliere la/e pastiglia/e agitando.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



Premere il tasto **TEST** (XD: **START**).



Attendere un **tempo di reazione di 2 minuto/i** .

Allo scadere del tempo di reazione viene effettuata automaticamente la misurazione.

Sul display compare il risultato in mg/L di Cloro totale.

Metodo chimico

DPD

Appendice

IT

Interferenze

Interferenze permanenti

- Tutti gli ossidanti presenti nei campioni reagiscono come il cloro dando risultati troppo elevati.

Interferenze escludibili

- Le interferenze da parte di rame e ferro(III) devono essere eliminate con EDTA.
- In caso di campioni con un elevato tenore di calcio* e/o un'elevata conducibilità*, utilizzando le pastiglie di reagente potrebbe verificarsi un intorbidimento del campione con conseguenti errori di misurazione. In questo caso si possono utilizzare in alternativa la pastiglia di reagente DPD No. 1 High Calcium e la pastiglia di reagente DPD No. 3 High Calcium.
  *Non è possibile indicare i valori esatti in quanto l'intorbidimento dipende dal tipo e dalla composizione dell'acqua campione.

Conforme

EN ISO 7393-2

[a)]Determinazione di libero, vincolato, totale possibile | [e)]Reagente ausiliario, in alternativa a DPD n. 1 / no 3 in caso di torbidità del campione a causa di alto contenuto di ioni di calcio e / o alta conduttività | [j)#]Bacchetta compresa

Valore pH T M330

6.5 - 8.4 pH PH

Rosso fenolo

IT

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
Fotometro rosso fenolo	Pastiglia / 100	511770BT
Fotometro rosso fenolo	Pastiglia / 250	511771BT
Fotometro rosso fenolo	Pastiglia / 500	511772BT

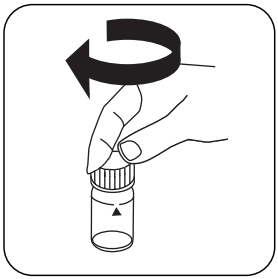
Note

1. Per la rilevazione fotometrica del valore di pH si devono utilizzare soltanto pastiglie PHENOL RED con etichetta nera contrassegnate con il termine PHOTOMETER.

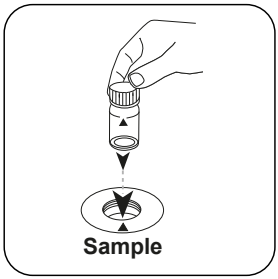
Esecuzione della rilevazione Valore pH con pastiglia

Selezionare il metodo nel dispositivo.

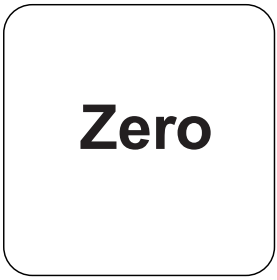
Riempire una cuvetta da 24 mm con **10 mL di campione**.



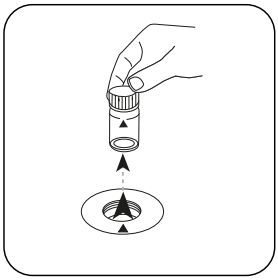
Chiudere la/e cuvetta/e.



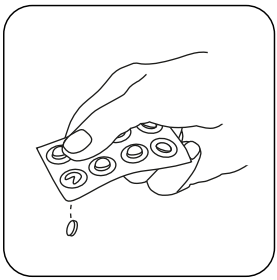
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



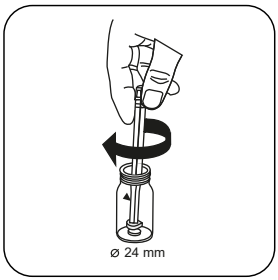
Premere il tasto **ZERO**.



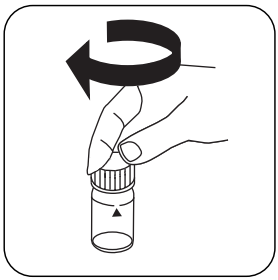
Prelevare la cuvetta dal vano di misurazione.



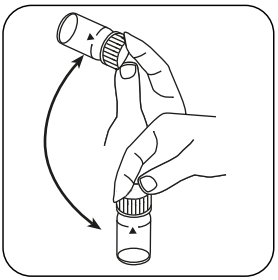
Aggiungere **una pastiglia PHENOL RED PHOTOMETER**.



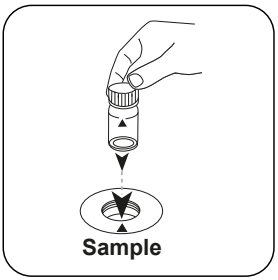
Frantumare la/e pastiglia/e con una leggera rotazione.



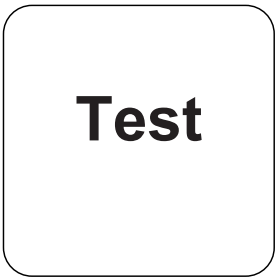
Chiudere la/e cuvetta/e.



Far sciogliere la/e pastiglia/e agitando.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



Premere il tasto **TEST** (XD: **START**).

Sul display compare il risultato come valore pH.

Metodo chimico

Rosso fenolo

Appendice

Interferenze

Interferenze permanenti

1. I campioni di acqua con una bassa durezza carbonatica* possono far ottenere valori di pH errati.
   *$K_{S4,3}$ < 0,7 mmol/l ≙ alcalinità totale < 35 mg/L $CaCO_3$.

Interferenze escludibili

1. I valori di pH minori di 6,5 e maggiori di 8,4 possono dare risultati entro il range di misura. Si consiglia un test di plausibilità (misuratore di pH).
2. Errore salino:
   Con una salinità fino a 2 g/L non è previsto alcun errore salino significativo dovuto alla salinità della pastiglia di reagente. Con salinità maggiori è necessario correggere i valori di misura nel modo seguente:

Salinità del campione in g/L	30 (acqua di mare)	60	120	180
Correzione	-0,15[1)]	-0,21[2)]	-0,26[2)]	-0,29[2)]

[1)] secondo Kolthoff (1922)
[2)] secondo Parson e Douglas (1926)

Riferimenti bibliografici

Colorimetric Chemical Analytical Methods, 9th Edition, London

Valore pH L M331

6.5 - 8.4 pH PH

Rosso fenolo

IT

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
Soluzione di rosso fenolo	15 mL	471040
Soluzione di rosso fenolo	100 mL	471041
Soluzione di rosso fenolo in confezione da 6	1 pz.	471046

Preparazione

1. Per via della dimensione variabile delle gocce, il risultato della misurazione può presentare divergenze maggiori di quanto avvenga con l'uso delle pastiglie. Utilizzando una pipetta (0,18 ml corrispondono a 6 gocce) si può ridurre al minimo questa divergenza.

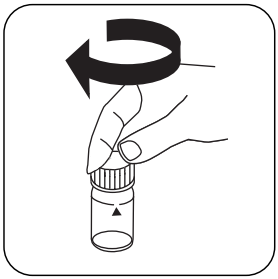
Note

1. Dopo l'uso bisogna richiudere immediatamente la boccetta contagocce con il relativo tappo dello stesso colore.
2. Conservare al fresco il reagente a una temperatura compresa tra +6 °C e +10 °C.

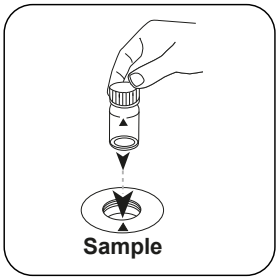
Esecuzione della rilevazione Valore pH con reagente liquido

Selezionare il metodo nel dispositivo.

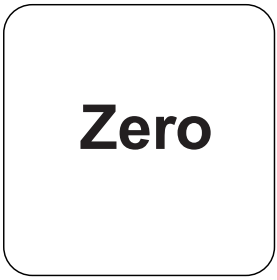
Riempire una cuvetta da 24 mm con **10 mL di campione**.



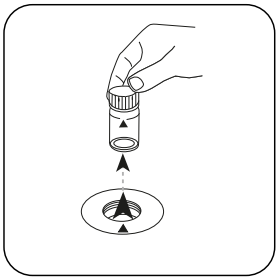
Chiudere la/e cuvetta/e.



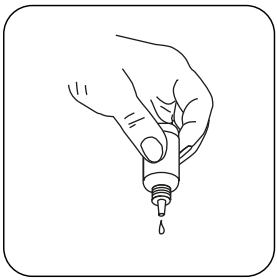
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



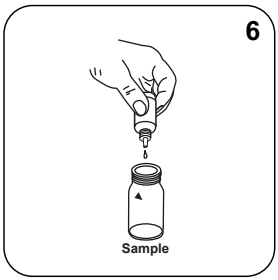
Premere il tasto **ZERO**.



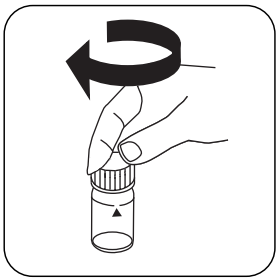
Prelevare la cuvetta dal vano di misurazione.



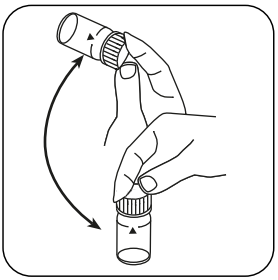
Tenere le boccette contagocce in posizione verticale e introdurre, premendo lentamente, gocce della stessa dimensione nella cuvetta.



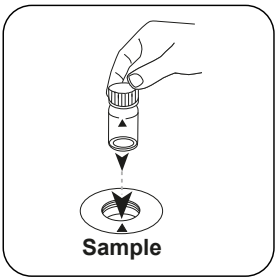
Introdurre **6 gocce di PHENOL Red-Lösung** nella cuvetta del campione.



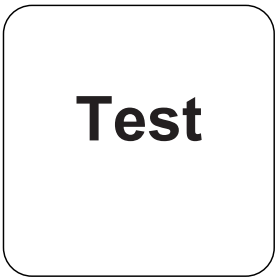
Chiudere la/e cuvetta/e.



Miscelare il contenuto capovolgendo.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



Premere il tasto **TEST** (XD: **START**).

Sul display compare il risultato come valore pH.

Metodo chimico

Rosso fenolo

Appendice

Interferenze

Interferenze escludibili

1. Errore salino: Correzione del valore di misura (valori medi) per i campioni con una salinità di:

2.

Salinità del campione	Correzione
30 g/L (acqua di mare)	-0,15[1)]
60 g/L	-0,21[2)]
120 g/L	-0,26[2)]
180 g/L	-0,29[2)]
[1)] secondo Kolthoff (1922)	[2)] secondo Parson e Douglas (1926)

3. Nell'analisi di acqua clorurata, il tenore di cloro residuo può influenzare la reazione cromatica del reagente liquido. Tale interferenza viene evitata immettendo un piccolo cristallo di tiosolfato di sodio ($Na_2S_2O_3 \cdot 5\ H_2O$) nella soluzione campione prima di aggiungere la soluzione PHENOL RED.

Riferimenti bibliografici

Colorimetric Chemical Analytical Methods, 9th Edition, London

Urea T M390

0.1 - 2.5 mg/L Urea Ur1

Indofenolo/ureasi

IT

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
Reagente UREA 1	15 mL	459300
Reagente UREA 2	10 mL	459400
Ammonio No. 1	Pastiglia / 100	512580BT
Ammonio No. 1	Pastiglia / 250	512581BT
Ammonio No. 2	Pastiglia / 100	512590BT
Ammonio No. 2	Pastiglia / 250	512591BT
Set Ammonia No. 1/no. 2#	ciascuna 100	517611BT
Set Ammonia No. 1/no. 2#	ciascuna 250	517612BT
Polvere condizionante di ammonio	Polvere / 26 g	460170
Urea Pretreat (compensates for the interference of free Chlorine up to 2 mg/l)	Pastiglia / 100	516110BT
Set di reagenti UREA	1 set	517800BT

Preparazione

1. La temperatura del campione deve essere compresa tra 20 °C e 30 °C.
2. Eseguire l'analisi al più tardi un'ora dopo il prelievo del campione.
3. Nell'analisi di campioni di acqua di mare, prima di aggiungere la pastiglia AMMONIA No. 1 si deve aggiungere due cucchiai dosatore di polvere condizionante di ammonio al campione e quindi farla sciogliere con un movimento oscillatorio.

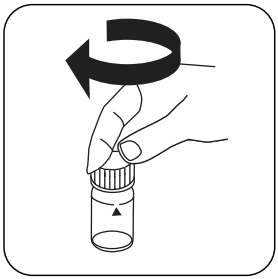
Note

1. La pastiglia AMMONIA No. 1 si scioglie completamente soltanto dopo aver aggiunto la pastiglia AMMONIA No. 2.
2. L'ammonio e la clorammina vengono rilevati nell'ambito della rilevazione dell'urea.

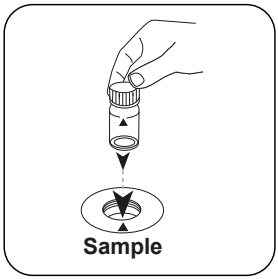
Esecuzione della rilevazione Urea con pastiglia e reagente liquido

Selezionare il metodo nel dispositivo.

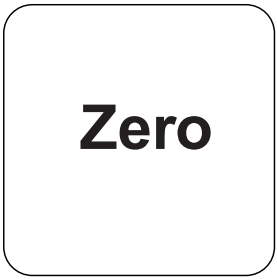
Riempire una cuvetta da 24 mm con **10 mL di campione**.



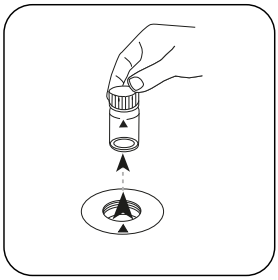
Chiudere la/e cuvetta/e.



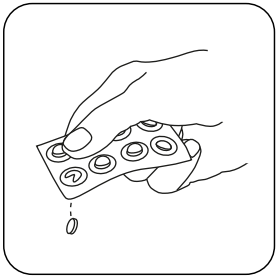
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



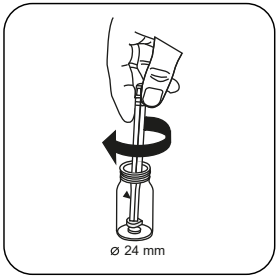
Premere il tasto **ZERO**.



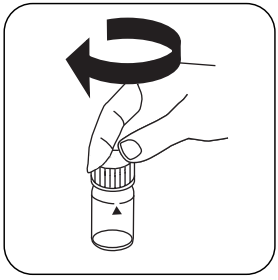
Prelevare la cuvetta dal vano di misurazione.



In presenza di cloro libero (HOCl) aggiungere **una pastiglia UREA PRETREAT**.

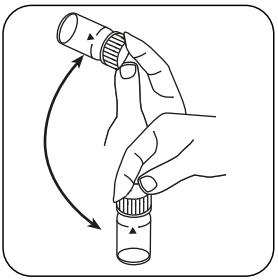


Frantumare la/e pastiglia/e con una leggera rotazione.

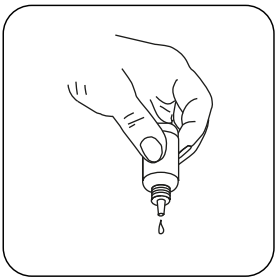


Chiudere la/e cuvetta/e.

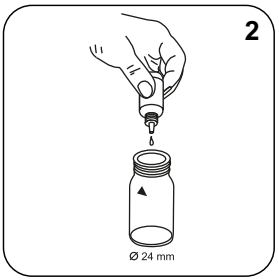
IT



Far sciogliere la/e pastiglia/e agitando.

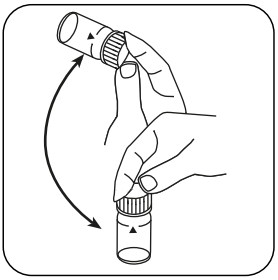


Tenere le boccette contagocce in posizione verticale e introdurre, premendo lentamente, gocce della stessa dimensione nella cuvetta.

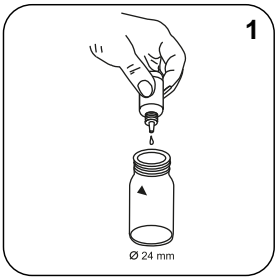


Aggiungere **2 gocce di Urea Reagenz 1**.

Chiudere la/e cuvetta/e.

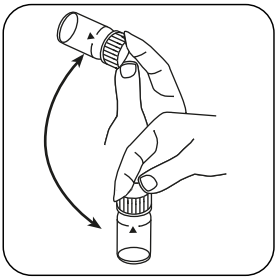


Miscelare il contenuto capovolgendo.

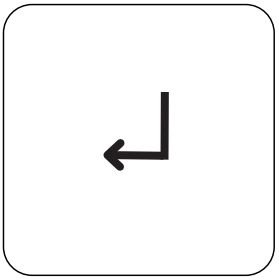


Aggiungere **1 gocce di Urea Reagenz 2**.

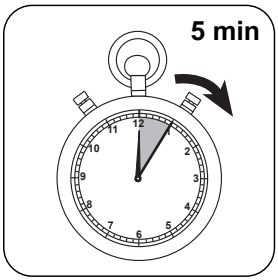
Chiudere la/e cuvetta/e.



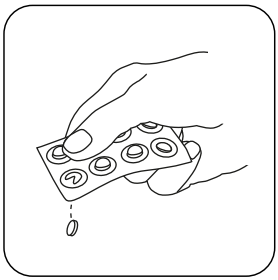
Miscelare il contenuto capovolgendo.



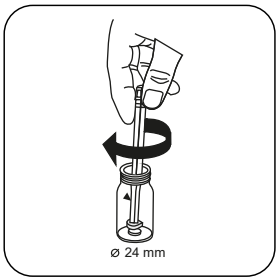
Premere il tasto **ENTER**.



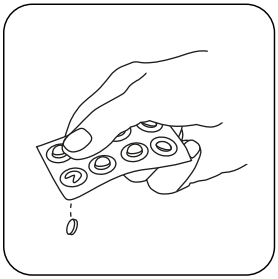
Attendere un **tempo di reazione di 5 minuto/i** .



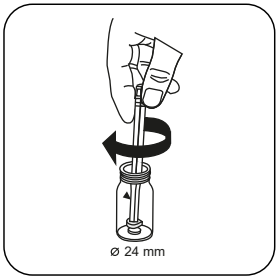
Aggiungere **una pastiglia AMMONIA No.1**.



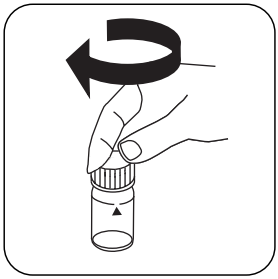
Frantumare la/e pastiglia/e con una leggera rotazione.



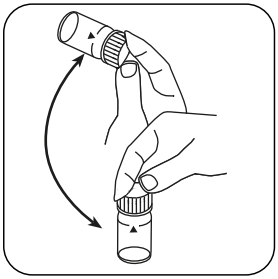
Aggiungere **una pastiglia AMMONIA No.2**.



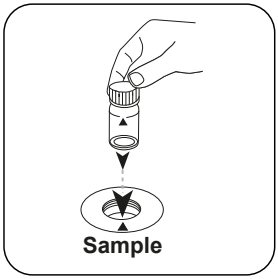
Frantumare la/e pastiglia/e con una leggera rotazione.



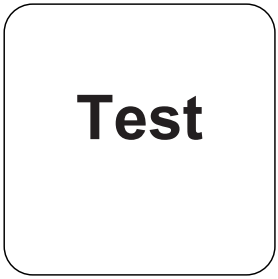
Chiudere la/e cuvetta/e.



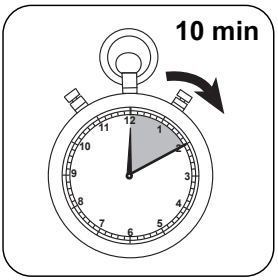
Far sciogliere la/e pastiglia/e agitando.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



Premere il tasto **TEST** (XD: **START**).



IT

Attendere un **tempo di reazione di 10 minuto/i** .

Allo scadere del tempo di reazione viene effettuata automaticamente la misurazione.

Sul display compare il risultato in mg/L di Urea.

Metodo chimico

Indofenolo/ureasi

Appendice

Interferenze

Interferenze permanenti

- Le concentrazioni di urea maggiori di 2 mg/L possono dare risultati entro il range di misura. In questo caso il campione di acqua deve essere diluito con acqua priva di urea e la misurazione deve essere ripetuta (test di plausibilità).

Interferenze escludibili

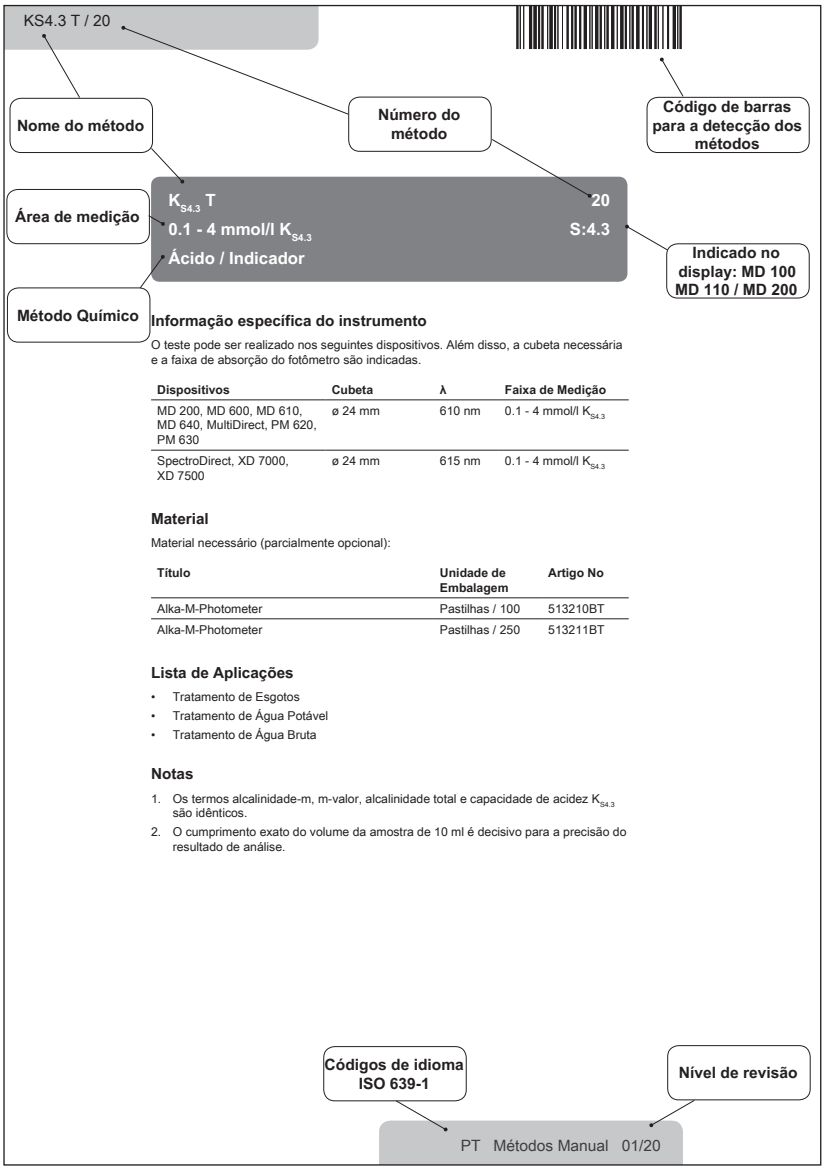
- Una pastiglia di UREA PRETREAT elimina l'interferenza del cloro libero fino a 2 mg/L (due pastiglie fino a 4 mg/L, tre pastiglie fino a 6 mg/L).

Interferenze	da / [mg/L]
Cl_2	2

Riferimenti bibliografici

R.J. Creno, R.E. Wenk, P. Bohling, Automated Micromeasurement of Urea Using Urease and the Berthelot Reaction, American Journal of Clinical Pathology (1970), 54 (6), pagg. 828-832

[1] #Bacchetta compresa


KS4.3 T / 20
Nome do método
Número do método
Código de barras para a detecção dos métodos
Área de medição
$K_{S4.3}$ T
20
0.1 - 4 mmol/l $K_{S4.3}$
S:4.3
Ácido / Indicador
Indicado no display: MD 100 MD 110 / MD 200
Método Químico
Informação específica do instrumento
O teste pode ser realizado nos seguintes dispositivos. Além disso, a cubeta necessária e a faixa de absorção do fotômetro são indicadas.
Dispositivos | Cubeta | λ | Faixa de Medição
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630 | ø 24 mm | 610 nm | 0.1 - 4 mmol/l $K_{S4.3}$
SpectroDirect, XD 7000, XD 7500 | ø 24 mm | 615 nm | 0.1 - 4 mmol/l $K_{S4.3}$
Material
Material necessário (parcialmente opcional):
Título | Unidade de Embalagem | Artigo No
Alka-M-Photometer | Pastilhas / 100 | 513210BT
Alka-M-Photometer | Pastilhas / 250 | 513211BT
Lista de Aplicações
• Tratamento de Esgotos
• Tratamento de Água Potável
• Tratamento de Água Bruta
Notas
1. Os termos alcalinidade-m, m-valor, alcalinidade total e capacidade de acidez $K_{S4.3}$ são idênticos.
2. O cumprimento exato do volume da amostra de 10 ml é decisivo para a precisão do resultado de análise.
Códigos de idioma ISO 639-1
Nível de revisão
PT Métodos Manual 01/20

Efetuar a medição

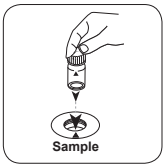
Realização da determinação Capacidade de acidez $K_{S4.3}$ com pastilha

Escolher o método no equipamento.

Para este método não tem de ser efetuada uma medição ZERO nos seguintes equipamentos: XD 7000, XD 7500

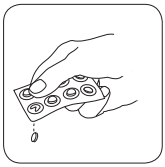
Encher a célula de 24 mm com **10 ml de amostra** .

Fechar a(s) célula(s).

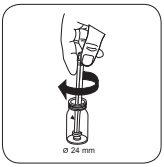


Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

• • •



Pastilha ALKA-M-PHOTOMETER.



Esmagar a(s) pastilha(s) rodando ligeiramente.

Fechar a(s) célula(s).

$K_{S4.3}$ T — M20

0.1 - 4 mmol/L $K_{S4.3}$ — S:4.3

Ácido / Indicador

PT

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
Alca-M-fotómetro	Pastilhas / 100	513210BT
Alca-M-fotómetro	Pastilhas / 250	513211BT

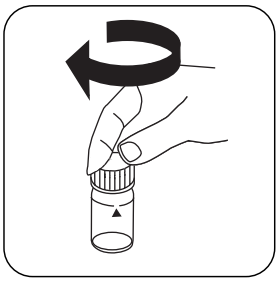
Notas

1. Os termos alcalinidade-m, m-valor, alcalinidade total e capacidade de acidez $K_{S4.3}$ são idênticos.
2. O cumprimento exato do volume da amostra de 10 ml é decisivo para a precisão do resultado de análise.

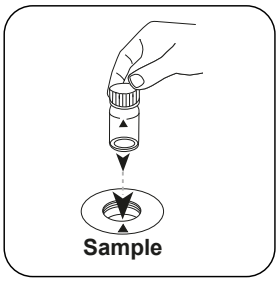
Realização da determinação Capacidade de acidez$_{KS4.3}$ com tablet

Escolher o método no equipamento.

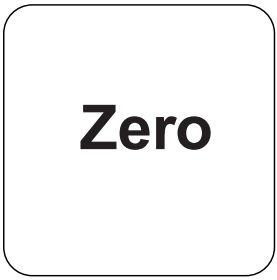
Encher a célula de 24 mm com **10 mL de amostra** .



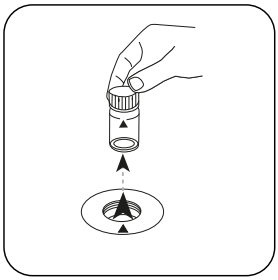
Fechar a(s) célula(s).



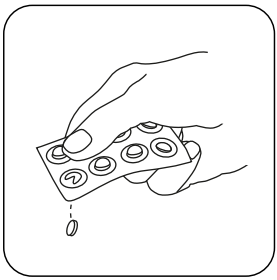
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



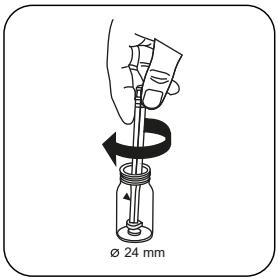
Premir a tecla **ZERO**.



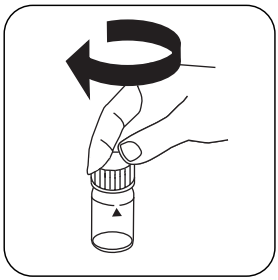
Retirar a célula do compartimento de medição.



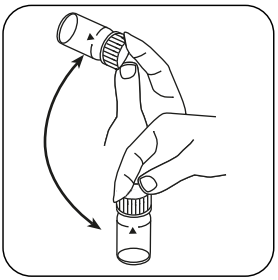
Pastilha ALKA-M-PHOTOMETER.



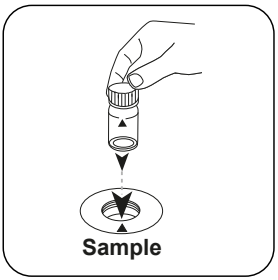
Esmagar a(s) pastilha(s) rodando ligeiramente.



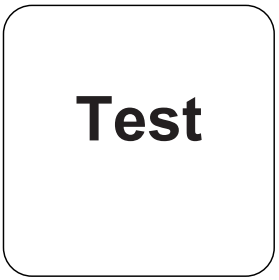
Fechar a(s) célula(s).



Dissolver a(s) pastilha(s) girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



Premir a tecla **TEST** (XD: **START**).

No visor aparece o resultado como Capacidade de acidez $K_{S4.3}$.

Método Químico

Ácido / Indicador

Apêndice

Derivado de

DIN 38409 - H 7-2

Cloro T M100

0.01 - 6.0 mg/L Cl_2 [a] CL6

DPD

PT

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
DPD Nº.1	Pastilhas / 100	511050BT
DPD Nº. 1	Pastilhas / 250	511051BT
DPD Nº. 1	Pastilhas / 500	511052BT
DPD Nº. 3	Pastilhas / 100	511080BT
DPD Nº. 3	Pastilhas / 250	511081BT
DPD Nº. 3	Pastilhas / 500	511082BT
DPD Nº. 1 Alto Cálcio [e]	Pastilhas / 100	515740BT
DPD Nº. 1 Alto Cálcio [e]	Pastilhas / 250	515741BT
DPD Nº. 1 Alto Cálcio [e]	Pastilhas / 500	515742BT
DPD Nº. 3 Alto Cálcio [e]	Pastilhas / 100	515730BT
DPD Nº. 3 Alto Cálcio [e]	Pastilhas / 250	515731BT
DPD Nº. 3 Alto Cálcio [e]	Pastilhas / 500	515732BT
DPD Nº. 4	Pastilhas / 100	511220BT
DPD Nº. 4	Pastilhas / 250	511221BT
DPD Nº. 4	Pastilhas / 500	511222BT
DPD Nº. 3 Evo	Pastilhas / 100	511420BT
DPD Nº. 3 Evo	Pastilhas / 250	511421BT
DPD Nº. 3 Evo	Pastilhas / 500	511422BT
DPD Nº.4 Evo	Pastilhas / 100	511970BT
DPD Nº. 4 Evo	Pastilhas / 250	511971BT
DPD Nº. 4 Evo	Pastilhas / 500	511972BT

Padrões disponíveis

Título	Unidade de Embalagem	Código do Produto
ValidCheck Cloro 1,5 mg/l	1 pc.	48105510

Amostragem

1. Na preparação da amostra é preciso evitar a libertação de gases de cloro, p. ex. através da pipetagem e agitação.
2. A análise tem de ser efetuada logo após a recolha da amostra.

Preparação

1. Limpeza das células:
   Uma vez que muitos produtos de limpeza domésticos (p. ex. lava-louça) contêm substâncias redutoras, na determinação de cloro pode haver demasiadas reduções. Para excluir este erro de medição, os equipamentos de vidro não deviam ter a capacidade de absorção de cloro. Para esse efeito, os equipamentos de vidro são guardados por uma hora sob solução de hipoclorito de sódio (0,1 g/L) e depois devem ser bem enxaguados com água desmineralizada.
2. Para a determinação individual de cloro livre e cloro total é conveniente usar respetivamente um conjunto próprio de células (ver EN ISO 7393-2, alínea 5.3).
3. A formação de cores DPD ocorre com um valor pH entre 6,2 e 6,5. Os reagentes contêm, por isso, um tampão para ajustar o valor pH. As águas fortemente alcalinas ou ácidas devem, porém, antes da análise, ser ajustadas para um valor pH entre 6 e 7 (com 0,5 mol/L de ácido sulfúrico ou 1 mol/L soda cáustica).

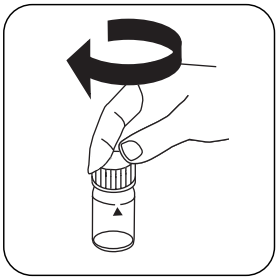
Notas

1. Os pastilhas Evo podem ser utilizadas como alternativa à pastilha padrão correspondente (por exemplo, DPD Nº 3 Evo em vez da DPD Nº 3).

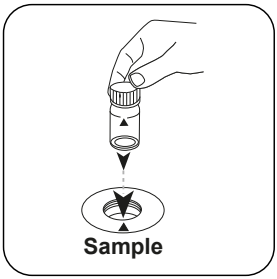
Realização da determinação Cloro livre com pastilha

Escolher o método no equipamento.

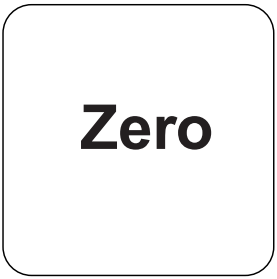
Encher a célula de 24 mm com **10 mL de amostra** .



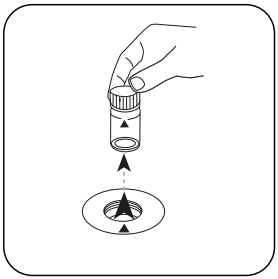
Fechar a(s) célula(s).



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

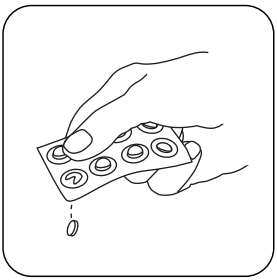


Premir a tecla **ZERO**.

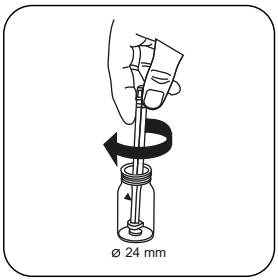


Retirar a célula do compartimento de medição.

Esvaziar a célula até ficarem apenas algumas gotas.

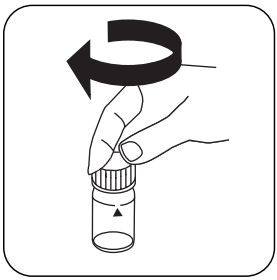


Pastilha DPD No. 1.

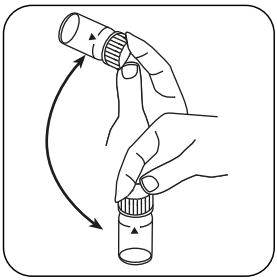


Esmagar a(s) pastilha(s) rodando ligeiramente.

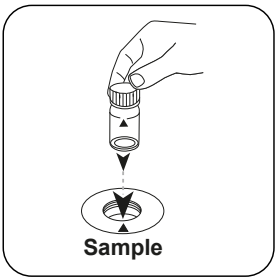
Encher a célula até à **marca de 10 mL** com a **amostra** .



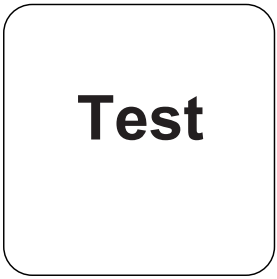
Fechar a(s) célula(s).



Dissolver a(s) pastilha(s) girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



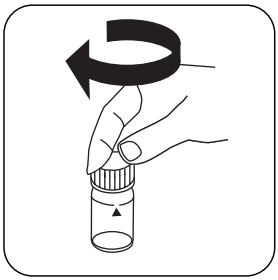
Premir a tecla **TEST** (XD: **START**).

No visor aparece o resultado em mg/L Cloro livre.

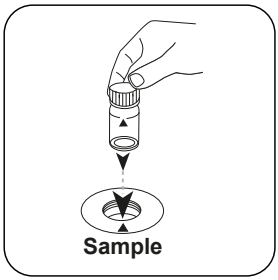
Realização da determinação Cloro total com pastilha

Escolher o método no equipamento.

Encher a célula de 24 mm com **10 mL de amostra** .

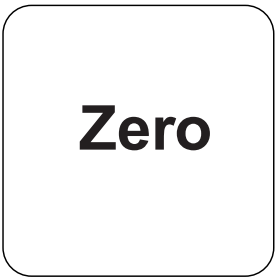


Fechar a(s) célula(s).

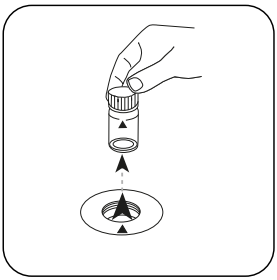


Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

PT

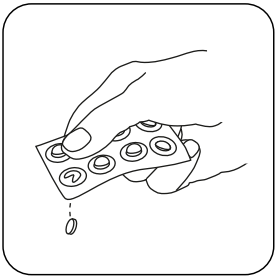


Premir a tecla **ZERO**.

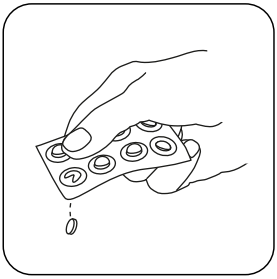


Retirar a célula do compartimento de medição.

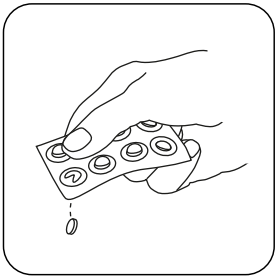
Esvaziar a célula até ficarem apenas algumas gotas.



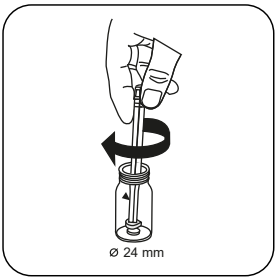
Pastilha DPD No. 1.



Pastilha DPD No. 3.

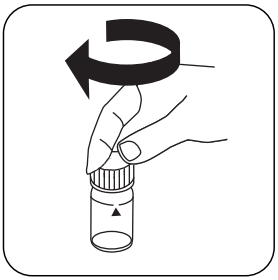


Como alternativa aos comprimidos DPD No. 1 e No. 3, pode ser adicionado 1 comprimido DPD No. 4.

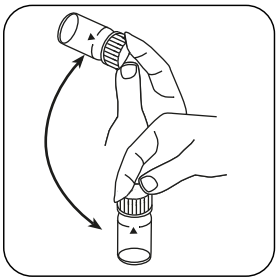


Esmagar a(s) pastilha(s) rodando ligeiramente.

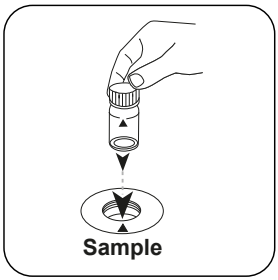
Encher a célula até à **marca de 10 mL** com a **amostra** .



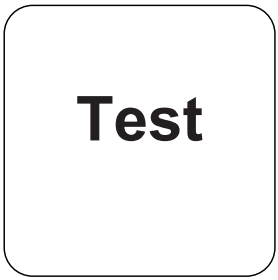
Fechar a(s) célula(s).



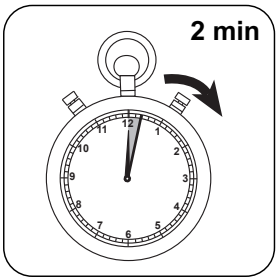
Dissolver a(s) pastilha(s) girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



Premir a tecla **TEST** (XD: **START**).



Aguardar **2 minuto(s) de tempo de reação**.

Decorrido o tempo de reação, a medição é efetuada automaticamente.

No visor aparece o resultado em mg/L Cloro total.

Método Químico

DPD

Apêndice

PT

Texto de Interferências

Interferências Pesistentes

- Todos os oxidantes presentes nas amostras reagem como o cloro, o que leva a resultados demasiado altos.

Interferências Removíveis

- As interferências por cobre e ferro(III) devem ser eliminadas por EDTA.
- Nas amostras com elevado teor de cálcio* e/ou elevada condutividade* pode ocorrer, se forem usadas as pastilhas de reagente, uma turvação da amostra e, por conseguinte, a medição pode ficar errada. Neste caso, deve usar em alternativa a pastilha de reagente DPD No. 1 High Calcium e a pastilha de reagente DPD No. 3 High Calcium.
  *não podem ser indicados valores exatos, uma vez que a formação de uma turvação depende do tipo e da composição da água da amostra.
- Concentrações de cloro superiores a 10 mg/L, se forem usadas pastilhas, podem causar resultados dentro da área de medição até 0 mg/L. No caso de uma concentração demasiado alta de cloro, deve diluir a amostra com água sem cloro. 10 mL da amostra diluída é colocada em reagente e a medição é repetida (teste de plausibilidade).

Interferências	**a partir de / [mg/L]**
CrO_4^{2-}	0.01
MnO_2	0.01

Validação de método

Limite de Detecção	0.02 mg/L
Limite de Determinação	0.06 mg/L
Fim da Faixa de Medição	6 mg/L
Sensibilidade	2.05 mg/L / Abs
Faixa de Confiança	0.04 mg/L
Desvio Padrão	0.019 mg/L
Coeficiente de Variação	0.87 %

Conformidade

EN ISO 7393-2

[a]Determinação do possível livre, vinculado, total | [e]Reagente auxiliar, alternativamente ao DPD no. 1 / não 3 quando a amostra é nublada devido ao alto teor de íons de cálcio e / ou alta condutividade

Cloro L M101

0.02 - 4.0 mg/L Cl_2 [a] CL6

DPD

PT

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
DPD 1 solução tampão, frasco azul	15 mL	471010
Solução tampão DPD 1	100 mL	471011
DPD 1 solução tampão em embalagem de 6	1 pc.	471016
Solução de reagente DPD 1, frasco verde	15 mL	471020
Solução de reagente DPD 1	100 mL	471021
Solução de reagente DPD 1 numa embalagem de 6 unidades	1 pc.	471026
DPD 3 Solução, frasco vermelho	15 mL	471030
Solução DPD 3	100 mL	471031
Solução DPD 3 numa embalagem de 6 unidades	1 pc.	471036
Kit de reagentes DPD	1 pc.	471056

Padrões disponíveis

Título	Unidade de Embalagem	Código do Produto
ValidCheck Cloro 1,5 mg/l	1 pc.	48105510

Amostragem

1. Na preparação da amostra é preciso evitar a libertação de gases de cloro, p. ex. através da pipetagem e agitação.
2. A análise tem de ser efetuada logo após a recolha da amostra.

Preparação

1. Limpeza das células:
   Uma vez que muitos produtos de limpeza domésticos (p. ex. lava-louça) contêm substâncias redutoras, na determinação de cloro pode haver demasiadas reduções. Para excluir este erro de medição, os equipamentos de vidro não deviam ter a capacidade de absorção de cloro. Para esse efeito, os equipamentos de vidro são guardados por uma hora sob solução de hipoclorito de sódio (0,1 g/L) e depois devem ser bem enxaguados com água desmineralizada.
2. Para a determinação individual de cloro livre e cloro total é conveniente usar respetivamente um conjunto próprio de células (ver EN ISO 7393-2, alínea 5.3).
3. A formação de cores DPD ocorre com um valor pH entre 6,2 e 6,5. Os reagentes contêm, por isso, um tampão para ajustar o valor pH. As águas fortemente alcalinas ou ácidas devem, porém, antes da análise, ser ajustadas para um valor pH entre 6 e 7 (com 0,5 mol/l de ácido sulfúrico ou 1 mol/l soda cáustica).

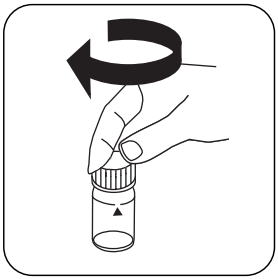
Notas

1. Depois de usados, os frascos conta-gotas devem ser novamente fechados com a respetiva tampa de enroscar à cor.
2. Guardar o conjunto de reagentes em local fresco entre +6 °C e +10 °C.

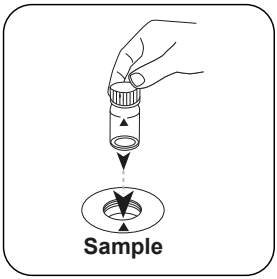
Realização da determinação Cloro livre com reagente líquido

Escolher o método no equipamento.

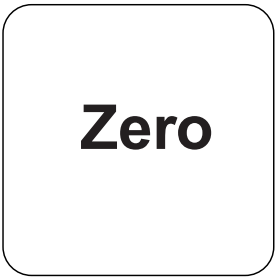
Encher a célula de 24 mm com **10 mL de amostra** .



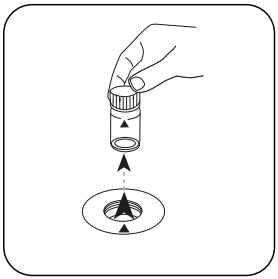
Fechar a(s) célula(s).



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

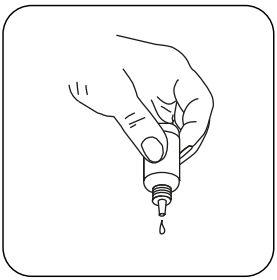


Premir a tecla **ZERO**.

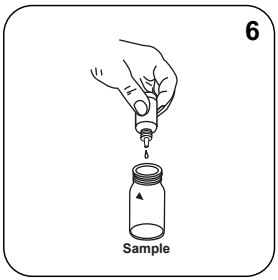


Retirar a célula do compartimento de medição.

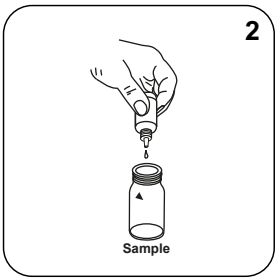
Esvaziar a célula.



Manter os frascos conta gotas na vertical e pressionar lentamente para adicionar gotas de igual dimensão.

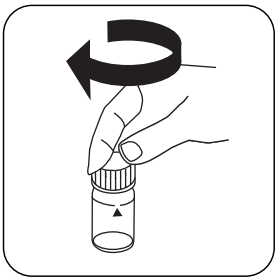


Adicionar **6 gotas DPD 1 Buffer Solution** à célula de amostra.

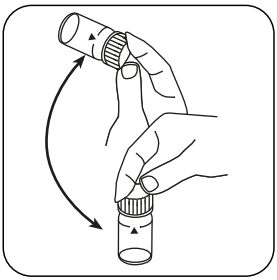


Adicionar **2 gotas DPD 1 Reagent Solution** à célula de amostra.

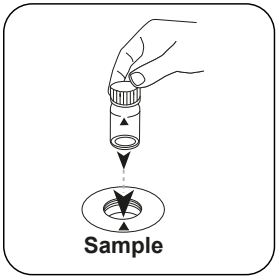
Encher a célula até à **marca de 10 mL** com a **amostra** .



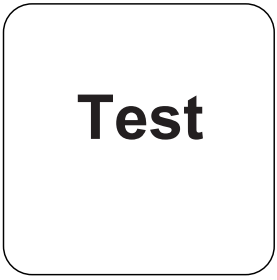
Fechar a(s) célula(s).



Misturar o conteúdo girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



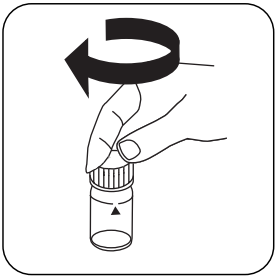
Premir a tecla **TEST** (XD: **START**).

No visor aparece o resultado em mg/L Cloro livre.

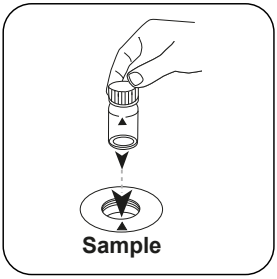
Realização da determinação Cloro total com reagente líquido

Escolher o método no equipamento.

Encher a célula de 24 mm com **10 mL de amostra** .

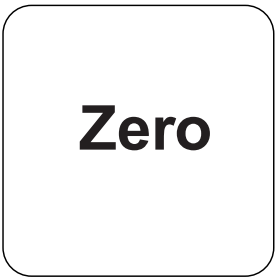


Fechar a(s) célula(s).

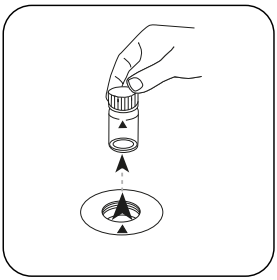


Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

PT

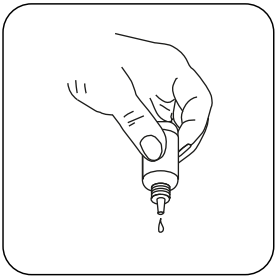


Premir a tecla **ZERO**.

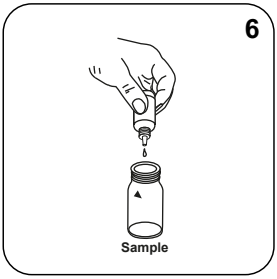


Retirar a célula do compartimento de medição.

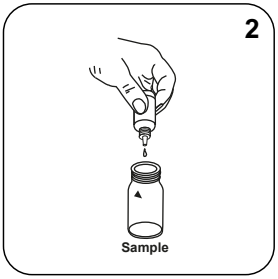
Esvaziar a célula.



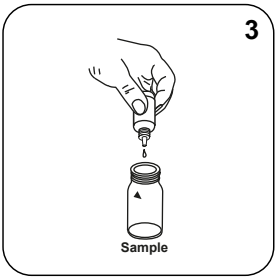
Manter os frascos conta gotas na vertical e pressionar lentamente para adicionar gotas de igual dimensão.



Adicionar **6 gotas DPD 1 Buffer Solution** à célula de amostra.

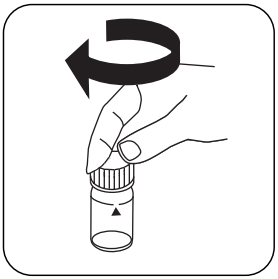


Adicionar **2 gotas DPD 1 Reagent Solution** à célula de amostra.

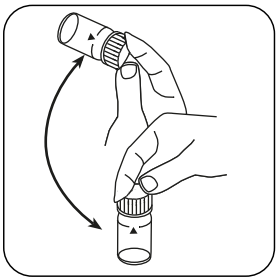


Adicionar **3 gotas DPD 3 Solution** à célula de amostra.

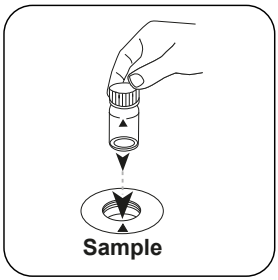
Encher a célula até à **marca de 10 mL** com a **amostra** .



Fechar a(s) célula(s).

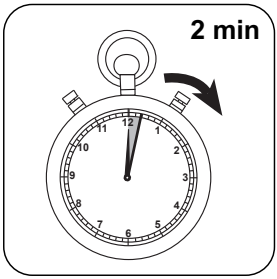


Misturar o conteúdo girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Premir a tecla **TEST** (XD: **START**).



Aguardar **2 minuto(s) de tempo de reação**.

Decorrido o tempo de reação, a medição é efetuada automaticamente.

No visor aparece o resultado em mg/L Cloro total.

Método Químico

DPD

Apêndice

PT

Texto de Interferências

Interferências Pesistentes

- Todos os oxidantes presentes nas amostras reagem como o cloro, o que leva a resultados demasiado altos.

Interferências Removíveis

- As interferências por cobre e ferro(III) devem ser eliminadas por EDTA.
- Concentrações de cloro superiores a 4 mg/L, se forem usados reagentes líquidos, podem causar resultados dentro da área de medição até 0 mg/L. Neste caso, deve diluir a amostra com água sem cloro. 10 ml da amostra diluída é colocada em reagente e a medição é repetida (teste de plausibilidade).

Interferências	a partir de / [mg/L]
CrO_4^{2-}	0,01
MnO_2	0,01

Conformidade

EN ISO 7393-2

[a)]Determinação do possível livre, vinculado, total

Cloro HR T M103

0.1 - 10 mg/L Cl_2 [a] CL10

DPD

PT

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
DPD Nº. 1 HR	Pastilhas / 100	511500BT
DPD Nº. 1 HR	Pastilhas / 250	511501BT
DPD Nº. 1 HR	Pastilhas / 500	511502BT
DPD Nº.3 HR Evo	Pastilhas / 100	511920BT
DPD Nº. 3 HR Evo	Pastilhas / 250	511921BT
DPD Nº. 3 HR Evo	Pastilhas / 500	511922BT
DPD Nº. 3 HR	Pastilhas / 100	511590BT
DPD Nº. 3 HR	Pastilhas / 250	511591BT
DPD Nº. 3 HR	Pastilhas / 500	511592BT
Definir N.º DPD 1 HR/No. 3 HR [#]	cada 100	517791BT
Definir N.º DPD 1 HR/No. 3 HR [#]	cada 250	517792BT
DPD Nº. 1 Alto Cálcio [e]	Pastilhas / 100	515740BT
DPD Nº. 1 Alto Cálcio [e]	Pastilhas / 250	515741BT
DPD Nº. 1 Alto Cálcio [e]	Pastilhas / 500	515742BT
DPD Nº. 3 Alto Cálcio [e]	Pastilhas / 100	515730BT
DPD Nº. 3 Alto Cálcio [e]	Pastilhas / 250	515731BT
DPD Nº. 3 Alto Cálcio [e]	Pastilhas / 500	515732BT

Amostragem

1. Na preparação da amostra é preciso evitar a libertação de gases de cloro, p. ex. através da pipetagem e agitação.
2. A análise tem de ser efetuada logo após a recolha da amostra.

Preparação

1. Limpeza das células:
   Uma vez que muitos produtos de limpeza domésticos (p. ex. lava-louça) contêm substâncias redutoras, na determinação de cloro pode haver demasiadas reduções. Para excluir este erro de medição, os equipamentos de vidro não deviam ter a capacidade de absorção de cloro. Para esse efeito, os equipamentos de vidro são guardados por uma hora sob solução de hipoclorito de sódio (0,1 g/L) e depois devem ser bem enxaguados com água desmineralizada.
2. Para a determinação individual de cloro livre e cloro total é conveniente usar respetivamente um conjunto próprio de células (ver EN ISO 7393-2, alínea 5.3).
3. A formação de cores DPD ocorre com um valor pH entre 6,2 e 6,5. Os reagentes contêm, por isso, um tampão para ajustar o valor pH. As águas fortemente alcalinas ou ácidas devem, porém, antes da análise, ser ajustadas para um valor pH entre 6 e 7 (com 0,5 mol/L de ácido sulfúrico ou 1 mol/L soda cáustica).

Notas

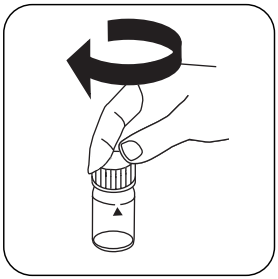
1. Os pastilhas Evo podem ser utilizadas como alternativa à pastilha padrão correspondente (por exemplo, DPD Nº 3 Evo em vez da DPD Nº 3).

Realização da determinação Cloro HR livre com pastilha

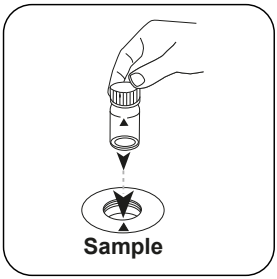
Escolher o método no equipamento.

PT

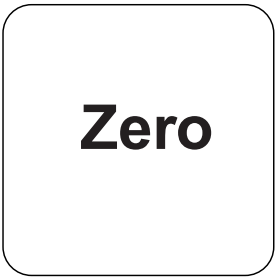
Encher a célula de 24 mm com **10 mL de amostra** .



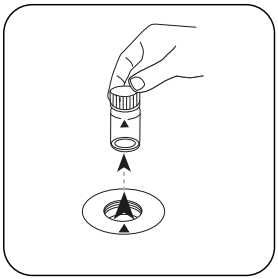
Fechar a(s) célula(s).



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

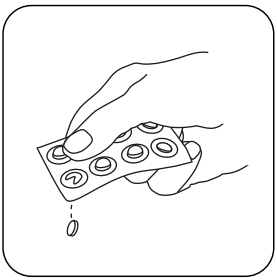


Premir a tecla **ZERO**.

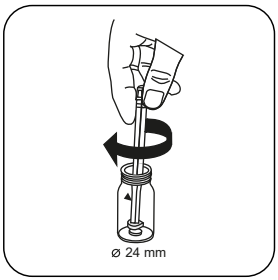


Retirar a célula do compartimento de medição.

Esvaziar a célula até ficarem apenas algumas gotas.

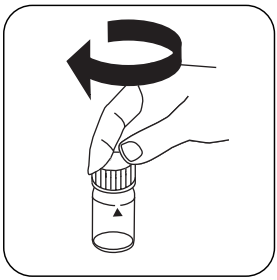


Pastilha DPD No. 1 HR .

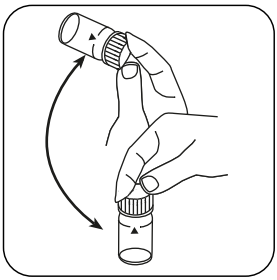


Esmagar a(s) pastilha(s) rodando ligeiramente.

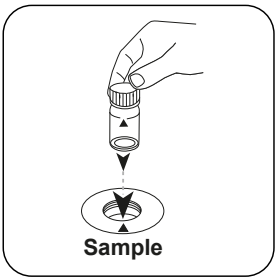
Encher a célula até à **marca de 10 mL** com a **amostra** .



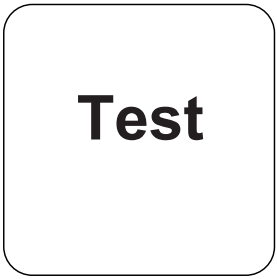
Fechar a(s) célula(s).



Dissolver a(s) pastilha(s) girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



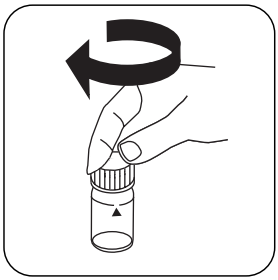
Premir a tecla **TEST** (XD: **START**).

No visor aparece o resultado em mg/L Cloro livre.

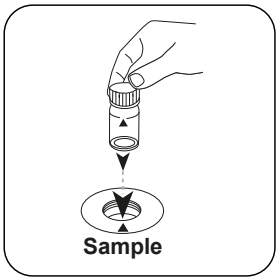
Realização da determinação Cloro HR total com pastilha

Escolher o método no equipamento.

Encher a célula de 24 mm com **10 mL de amostra** .

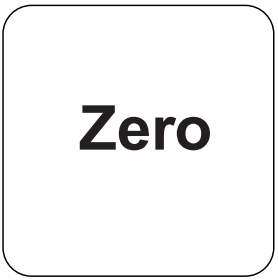


Fechar a(s) célula(s).

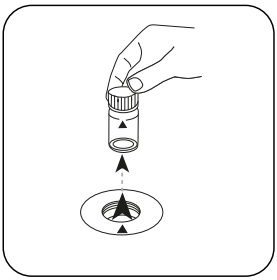


Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

PT

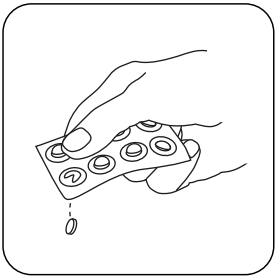


Premir a tecla **ZERO**.

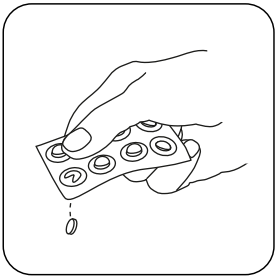


Retirar a célula do compartimento de medição.

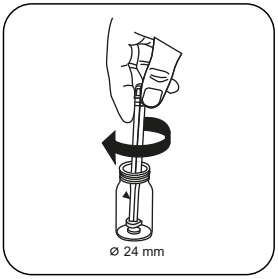
Esvaziar a célula até ficarem apenas algumas gotas.



Pastilha DPD No. 1 HR .



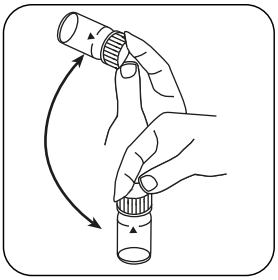
Pastilha DPD No. 3 HR .



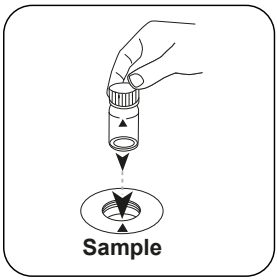
Esmagar a(s) pastilha(s) rodando ligeiramente.

Encher a célula até à **marca de 10 mL** com a **amostra** .

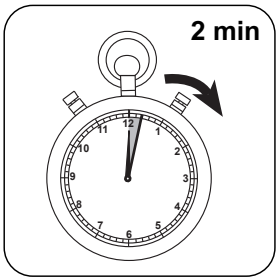
Fechar a(s) célula(s).



Dissolver a(s) pastilha(s) girando.



Test



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Premir a tecla **TEST** (XD: **START**).

Aguardar **2 minuto(s) de tempo de reação**.

Decorrido o tempo de reação, a medição é efetuada automaticamente.

No visor aparece o resultado em mg/L Cloro total.

Método Químico

DPD

Apêndice

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Texto de Interferências

Interferências Pesistentes

- Todos os oxidantes presentes nas amostras reagem como o cloro, o que leva a resultados demasiado altos.

Interferências Removíveis

- As interferências por cobre e ferro(III) devem ser eliminadas por EDTA.
- Nas amostras com elevado teor de cálcio* e/ou elevada condutividade* pode ocorrer, se forem usadas as pastilhas de reagente, uma turvação da amostra e, por conseguinte, a medição pode ficar errada.Neste caso, deve usar em alternativa a pastilha de reagente DPD No. 1 High Calcium e a pastilha de reagente DPD No. 3 High Calcium.
  *não podem ser indicados valores exatos, uma vez que a formação de uma turvação depende do tipo e da composição da água da amostra.

Conformidade

EN ISO 7393-2

[a]Determinação do possível livre, vinculado, total | [e]Reagente auxiliar, alternativamente ao DPD no. 1 / não 3 quando a amostra é nublada devido ao alto teor de íons de cálcio e / ou alta condutividade | [f]incluindo vareta de agitação

Valor pH T M330

6.5 - 8.4 pH PH

Phenol Red

PT

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
Fotómetro Fenol Vermelho	Pastilhas / 100	511770BT
Fotómetro Fenol Vermelho	Pastilhas / 250	511771BT
Fotómetro Fenol Vermelho	Pastilhas / 500	511772BT

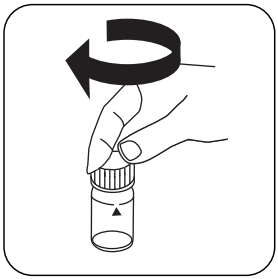
Notas

1. Para a determinação fotométrica do valor pH deve usar somente pastilhas PHENOL RED com impressão de película preta, que estão identificadas com o termo PHOTOMETER.

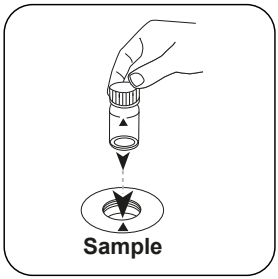
Realização da determinação Valor pH com pastilha

Escolher o método no equipamento.

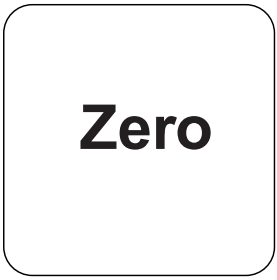
Encher a célula de 24 mm com **10 mL de amostra** .



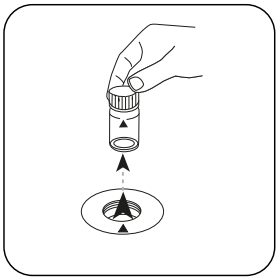
Fechar a(s) célula(s).



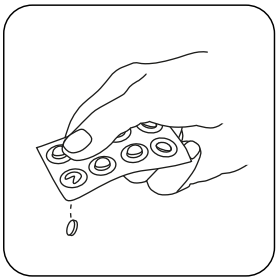
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



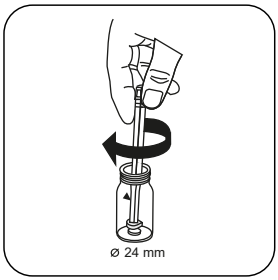
Premir a tecla **ZERO**.



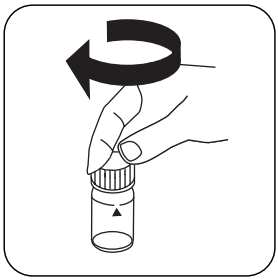
Retirar a célula do compartimento de medição.



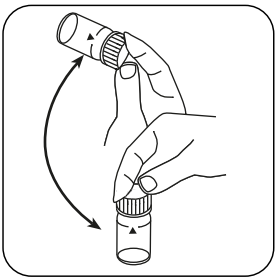
Pastilha PHENOL RED PHOTOMETER.



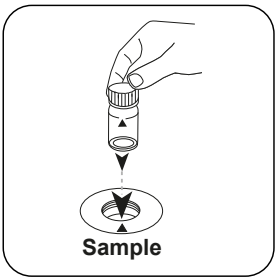
Esmagar a(s) pastilha(s) rodando ligeiramente.



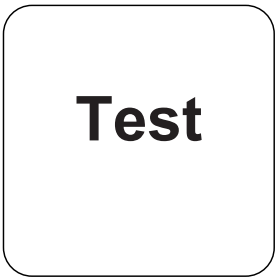
Fechar a(s) célula(s).



Dissolver a(s) pastilha(s) girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



Premir a tecla **TEST** (XD: **START**).

No visor aparece o resultado como valor pH.

Método Químico

Phenol Red

Apêndice

Texto de Interferências

Interferências Pesistentes

1. As amostras de água com baixa dureza de carbonato* podem obter valores pH incorretos.
   *$K_{S4,3}$ < 0,7 mmol/l ≙ Alcalinidade total < 35 mg/L $CaCO_3$.

Interferências Removíveis

1. Os valores pH inferiores a 6,5 e superiores a 8,4 podem causar resultados dentro da área de medição. Recomenda-se um teste de plausibilidade (medidor de pH).
2. Erro de sal:
   No caso de teores de sal até 2 g/L não é expectável nenhum erro de sal significativo devido ao teor de sal da pastilha de reagente. No caso de teores de sal superiores, deve corrigir os valores de medição do seguinte modo:

Teor de sal da amostra emg/L	30 (água do mar)	60	120	180
Correção	-0,15[1)]	-0,21[2)]	-0,26[2)]	-0,29[2)]

[1)] segundo Kolthoff (1922)
[2)] segundo Parson e Douglas (1926)

Bibliografia

Colorimetric Chemical Analytical Methods, 9th Edition, London

Valor pH L M331

6.5 - 8.4 pH PH

Phenol Red

PT

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
Solução de vermelho fenol	15 mL	471040
Solução de vermelho fenol	100 mL	471041
Solução de vermelho fenol em embalagem de -6	1 pc.	471046

Preparação

1. Devido aos diferentes tamanhos de gotas, o resultado de medição pode apresentar desvios maiores do que ao utilizar pastilhas.
   Se utilizar uma pipeta (0,18 ml corresponde a 6 gotas) pode reduzir este desvio.

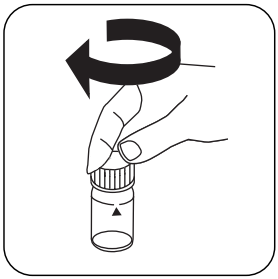
Notas

1. Depois de usado, o frasco conta-gotas deve ser novamente fechado com a respetiva tampa de enroscar à cor.
2. Guardar o reagente em local fresco entre +6 °C e +10 °C.

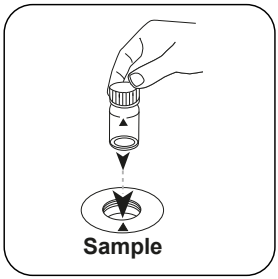
Realização da determinação Valor pH com reagente líquido

Escolher o método no equipamento.

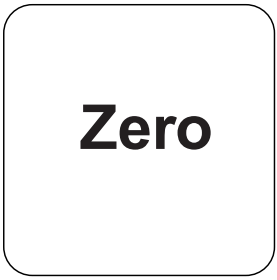
Encher a célula de 24 mm com **10 mL de amostra** .



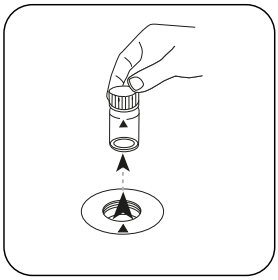
Fechar a(s) célula(s).



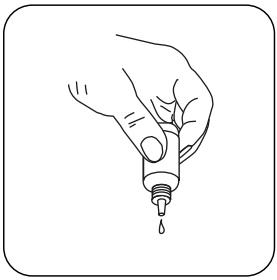
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



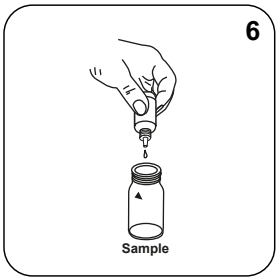
Premir a tecla **ZERO**.



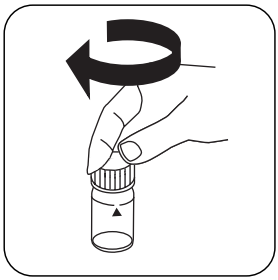
Retirar a célula do compartimento de medição.



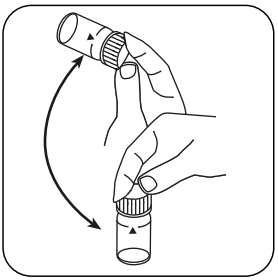
Manter os frascos conta gotas na vertical e pressionar lentamente para adicionar gotas de igual dimensão.



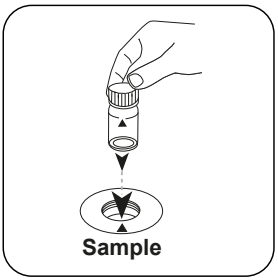
Adicionar **6 gotas PHENOL Red-Lösung** à célula de amostra.



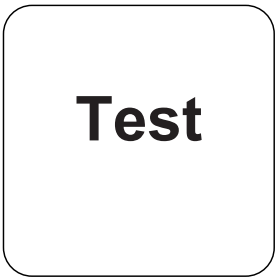
Fechar a(s) célula(s).



Misturar o conteúdo girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



Premir a tecla **TEST** (XD: **START**).

No visor aparece o resultado como valor pH.

Método Químico

Phenol Red

Apêndice

Texto de Interferências

Interferências Removíveis

1. Erro de sal: Correção do valor de medição (valores médios) para amostras com um teor de sal de:

2.

Teor de sal da amostra	Correção
30 g/L (água do mar)	-0,15[1)]
60 g/L	-0,21[2)]
120 g/L	-0,26[2)]
180 g/L	-0,29[2)]
[1)] segundo Kolthoff (1922)	[2)] segundo Parson e Douglas (1926)

3. Na análise de água clorada, o teor de cloro residual existente pode influenciar a reação de cor do reagente líquido. Isto é evitado, na medida em que se insere um pequeno cristal de tiossulfato de sódio ($Na_2S_2O_3 \cdot 5\ H_2O$) na solução de amostra antes de ser adicionada a solução PHENOL RED.

Bibliografia

Colorimetric Chemical Analytical Methods, 9th Edition, London

Ureia T M390

0.1 - 2.5 mg/L Urea Ur1

Indophenol / Urease

PT

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
UREA Reagente 1	15 mL	459300
UREA Reagente 2	10 mL	459400
Amónia Não. 1	Pastilhas / 100	512580BT
Amónia Não. 1	Pastilhas / 250	512581BT
Amónia Não. 2	Pastilhas / 100	512590BT
Amónia Não. 2	Pastilhas / 250	512591BT
Set Amónio Não. 1/Não. 2#	cada 100	517611BT
Set Amónio Não. 1/Não. 2#	cada 250	517612BT
Pó de condicionamento de amónio	Pó / 26 g	460170
Pré-tratamento da ureia (compensates for the interference of free Chlorine up to 2 mg/l)	Pastilhas / 100	516110BT
Kit de reagentes UREA	1 Conjunto	517800BT

Preparação

1. A temperatura da amostra deve situar-se entre 20 °C e 30 °C.
2. A análise tem de ser efetuada o mais tardar uma hora após a recolha da amostra.
3. Na análise de amostras de água do mar deve se, antes da adição da pastilha Ammonia No. 1, introduzir na amostra duas colheres medida de pó de condicionamento de amónio e dissolver por agitação.

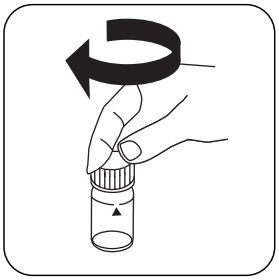
Notas

1. A pastilha AMMONIA No. 1 dissolve-se totalmente apenas depois da adição da pastilha AMMONIA No. 2.
2. O amónio e a cloramina são juntamente captados na determinação de ureia.

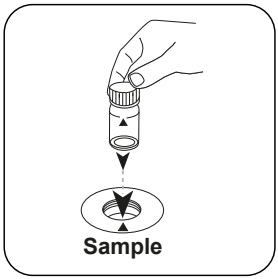
Realização da determinação Ureia com pastilha e reagente líquido

Escolher o método no equipamento.

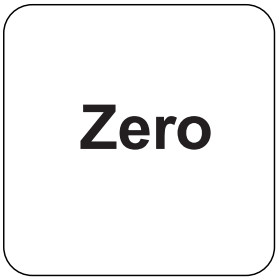
Encher a célula de 24 mm com **10 mL de amostra** .



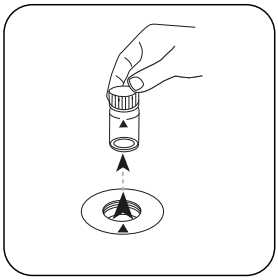
Fechar a(s) célula(s).



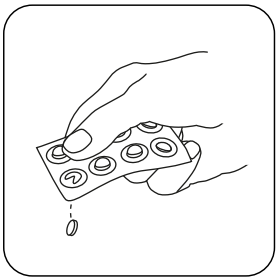
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



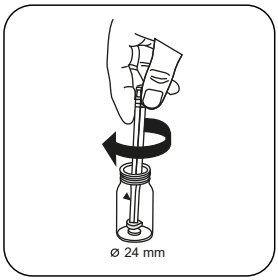
Premir a tecla **ZERO**.



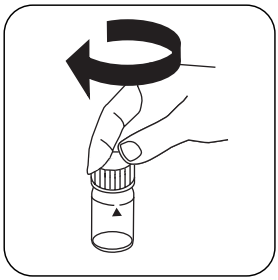
Retirar a célula do compartimento de medição.



Na presença de cloro livre (HOCl) adicionar **umas pastilha UREA PRETREAT**.

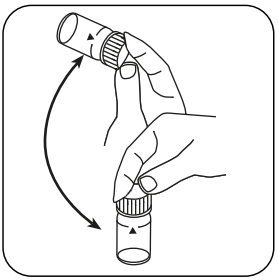


Esmagar a(s) pastilha(s) rodando ligeiramente.

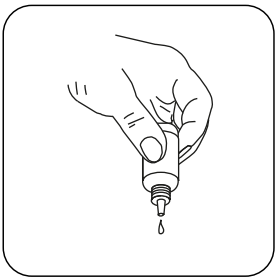


Fechar a(s) célula(s).

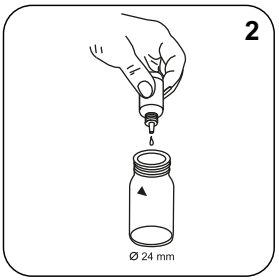
PT



Dissolver a(s) pastilha(s) girando.

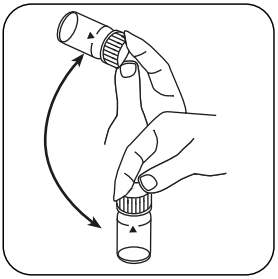


Manter os frascos conta gotas na vertical e pressionar lentamente para adicionar gotas de igual dimensão.

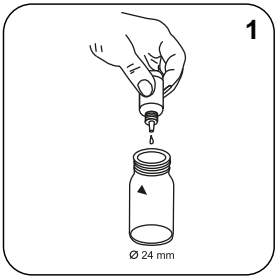


Adicionar **2 gotas Urea Reagenz 1**.

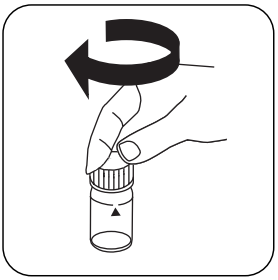
Fechar a(s) célula(s).



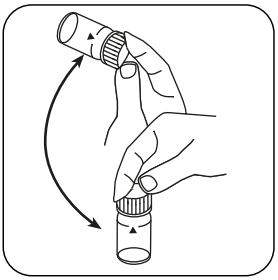
Misturar o conteúdo girando.



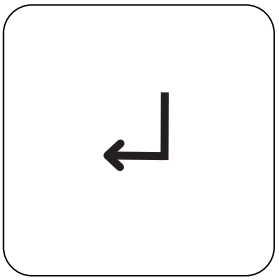
Adicionar **1 gotas Urea Reagenz 2**.



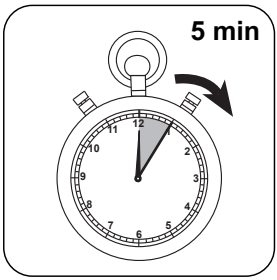
Fechar a(s) célula(s).



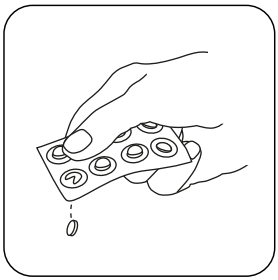
Misturar o conteúdo girando.



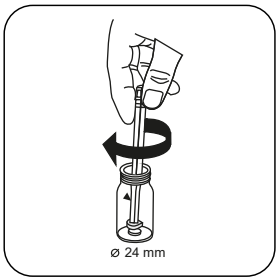
Premir a tecla **ENTER**.



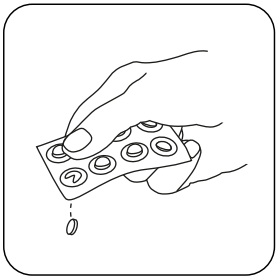
Aguardar **5 minuto(s) de tempo de reação**.



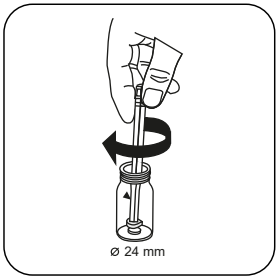
Pastilha AMMONIA No.1.



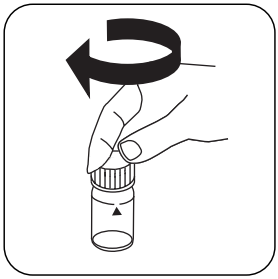
Esmagar a(s) pastilha(s) rodando ligeiramente.



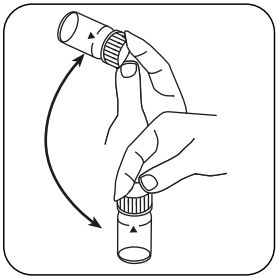
Pastilha AMMONIA No.2.



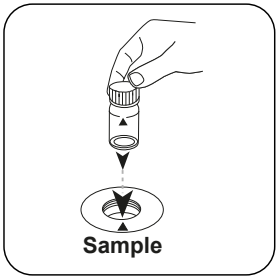
Esmagar a(s) pastilha(s) rodando ligeiramente.



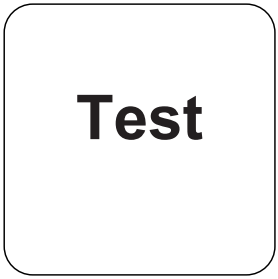
Fechar a(s) célula(s).



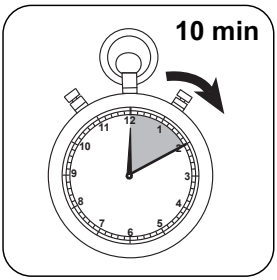
Dissolver a(s) pastilha(s) girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



Premir a tecla **TEST** (XD: **START**).



PT

Aguardar **10 minuto(s) de tempo de reação**.

Decorrido o tempo de reação, a medição é efetuada automaticamente.

No visor aparece o resultado em mg/L Uréia.

Método Químico

Indophenol / Urease

Apêndice

Texto de Interferências

Interferências Pesistentes

- Concentrações de ureia superiores a 2 mg/L podem causar resultados dentro da área de medição. Neste caso, deve diluir a amostra de água em água sem ureia e repetir a medição (teste de plausibilidade).

Interferências Removíveis

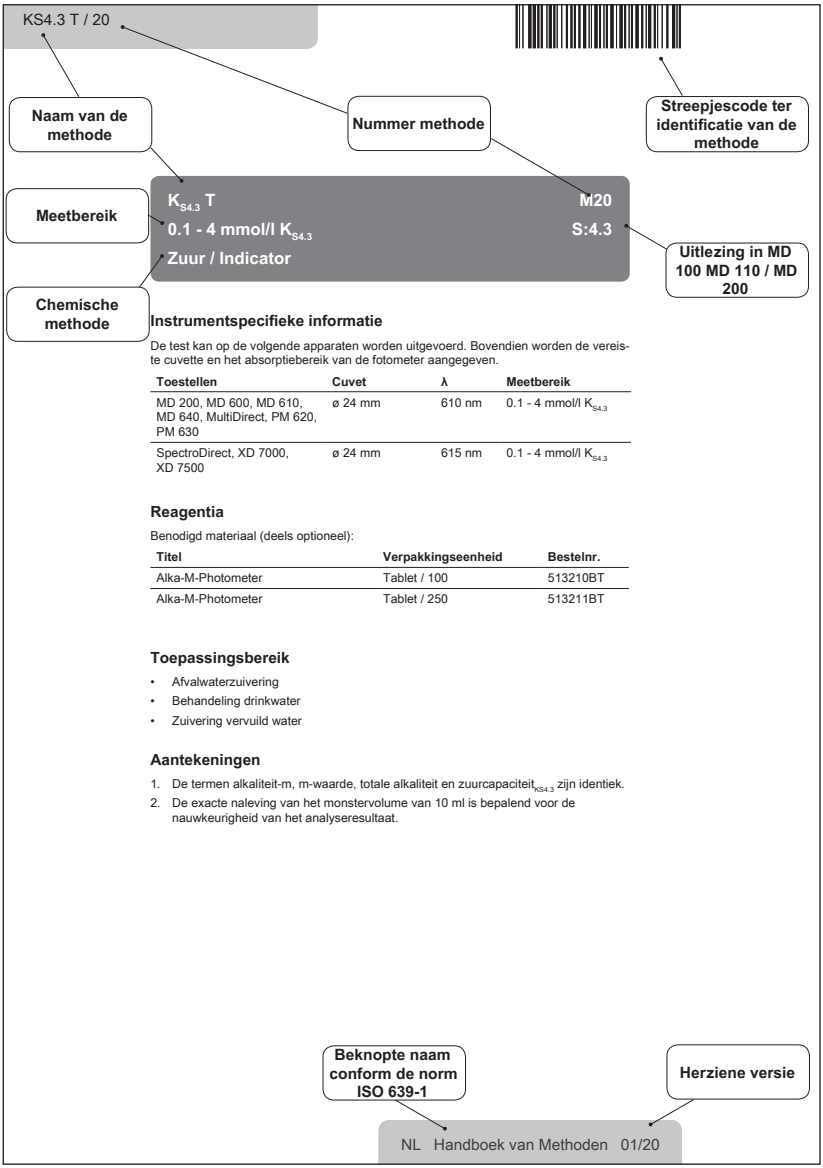
- Uma pastilha de UREA PRETREAT elimina a interferência do cloro livre até 2 mg/L (duas pastilhas até 4 mg/L, três pastilhas até 6 mg/L).

Interferências	a partir de / [mg/L]
Cl_2	2

Bibliografia

R.J. Creno, R.E. Wenk, P. Bohling, Automated Micromeasurement of Urea Using Urease and the Berthelot Reaction, American Journal of Clinical Pathology (1970), 54 (6), p. 828-832

[#]incluindo vareta de agitação


KS4.3 T / 20
Naam van de methode
Nummer methode
Streepjescode ter identificatie van de methode
Meetbereik
Chemische methode
Uitlezing in MD 100 MD 110 / MD 200
K S4.3 T
M20
0.1 - 4 mmol/l K S4.3
S:4.3
Zuur / Indicator
Instrumentspecifieke informatie
De test kan op de volgende apparaten worden uitgevoerd. Bovendien worden de vereiste cuvette en het absorptiebereik van de fotometer aangegeven.
Toestellen
Cuvet
λ
Meetbereik
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630
ø 24 mm
610 nm
0.1 - 4 mmol/l K S4.3
SpectroDirect, XD 7000, XD 7500
ø 24 mm
615 nm
0.1 - 4 mmol/l K S4.3
Reagentia
Benodigd materiaal (deels optioneel):
Titel
Verpakkingseenheid
Bestelnr.
Alka-M-Photometer
Tablet / 100
513210BT
Alka-M-Photometer
Tablet / 250
513211BT
Toepassingsbereik
• Afvalwaterzuivering
• Behandeling drinkwater
• Zuivering vervuild water
Aantekeningen
1. De termen alkaliteit-m, m-waarde, totale alkaliteit en zuurcapaciteit KS4.3 zijn identiek.
2. De exacte naleving van het monstervolume van 10 ml is bepalend voor de nauwkeurigheid van het analyseresultaat.
Beknopte naam conform de norm ISO 639-1
Herziene versie
NL Handboek van Methoden 01/20

Uitvoering van de meting

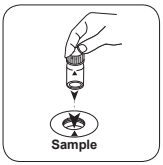
Uitvoering van de bepaling Zuurcapaciteit $K_{S4.3}$ met tablet

De methode in het apparaat selecteren.

Voor deze methode moet bij de volgende apparaten geen nulmeting worden uitgevoerd:
XD 7000, XD 7500

Spoelbakje van 24 mm met **10 ml staal** vullen.

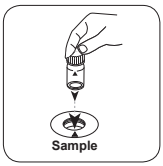
De spoelbakjes afsluiten.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

• • •

Tabletten oplossen door om te draaien



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

De toets **TEST** (XD: **START**) indrukken.

De display toont het resultaat als Zuurcapaciteit $K_{S4.3}$.

$K_{S4.3}$ T — M20

0.1 - 4 mmol/L $K_{S4.3}$ — S:4.3

Zuur / Indicator

NL

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
Alka-M-fotometer	Tablet / 100	513210BT
Alka-M-fotometer	Tablet / 250	513211BT

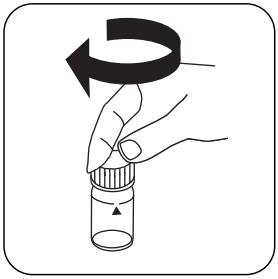
Aantekeningen

1. De termen alkaliteit-m, m-waarde, totale alkaliteit en zuurcapaciteit$_{KS4.3}$ zijn identiek.
2. De exacte naleving van het monstervolume van 10 ml is bepalend voor de nauwkeurigheid van het analyseresultaat.

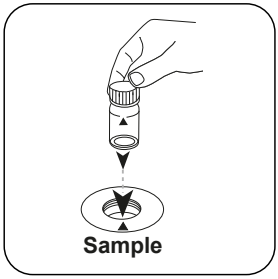
Uitvoering van de bepaling Zuurcapaciteit $K_{S4.3}$ met tablet

De methode in het apparaat selecteren.

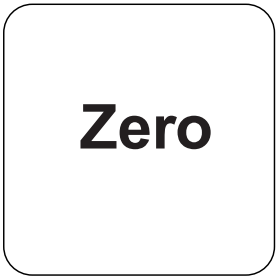
Spoelbakje van 24 mm met **10 mL staal** vullen.



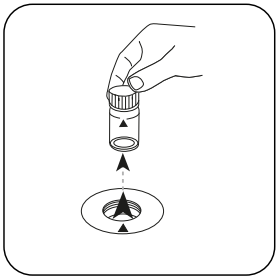
De spoelbakjes afsluiten.



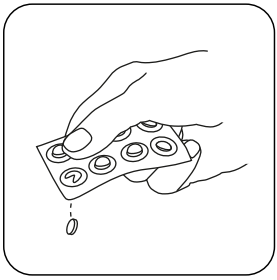
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



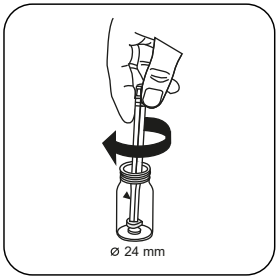
De toets **NUL** indrukken.



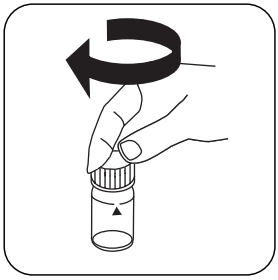
Het spoelbakje uit de meetschacht nemen.



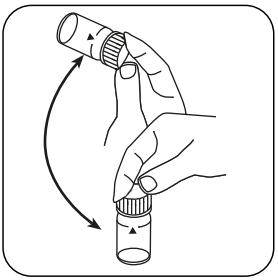
Een ALKA-M-FOTOMETER tablet toevoegen.



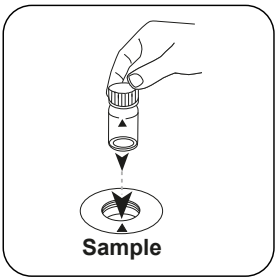
De tabletten onder lichte rotatie verpletteren.



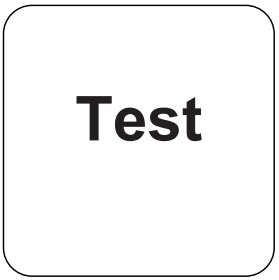
De spoelbakjes afsluiten.



Tabletten oplossen door om te draaien



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



De toets **TEST** (XD: **START**) indrukken.

De display toont het resultaat als Zuurcapaciteit $K_{S4.3}$.

Chemische methode

Zuur / Indicator

Aanhangsel

Afgeleid van

DIN 38409 - H 7-2

Chloor T M100

0.01 - 6.0 mg/L Cl_2 [a] CL6

DPD

NL

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
DPD Nr.1	Tablet / 100	511050BT
DPD Nr. 1	Tablet / 250	511051BT
DPD Nr. 1	Tablet / 500	511052BT
DPD Nr. 3	Tablet / 100	511080BT
DPD Nr. 3	Tablet / 250	511081BT
DPD Nr. 3	Tablet / 500	511082BT
DPD Nr. 1 hoog calcium [e]	Tablet / 100	515740BT
DPD Nr. 1 hoog calcium [e]	Tablet / 250	515741BT
DPD Nr. 1 hoog calcium [e]	Tablet / 500	515742BT
DPD Nr. 3 hoog calcium [e]	Tablet / 100	515730BT
DPD Nr. 3 hoog calcium [e]	Tablet / 250	515731BT
DPD Nr. 3 hoog calcium [e]	Tablet / 500	515732BT
DPD Nr. 4	Tablet / 100	511220BT
DPD Nr. 4	Tablet / 250	511221BT
DPD Nr. 4	Tablet / 500	511222BT
DPD No. 3 Evo	Tablet / 100	511420BT
DPD No. 3 Evo	Tablet / 250	511421BT
DPD No. 3 Evo	Tablet / 500	511422BT
DPD Nr.4 Evo	Tablet / 100	511970BT
DPD Nr. 4 Evo	Tablet / 250	511971BT
DPD Nr. 4 Evo	Tablet / 500	511972BT

Beschikbare standaarden

Omschrijving	Verpakkingseenheid	Bestelnr.
ValidCheck Chloor 1,5 mg/l	1 St.	48105510

Bemonstering

1. Tijdens de monstervoorbereiding moet worden vermeden dat het chloor wordt uitgestoten, bijvoorbeeld door pipetteren en schudden.
2. De analyse moet onmiddellijk na de bemonstering worden uitgevoerd.

Voorbereiding

1. Het schoonmaken van de spoelbakjes:
   Aangezien veel huishoudelijke reinigingsmiddelen (bijv. afwasmiddelen) minder schadelijke stoffen bevatten, kan de bepaling van chloor leiden tot minder goede resultaten. Om deze meetfout uit te sluiten, moeten de glasapparaten chloorvrij zijn. Hiertoe wordt het glaswerk gedurende één uur onder natriumhypochlorietoplossing (0,1 g/L) bewaard en vervolgens grondig gespoeld met gedeïoniseerd water.
2. Voor de individuele bepaling van vrij chloor en totaal chloor is het zinvol om een aparte set spoelbakjes te gebruiken (zie EN ISO 7393-2, paragraaf 5.3).
3. De DPD-kleurontwikkeling vindt plaats bij een pH-waarde van 6,2 tot 6,5. De reagentia bevatten daarom een buffer voor de aanpassing van de pH-waarde. Sterk alkalisch of zuur water moet echter vóór de analyse in een pH-gebied tussen 6 en 7 (met 0,5 mol/L-zwavelzuur of 1 mol/L-natriumhydroxideoplossing) worden geplaatst.

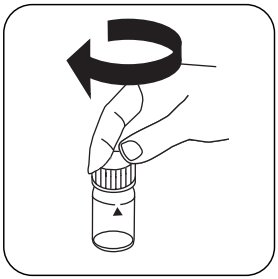
Aantekeningen

1. Evo-tabletten kunnen worden gebruikt als alternatief voor de overeenkomstige standaardtabletten (bv. DPD nr. 3 Evo in plaats van DPD nr. 3).

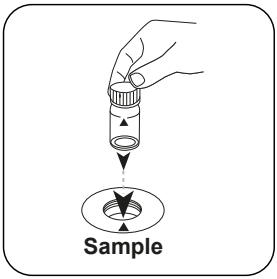
Uitvoering van de bepaling vrij chloor met tablet

De methode in het apparaat selecteren.

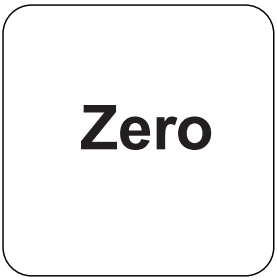
Spoelbakje van 24 mm met **10 mL staal** vullen.



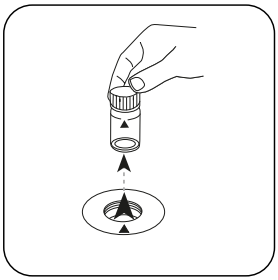
De spoelbakjes afsluiten.



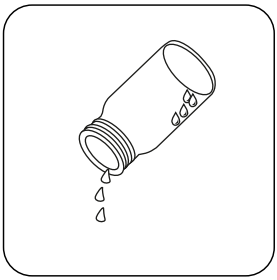
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



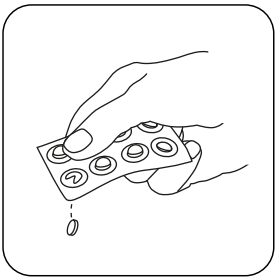
De toets **NUL** indrukken.



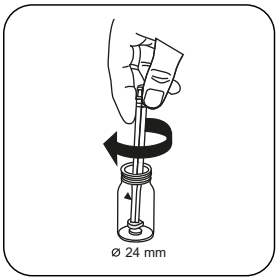
Het spoelbakje uit de meetschacht nemen.



Het spoelbakje tot op enkele druppels ledigen.

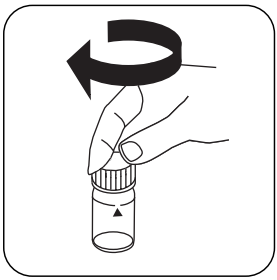


Een DPD Nr. 1 tablet toevoegen.

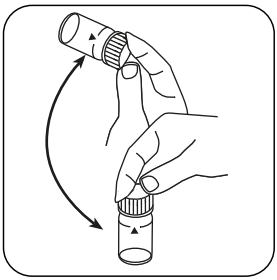


De tabletten onder lichte rotatie verpletteren.

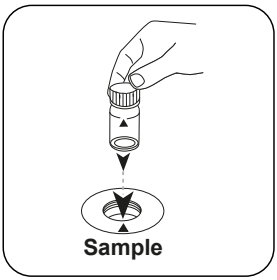
Het spoelbakje tot aan de **markering van 10 mL** met het **staal** vullen.



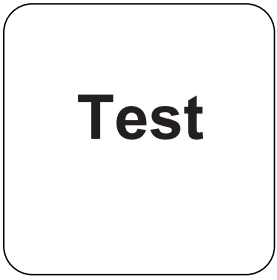
De spoelbakjes afsluiten.



Tabletten oplossen door om te draaien



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



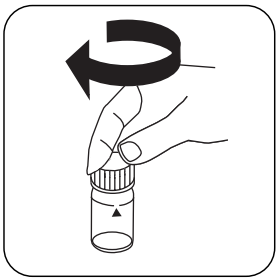
De toets **TEST** (XD: **START**) indrukken.

De display toont het resultaat in mg/L vrij chloor.

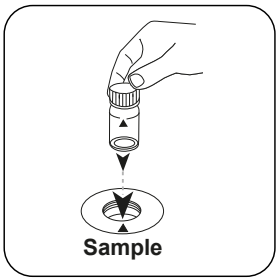
Uitvoering van de bepaling totaal chloor met tablet

De methode in het apparaat selecteren.

Spoelbakje van 24 mm met **10 mL staal** vullen.

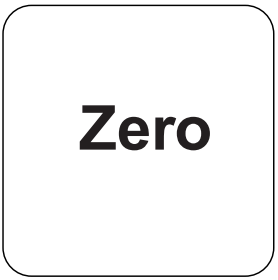


De spoelbakjes afsluiten.

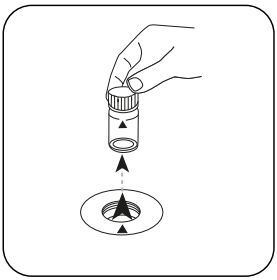


Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

NL

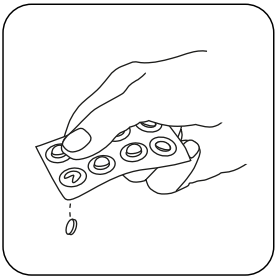


De toets **NUL** indrukken.

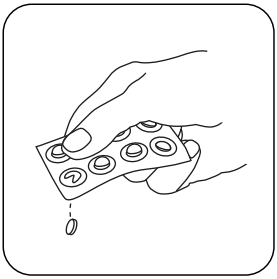


Het spoelbakje uit de meetschacht nemen.

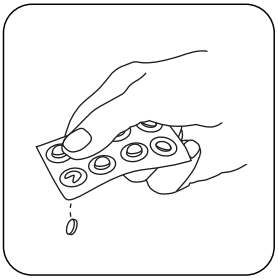
Het spoelbakje tot op enkele druppels ledigen.



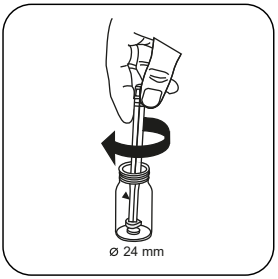
Een DPD Nr. 1 tablet toevoegen.



Een DPD Nr. 3 tablet toevoegen.

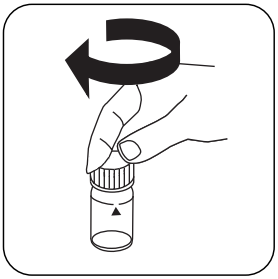


Als alternatief voor DPD nr. 1 en nr. 3 tabletten kan 1 DPD nr. 4 tablet worden toegevoegd.

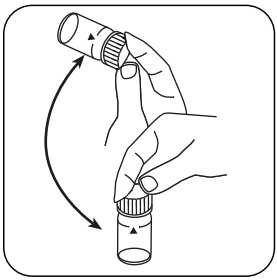


De tabletten onder lichte rotatie verpletteren.

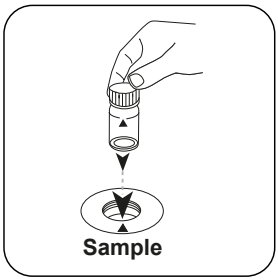
Het spoelbakje tot aan de **markering van 10 mL** met het **staal** vullen.



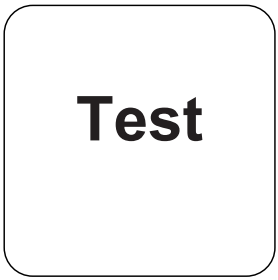
De spoelbakjes afsluiten.



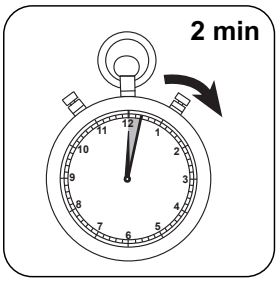
Tabletten oplossen door om te draaien



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



De toets **TEST** (XD: **START**) indrukken.



De reactietijd van 2 minuten afwachten.

Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

De display toont het resultaat in mg/L Totaal chloor.

Chemische methode

DPD

Aanhangsel

NL

Verstoringen

Permanente verstoringen

- Alle oxidatiemiddelen in de monsters reageren als chloor, wat tot extra resultaten leidt.

Uit te sluiten verstoringen

- Storingen veroorzaakt door koper en ijzer(III) worden door EDTA geëlimineerd.
- Bij monsters met een hoog calciumgehalte* en/of een hoge geleidbaarheid* kan het gebruik van reagenstabletten leiden tot vertroebeling van het monster en de daarmee samenhangende onjuiste meting. In dit geval zijn de reagenstabletten DPD-nr. 1 High Calcium en het reagenstablet DPD-nr. 3 High Calcium te gebruiken.
  *exacte waarden kunnen niet worden gegeven omdat de troebelheidsvorming afhankelijk is van de aard en samenstelling van het monsterwater.
- Concentraties van meer dan 10 mg/L chloor, bij gebruik van tabletten, kunnen leiden tot resultaten binnen het meetbereik tot 0 mg/L. Als de chloorconcentratie te hoog is, moet het monster worden verdund met chloorvrij water. Voeg reagens toe aan 10 mL van het verdunde monster en herhaal de meting (plausibiliteitstest).

Verstoringen	verstoort vanaf
CrO_4^{2-}	0.01
MnO_2	0.01

Validatie van de methodes

Aantoonbaarheidsgrens	0.02 mg/L
Bepaalbaarheidsgrens	0.06 mg/L
Einde meetbereik	6 mg/L
Gevoeligheid	2.05 mg/L / Abs
Betrouwbaarheidsgrenzen	0.04 mg/L
Standaardafwijking procedure	0.019 mg/L
Variatiecoefficient procedure	0.87 %

Conform

EN ISO 7393-2

[a)] bepaling van de vrije, gebonden, totaal mogelijke | [e)] hulpreagens, alternatief voor DPD-nr. 1 / nr. 3 in geval van troebelheid van het monster als gevolg van een hoog calciumionengehalte en/of een hoge geleidbaarheid

Chloor L M101

0.02 - 4.0 mg/L Cl_2 [a] CL6

DPD

NL

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
DPD 1 bufferoplossing, blauw flesje	15 mL	471010
DPD 1-bufferoplossing	100 mL	471011
DPD 1 bufferoplossing in verpakking van 6 stuks	1 St.	471016
DPD 1 reagensoplossing, groen flesje	15 mL	471020
DPD 1-reagensoplossing	100 mL	471021
DPD 1 reagensoplossing in verpakking van 6 stuks	1 St.	471026
DPD 3 oplossing, rood flesje	15 mL	471030
DPD 3 oplossing	100 mL	471031
DPD 3 oplossing in verpakking van 6 stuks	1 St.	471036
DPD reagentia set	1 St.	471056

Beschikbare standaarden

Omschrijving	Verpakkingseenheid	Bestelnr.
ValidCheck Chloor 1,5 mg/l	1 St.	48105510

Bemonstering

1. Tijdens de monstervoorbereiding moet worden vermeden dat het chloor wordt uitgestoten, bijvoorbeeld door pipetteren en schudden.
2. De analyse moet onmiddellijk na de bemonstering worden uitgevoerd.

Voorbereiding

1. Het schoonmaken van de spoelbakjes:
   Aangezien veel huishoudelijke reinigingsmiddelen (bijv. afwasmiddelen) minder schadelijke stoffen bevatten, kan de bepaling van chloor leiden tot minder goede resultaten. Om deze meetfout uit te sluiten, moeten de glasapparaten chloorvrij zijn. Hiertoe wordt het glaswerk gedurende één uur onder natriumhypochlorietoplossing (0,1 g/L) bewaard en vervolgens grondig gespoeld met gedeïoniseerd water.
2. Voor de individuele bepaling van vrij chloor en totaal chloor is het zinvol om een aparte set spoelbakjes te gebruiken (zie EN ISO 7393-2, paragraaf 5.3).
3. De DPD-kleurontwikkeling vindt plaats bij een pH-waarde van 6,2 tot 6,5. De reagentia bevatten daarom een buffer voor de aanpassing van de pH-waarde. Sterk alkalisch of zuur water moet echter vóór de analyse in een pH-gebied tussen 6 en 7 (met 0,5 mol/l-zwavelzuur of 1 mol/l-natriumhydroxideoplossing) worden geplaatst.

Aantekeningen

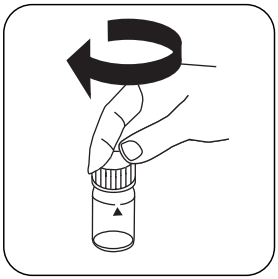
1. Na gebruik moeten de druppelflacons onmiddellijk worden gesloten met de schroefdop van dezelfde kleur.
2. Bewaar het reagens ingesteld op +6 °C tot +10 °C op een koele plaats.

NL

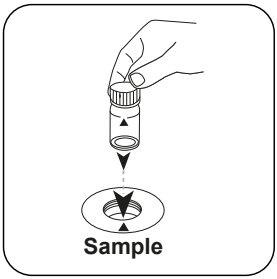
Uitvoering van de bepaling vrij chloor met vloeibaar reagens

De methode in het apparaat selecteren.

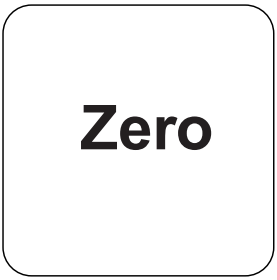
Spoelbakje van 24 mm met **10 mL staal** vullen.



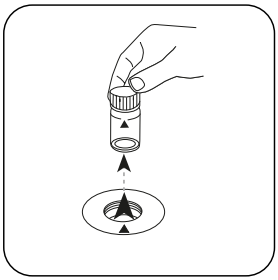
De spoelbakjes afsluiten.



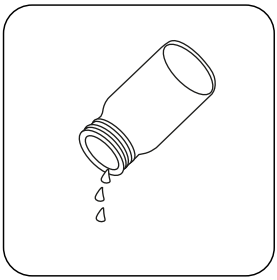
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



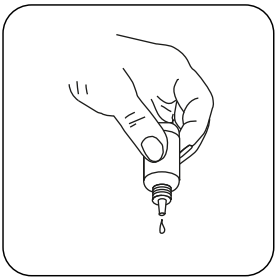
De toets **NUL** indrukken.



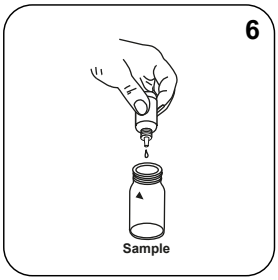
Het spoelbakje uit de meetschacht nemen.



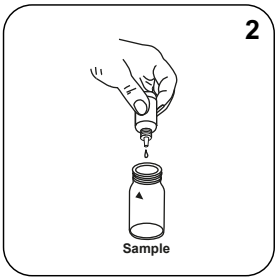
Het spoelbakje ledigen.



De druppelflessen verticaal houden en even grote druppels toevoegen door langzaam te drukken.

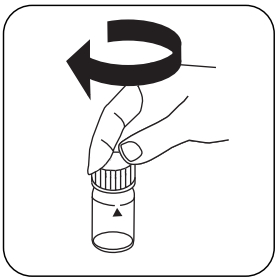


6 druppels DPD
1 bufferoplossing in het staalspoelbakje doen.

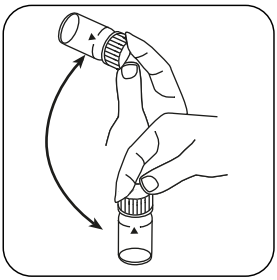


2 druppels DPD
1 reagensoplossing in het staalspoelbakje doen.

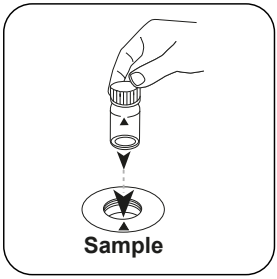
Het spoelbakje tot aan de **markering van 10 mL** met het **staal** vullen.



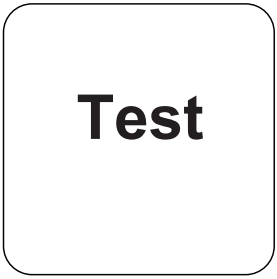
De spoelbakjes afsluiten.



De inhoud mengen door om te draaien.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



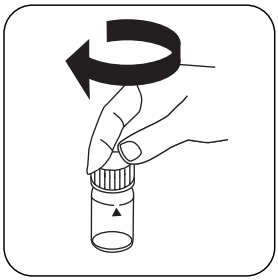
De toets **TEST** (XD: **START**) indrukken.

De display toont het resultaat in mg/L vrij chloor.

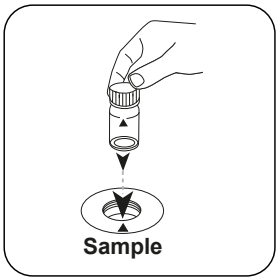
Uitvoering van de bepaling totaal chloor met vloeibaar reagens

De methode in het apparaat selecteren.

Spoelbakje van 24 mm met **10 mL staal** vullen.

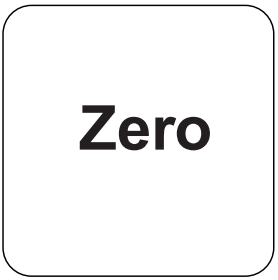


De spoelbakjes afsluiten.

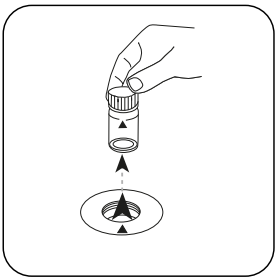


Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

NL

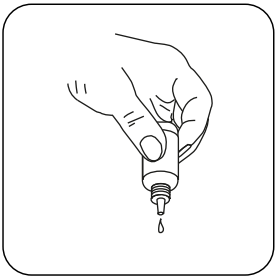


De toets **NUL** indrukken.

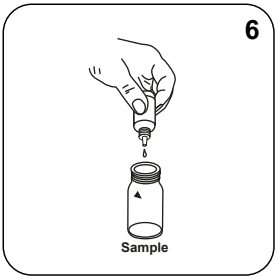


Het spoelbakje uit de meetschacht nemen.

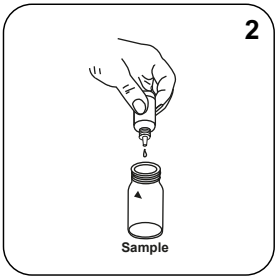
Het spoelbakje ledigen.



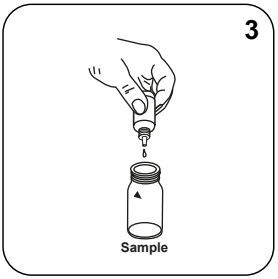
De druppelflessen verticaal houden en even grote druppels toevoegen door langzaam te drukken.



6 druppels DPD
1 bufferoplossing in het staalspoelbakje doen.

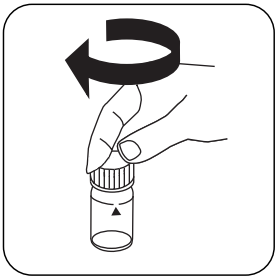


2 druppels DPD
1 reagensoplossing in het staalspoelbakje doen.

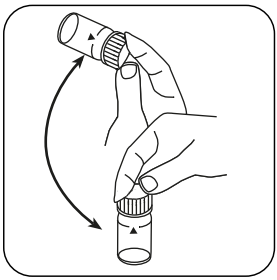


3 druppels DPD
3 oplossing in het staalspoelbakje doen.

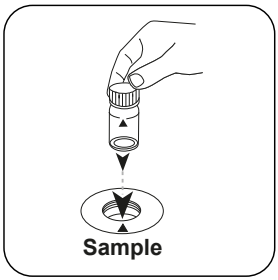
Het spoelbakje tot aan de **markering van 10 mL** met het **staal** vullen.



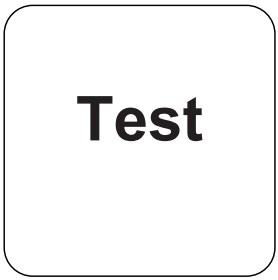
De spoelbakjes afsluiten.



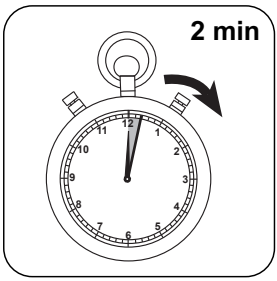
De inhoud mengen door om te draaien.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



De toets **TEST** (XD: **START**) indrukken.



De reactietijd van 2 minuten afwachten.

Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

De display toont het resultaat in mg/L Totaal chloor.

Chemische methode

DPD

Aanhangsel

NL

Verstoringen

Permanente verstoringen

- Alle oxidatiemiddelen in de monsters reageren als chloor, wat tot extra resultaten leidt.

Uit te sluiten verstoringen

- Storingen veroorzaakt door koper en ijzer(III) worden door EDTA geëlimineerd.
- Concentraties van meer dan 4 mg/L chloor, bij gebruik van vloeibare reagentia, kunnen leiden tot resultaten binnen het meetbereik tot 0 mg/L. In dit geval moet het monster worden verdund met chloorvrij water. Voeg reagens toe aan 10 ml van het verdunde monster en herhaal de meting (plausibiliteitstest).

Verstoringen	verstoort vanaf
CrO_4^{2-}	0,01
MnO_2	0,01

Conform

EN ISO 7393-2

[a] bepaling van de vrije, gebonden, totaal mogelijke

Chloor HR T M103

0.1 - 10 mg/L Cl_2 [a] CL10

DPD

NL

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
DPD Nr. 1 HR	Tablet / 100	511500BT
DPD Nr. 1 HR	Tablet / 250	511501BT
DPD Nr. 1 HR	Tablet / 500	511502BT
DPD Nr.3 HR Evo	Tablet / 100	511920BT
DPD Nr. 3 HR Evo	Tablet / 250	511921BT
DPD Nr. 3 HR Evo	Tablet / 500	511922BT
DPD Nr. 3 HR	Tablet / 100	511590BT
DPD Nr. 3 HR	Tablet / 250	511591BT
DPD Nr. 3 HR	Tablet / 500	511592BT
Set DPD nr. 1 HR/nr. 3 HR [#]	per 100	517791BT
Set DPD nr. 1 HR/nr. 3 HR [#]	per 250	517792BT
DPD Nr. 1 hoog calcium [e)]	Tablet / 100	515740BT
DPD Nr. 1 hoog calcium [e)]	Tablet / 250	515741BT
DPD Nr. 1 hoog calcium [e)]	Tablet / 500	515742BT
DPD Nr. 3 hoog calcium [e)]	Tablet / 100	515730BT
DPD Nr. 3 hoog calcium [e)]	Tablet / 250	515731BT
DPD Nr. 3 hoog calcium [e)]	Tablet / 500	515732BT

Bemonstering

1. Tijdens de monstervoorbereiding moet worden vermeden dat het chloor wordt uitgestoten, bijvoorbeeld door pipetteren en schudden.
2. De analyse moet onmiddellijk na de bemonstering worden uitgevoerd.

Voorbereiding

1. Het schoonmaken van de spoelbakjes:
   Aangezien veel huishoudelijke reinigingsmiddelen (bijv. afwasmiddelen) minder schadelijke stoffen bevatten, kan de bepaling van chloor leiden tot minder goede resultaten. Om deze meetfout uit te sluiten, moeten de glasapparaten chloorvrij zijn. Hiertoe wordt het glaswerk gedurende één uur onder natriumhypochlorietoplossing (0,1 g/L) bewaard en vervolgens grondig gespoeld met gedeïoniseerd water.
2. Voor de individuele bepaling van vrij chloor en totaal chloor is het zinvol om een aparte set spoelbakjes te gebruiken (zie EN ISO 7393-2, paragraaf 5.3).
3. De DPD-kleurontwikkeling vindt plaats bij een pH-waarde van 6,2 tot 6,5. De reagentia bevatten daarom een buffer voor de aanpassing van de pH-waarde. Sterk alkalisch of zuur water moet echter vóór de analyse in een pH-gebied tussen 6 en 7 (met 0,5 mol/L-zwavelzuur of 1 mol/L-natriumhydroxideoplossing) worden geplaatst.

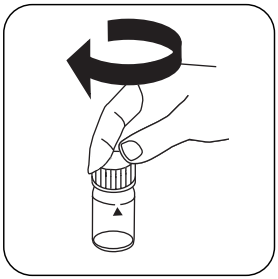
Aantekeningen

1. Evo-tabletten kunnen worden gebruikt als alternatief voor de overeenkomstige standaardtabletten (bv. DPD nr. 3 Evo in plaats van DPD nr. 3).

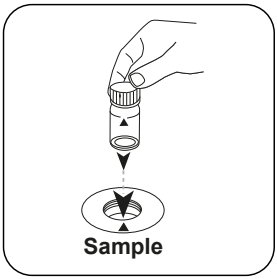
Uitvoering van de bepaling vrij chloor HR met tablet

De methode in het apparaat selecteren.

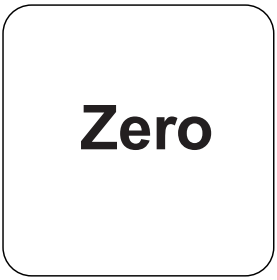
Spoelbakje van 24 mm met **10 mL staal** vullen.



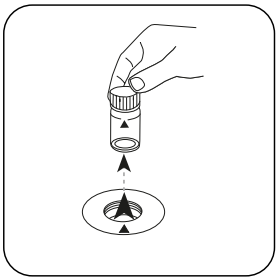
De spoelbakjes afsluiten.



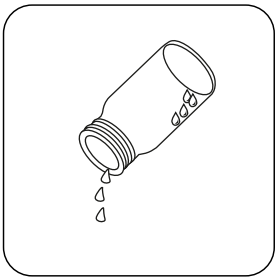
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



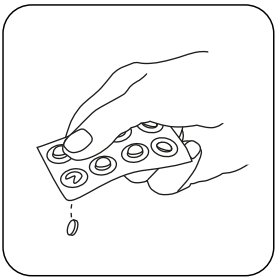
De toets **NUL** indrukken.



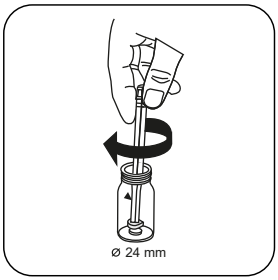
Het spoelbakje uit de meetschacht nemen.



Het spoelbakje tot op enkele druppels ledigen.

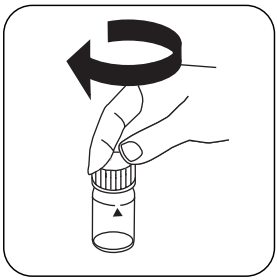


Een DPD Nr. 1 HR tablet toevoegen.

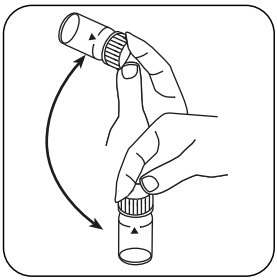


De tabletten onder lichte rotatie verpletteren.

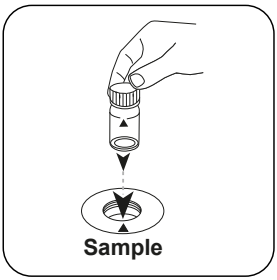
Het spoelbakje tot aan de **markering van 10 mL** met het **staal** vullen.



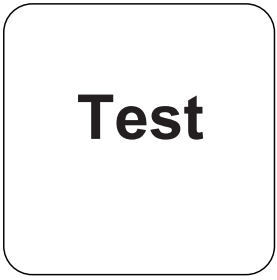
De spoelbakjes afsluiten.



Tabletten oplossen door om te draaien



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



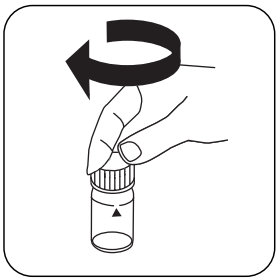
De toets **TEST** (XD: **START**) indrukken.

De display toont het resultaat in mg/L vrij chloor.

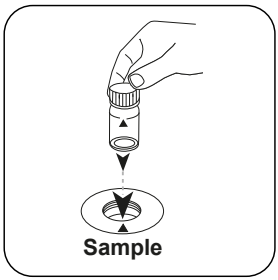
Uitvoering van de bepaling totaal chloor HR met tablet

De methode in het apparaat selecteren.

Spoelbakje van 24 mm met **10 mL staal** vullen.

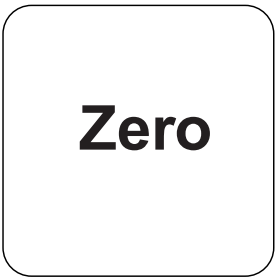


De spoelbakjes afsluiten.

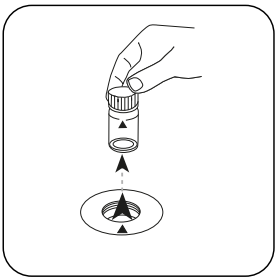


Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

NL

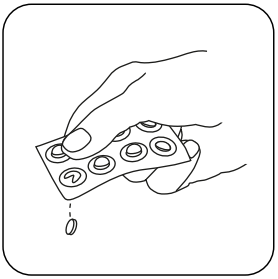


De toets **NUL** indrukken.

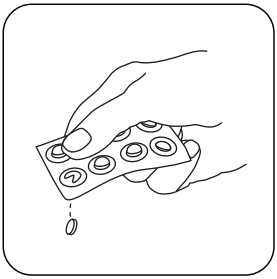


Het spoelbakje uit de meetschacht nemen.

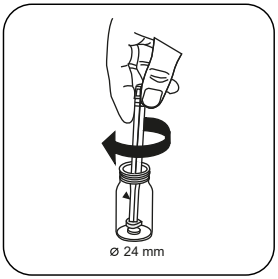
Het spoelbakje tot op enkele druppels ledigen.



Een DPD Nr. 1 HR tablet toevoegen.

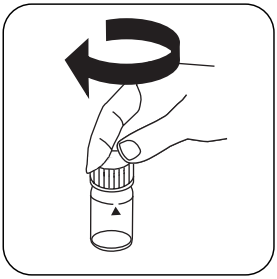


Een DPD Nr. 3 HR tablet toevoegen.

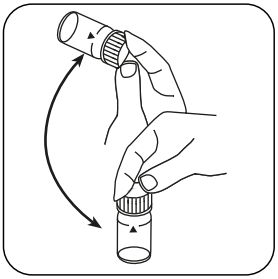


De tabletten onder lichte rotatie verpletteren.

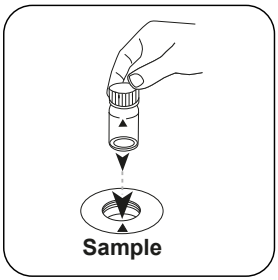
Het spoelbakje tot aan de **markering van 10 mL** met het **staal** vullen.



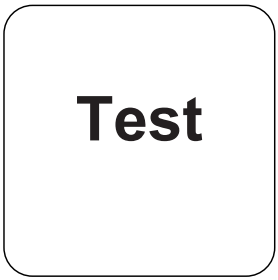
De spoelbakjes afsluiten.



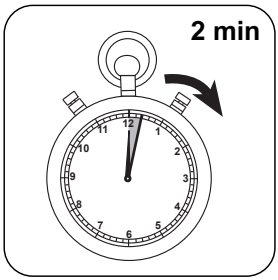
Tabletten oplossen door om te draaien



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



De toets **TEST** (XD: **START**) indrukken.



De reactietijd van 2 minuten afwachten.

Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

De display toont het resultaat in mg/L Totaal chloor.

Chemische methode

DPD

Aanhangsel

NL

Verstoringen

Permanente verstoringen

- Alle oxidatiemiddelen in de monsters reageren als chloor, wat tot extra resultaten leidt.

Uit te sluiten verstoringen

- Storingen veroorzaakt door koper en ijzer(III) worden door EDTA geëlimineerd.
- Als de reagenstabletten worden gebruikt voor monsters met een hoog calciumgehalte* en/of een hoge geleidbaarheid*, kan het monster troebel worden en kan de meting onjuist zijn. In dit geval is het DPD-nummer een alternatief. 1 High Calcium en het reagenstablet DPD-nr. 3 High Calcium te gebruiken.
  *exacte waarden kunnen niet worden gegeven omdat de troebelheidsvorming afhankelijk is van de aard en samenstelling van het monsterwater.

Conform

EN ISO 7393-2

[a)] bepaling van de vrije, gebonden, totaal mogelijke | [e)] hulpreagens, alternatief voor DPD-nr. 1 / nr. 3 in geval van troebelheid van het monster als gevolg van een hoog calciumionengehalte en/of een hoge geleidbaarheid | [#] met inbegrip van de mengstaaf

pH-waarde T M330

6.5 - 8.4 pH PH

Fenolrood

NL

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
Fenolrood fotometer	Tablet / 100	511770BT
Fenolrood fotometer	Tablet / 250	511771BT
Fenolrood fotometer	Tablet / 500	511772BT

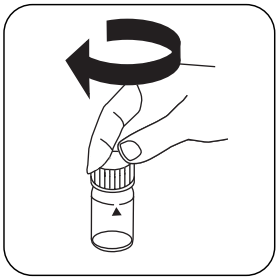
Aantekeningen

1. Voor de fotometrische pH-bepaling mogen alleen PHENOL RED-tabletten met een zwarte foliedruk en de term PHOTOMETER worden gebruikt.

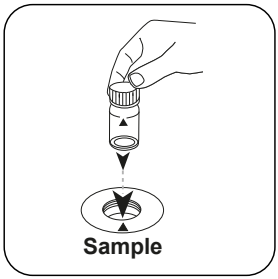
Uitvoering van de bepaling pH-waarde met tablet

De methode in het apparaat selecteren.

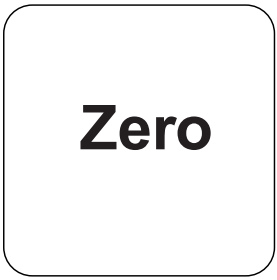
Spoelbakje van 24 mm met **10 mL staal** vullen.



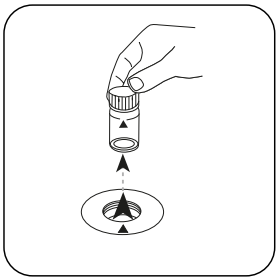
De spoelbakjes afsluiten.



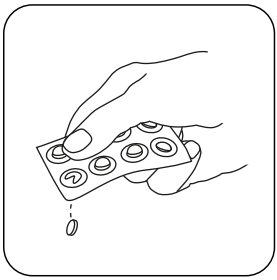
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



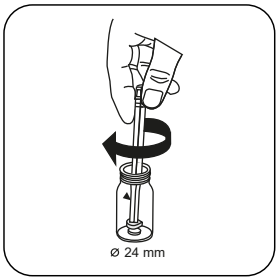
De toets **NUL** indrukken.



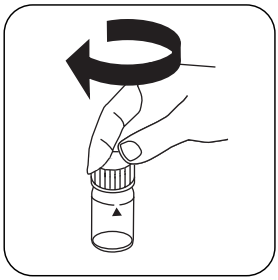
Het spoelbakje uit de meetschacht nemen.



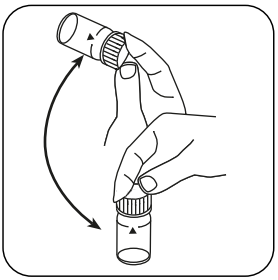
Een FENOLROOD FOTOMETER tablet toevoegen.



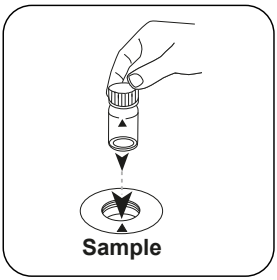
De tabletten onder lichte rotatie verpletteren.



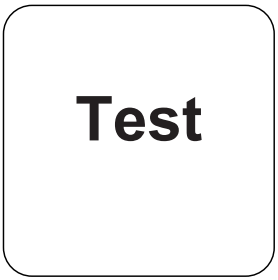
De spoelbakjes afsluiten.



Tabletten oplossen door om te draaien



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



De toets **TEST** (XD: **START**) indrukken.

De display toont het resultaat als pH-waarde.

Chemische methode

Fenolrood

Aanhangsel

Verstoringen

Permanente verstoringen

1. Watermonsters met een lage carbonaathardheid* kunnen leiden tot onjuiste pH-waarden.
   $*_{KS4,3}$ < 0,7 mmol/l ≙ Totale alkaliteit < 35 mg/L $CaCO_3$.

Uit te sluiten verstoringen

1. pH-waarden onder 6,5 en boven 8,4 kunnen leiden tot resultaten binnen het meetbereik. Een plausibiliteitstest (pH-meter) wordt aanbevolen.
2. Zoutgebrek:
   Voor zoutgehalten tot 2 g/L kan geen significante zoutfout worden verwacht als gevolg van het zoutgehalte van het reagenstablet. Indien het zoutgehalte hoger is, worden de gemeten waarden als volgt gecorrigeerd:

zoutgehalte van het monster (in g/L)	30 (zeewater)	60	120	180
Correctie	-0,15[1)]	-0,21[2)]	-0,26[2)]	-0,29[2)]

[1)] na Kolthoff (1922)
[2)] na Parson en Douglas (1926)

Literatuurverwijzing

Colorimetric Chemical Analytical Methods, 9th Edition, London

pH-waarde L M331

6.5 - 8.4 pH PH

Fenolrood

NL

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
Fenolrood oplossing	15 mL	471040
Fenolrood oplossing	100 mL	471041
Fenolrood oplossing in verpakking van 6 stuks	1 St.	471046

Voorbereiding

1. Door de verschillende druppelgroottes kan het meetresultaat grotere afwijkingen vertonen dan bij gebruik van tabletten.
   Bij gebruik van een pipet (0,18 ml komt overeen met 6 druppels) kan deze afwijking worden geminimaliseerd.

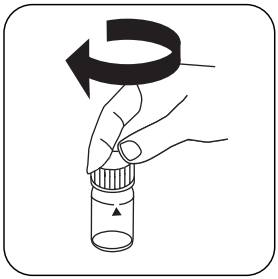
Aantekeningen

1. Na gebruik moet de druppelfles meteen onmiddellijk worden gesloten met de schroefdop van dezelfde kleur.
2. Bewaar het reagens bij +6 °C tot +10 °C op een koele plaats.

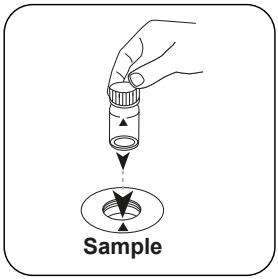
Uitvoering van de bepaling pH-waarde met vloeibaar reagens

De methode in het apparaat selecteren.

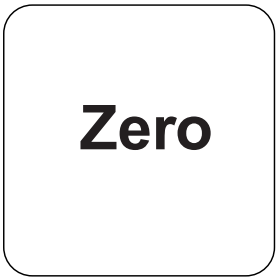
Spoelbakje van 24 mm met **10 mL staal** vullen.



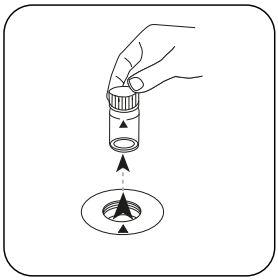
De spoelbakjes afsluiten.



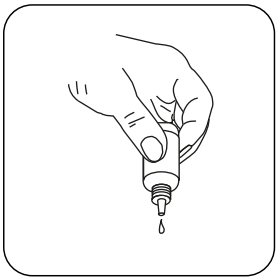
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



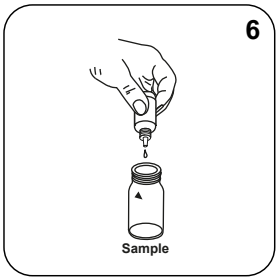
De toets **NUL** indrukken.



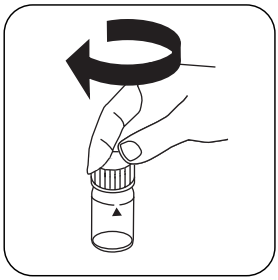
Het spoelbakje uit de meetschacht nemen.



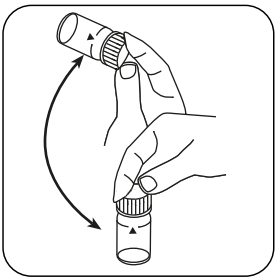
De druppelflessen verticaal houden en even grote druppels toevoegen door langzaam te drukken.



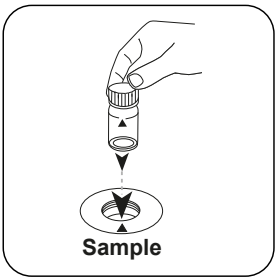
6 druppels FENOLROOD-oplossing in het staalspoelbakje doen.



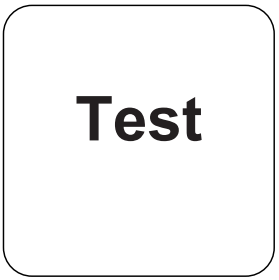
De spoelbakjes afsluiten.



De inhoud mengen door om te draaien.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



De toets **TEST** (XD: **START**) indrukken.

De display toont het resultaat als pH-waarde.

Chemische methode

Fenolrood

Aanhangsel

Verstoringen

Uit te sluiten verstoringen

1. Zoutgebrek: correctie van de gemeten waarde (gemiddelde waarden) voor monsters met een zoutgehalte van:

2.

Zoutgehalte van het monster	Correctie
30 g/L (zeewater)	-0,15[1)]
60 g/L	-0,21[2)]
120 g/L	-0,26[2)]
180 g/L	-0,29[2)]
[1)] na Kolthoff (1922)	[2)] na Parson en Douglas (1926)

3. Bij het testen van gechloreerd water kan het aanwezige chloorgehalte de kleurreactie van het vloeibare reagens beïnvloeden. Dit wordt voorkomen door een klein kristal natriumthiosulfaat ($Na_2S_2O_3$ 5 H_2O) aan de monsteroplossing toe te voegen voordat de PHENOL RED-oplossing wordt toegevoegd.

Literatuurverwijzing

Colorimetric Chemical Analytical Methods, 9th Edition, London

Ureum T M390

0.1 - 2.5 mg/L Urea Ur1

Indofenol / Urease

NL

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
UREUM reagens 1	15 mL	459300
UREUM reagens 2	10 mL	459400
Ammonia Nr. 1	Tablet / 100	512580BT
Ammonia Nr. 1	Tablet / 250	512581BT
Ammonia Nr. 2	Tablet / 100	512590BT
Ammonia Nr. 2	Tablet / 250	512591BT
Set ammonia nr. 1/Nr. 2#	per 100	517611BT
Set ammonia nr. 1/Nr. 2#	per 250	517612BT
Ammonium conditioneringspoeder	Poeder / 26 g	460170
Urea Pretreat (compenseert de interferentie van vrij chloor tot 2 mg / l)	Tablet / 100	516110BT
UREA reagentia set	1 Zin	517800BT

Voorbereiding

1. De bemonsteringstemperatuur moet tussen 20 en 30 °C liggen.
2. Voer de analyse uiterlijk één uur na de bemonstering uit.
3. Bij de analyse van zeewatermonsters moet voor toediening van het ammoniak-nr. 1 tablet, twee maatlepels ammoniumconditioneringspoeder aan het monster worden toegevoegd en door roteren opgelost.

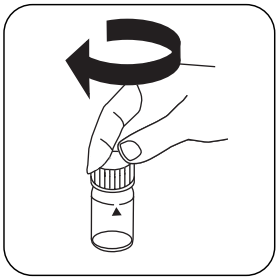
Aantekeningen

1. Het AMMONIA-nr. 1 tablet lost pas volledig op na toevoeging van AMMONIA-nr. 2 tablet.
2. Ammonium en chlooraminen zijn inbegrepen in de bepaling van ureum.

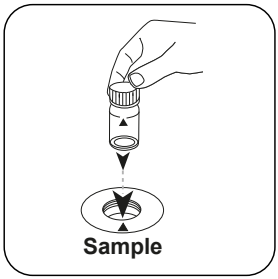
Uitvoering van de bepaling Ureum met tablet en vloeibaar reagens

De methode in het apparaat selecteren.

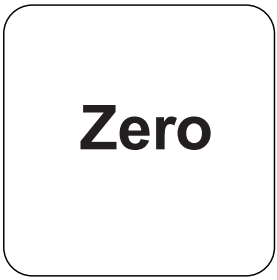
Spoelbakje van 24 mm met **10 mL staal** vullen.



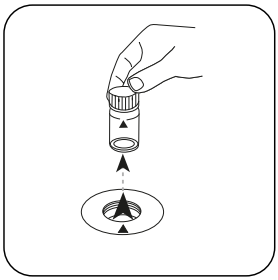
De spoelbakjes afsluiten.



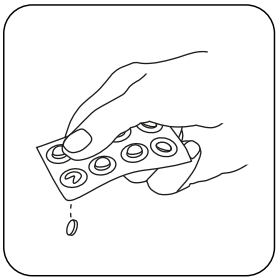
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



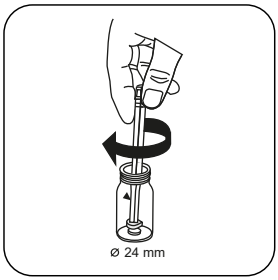
De toets **NUL** indrukken.



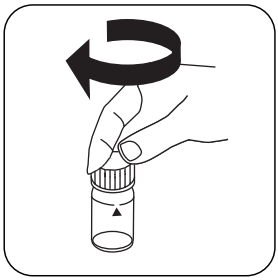
Het spoelbakje uit de meetschacht nemen.



Bij de aanwezigheid van vrij chloor (HOCl) **een UREA PRETREATtablet** toevoegen.

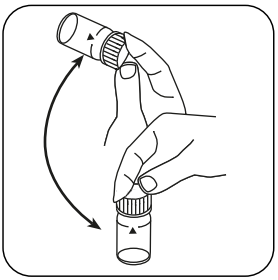


De tabletten onder lichte rotatie verpletteren.

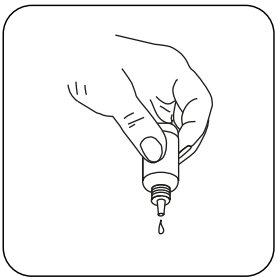


De spoelbakjes afsluiten.

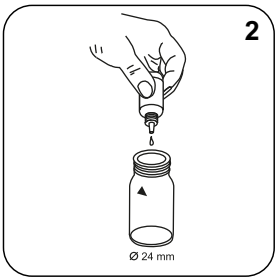
NL



Tabletten oplossen door om te draaien

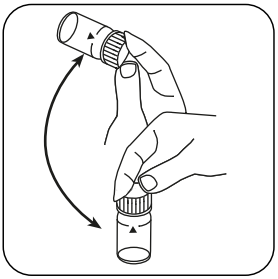


De druppelflessen verticaal houden en even grote druppels toevoegen door langzaam te drukken.

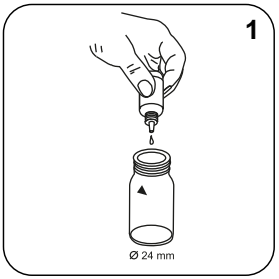


2 druppels Ureum reagens 1 toevoegen.

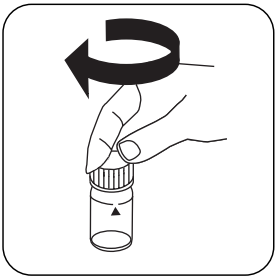
De spoelbakjes afsluiten.



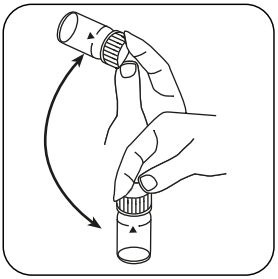
De inhoud mengen door om te draaien.



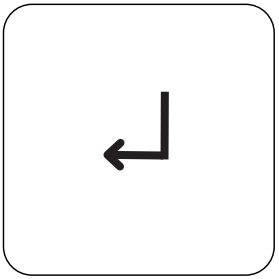
1 druppels Ureum reagens 2 toevoegen.



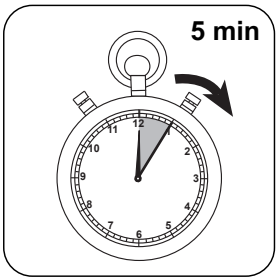
De spoelbakjes afsluiten.



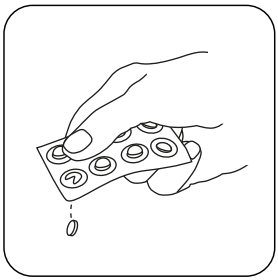
De inhoud mengen door om te draaien.



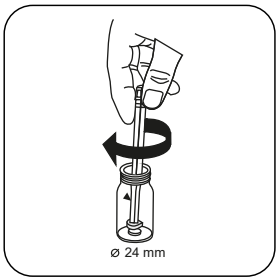
De toets **ENTER** indrukken.



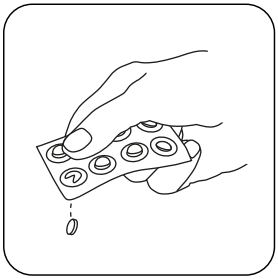
De reactietijd van 5 minuten afwachten.



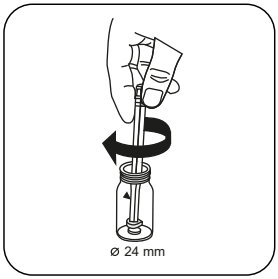
Een AMMONIA Nr. 1 tablet toevoegen.



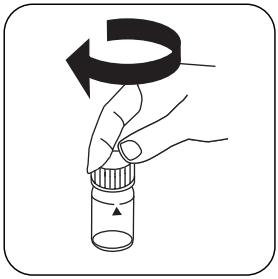
De tabletten onder lichte rotatie verpletteren.



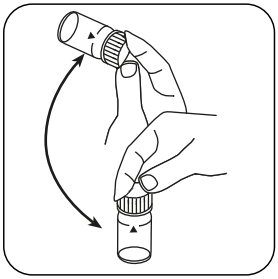
Een AMMONIA Nr. 2 tablet toevoegen.



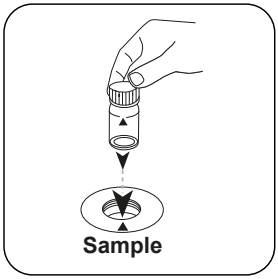
De tabletten onder lichte rotatie verpletteren.



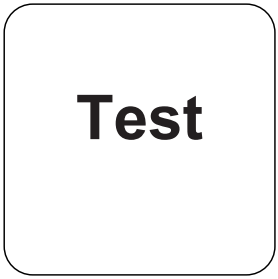
De spoelbakjes afsluiten.



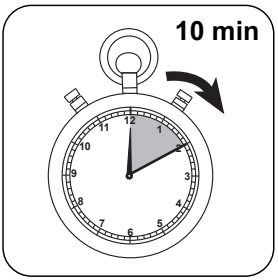
Tabletten oplossen door om te draaien



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



De toets **TEST** (XD: **START**) indrukken.



NL

De reactietijd van
10 minuten afwachten.

Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

De display toont het resultaat in mg/L Ureum.

Chemische methode

Indofenol / Urease

Aanhangsel

Verstoringen

Permanente verstoringen

- Concentraties boven 2 mg/L ureum kunnen leiden tot resultaten binnen het meetbereik. Verdun in dit geval het watermonster met ureumvrij water en herhaal de meting (plausibiliteitstest).

Uit te sluiten verstoringen

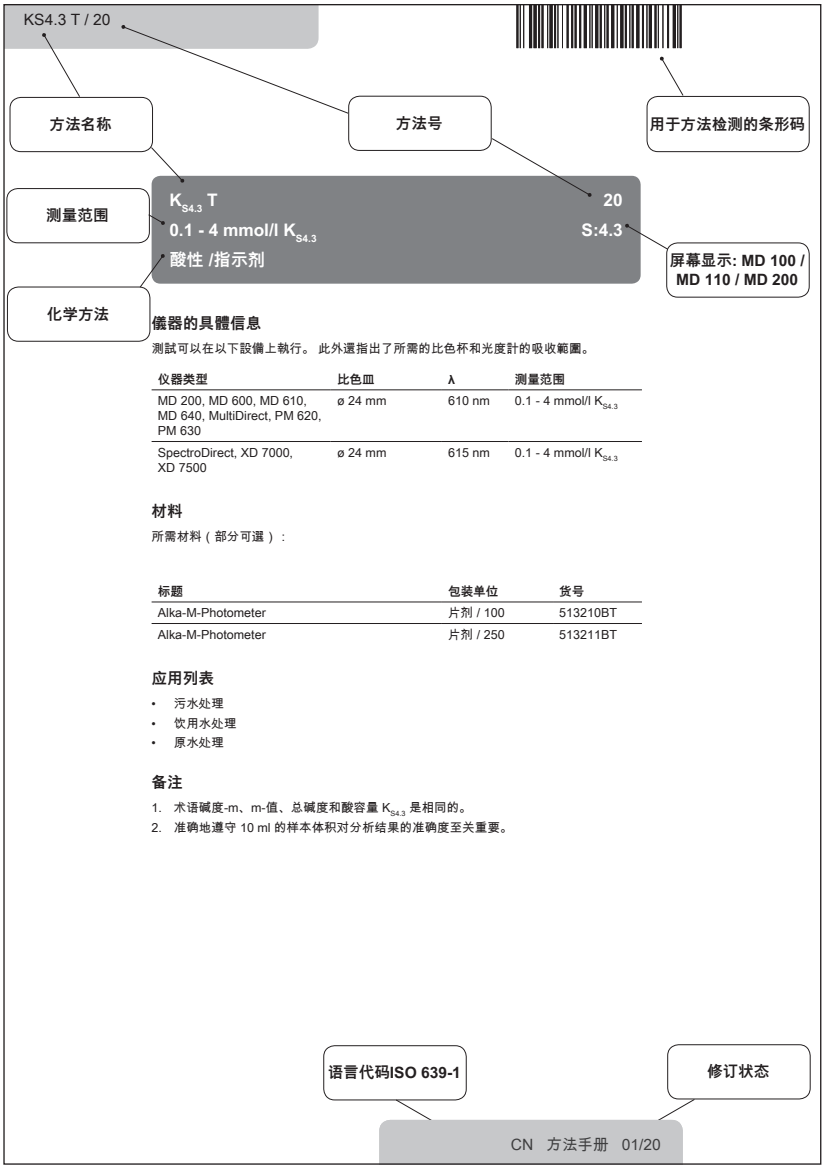
- Eén UREA PRETREAT-tablet elimineert de verstoring van vrij chloor tot 2 mg/L (twee tabletten tot 4 mg/L, drie tabletten tot 6 mg/L).

Verstoringen	verstoort vanaf
Cl_2	2

Literatuurverwijzing

R.J. Creno, R.E. Wenk, P. Bohling, Automated Micromeasurement of Urea Using Urease and the Berthelot Reaction, American Journal of Clinical Pathology (1970), 54 (6), blz. 828-832

[#] met inbegrip van de mengstaaf



儀器的具體信息

測試可以在以下設備上執行。 此外還指出了所需的比色杯和光度計的吸收範圍。

仪器类型	比色皿	λ	测量范围
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630	ø 24 mm	610 nm	0.1 - 4 mmol/l $K_{S4.3}$
SpectroDirect, XD 7000, XD 7500	ø 24 mm	615 nm	0.1 - 4 mmol/l $K_{S4.3}$

材料

所需材料（部分可選）：

标题	包装单位	货号
Alka-M-Photometer	片剂 / 100	513210BT
Alka-M-Photometer	片剂 / 250	513211BT

应用列表

- 污水处理
- 饮用水处理
- 原水处理

备注

1. 术语碱度-m、m-值、总碱度和酸容量 $K_{S4.3}$ 是相同的。
2. 准确地遵守 10 ml 的样本体积对分析结果的准确度至关重要。

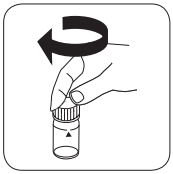
开始测量

进行测定 $K_{S4.3}$ 片剂酸容量

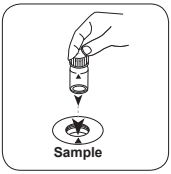
选择设备中的方法。

对于这种方法，在以下设备上不能进行 ZERO 测量：XD 7000, XD 7500

用 **10 ml** 样本填充 24 mm 比色杯。

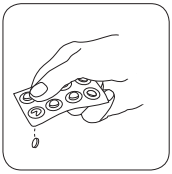


密封比色杯。

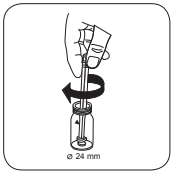


将样本比色杯放入测量轴中。注意定位。

• • •



加入 **ALKA-M-PHOTOMETER** 片剂。



用轻微的扭转压碎片剂。

密封比色杯。

CN 方法手册 01/20

$K_{S4.3}$ T — M20

0.1 - 4 mmol/L $K_{S4.3}$ — S:4.3

酸性 /指示剂

材料
所需材料（部分可選）：

ZH

试剂	包装单位	货号
碱度 M 光度计	片剂 / 100	513210BT
碱度 M 光度计	片剂 / 250	513211BT

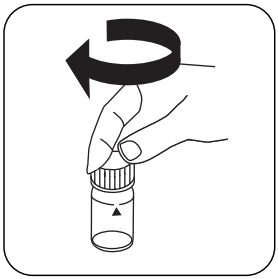
备注

1. 术语碱度-m、m-值、总碱度和酸容量 $K_{S4.3}$ 是相同的。
2. 准确地遵守 10 ml 的样本体积对分析结果的准确度至关重要。

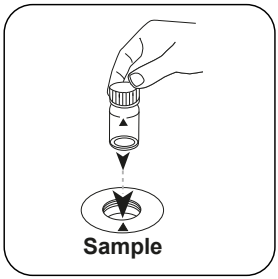
进行测定 Ks4.3 片剂酸容量

选择设备中的方法。

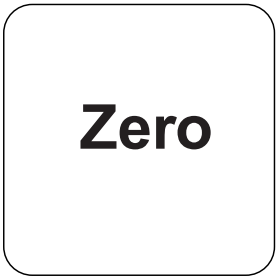
用 **10 mL 样本**填充 24 mm 比色杯。



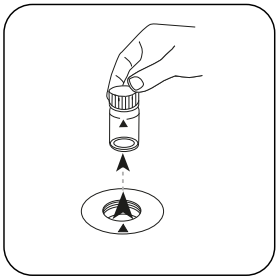
密封比色杯。



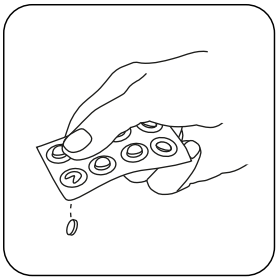
将**样本比色杯**放入测量轴中。注意定位。



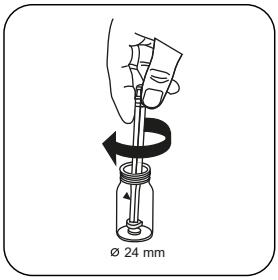
按下 **ZERO** 按钮。



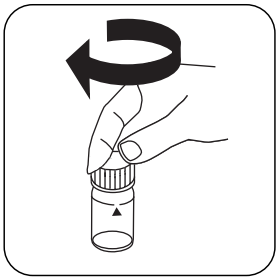
从测量轴上取下比色杯。



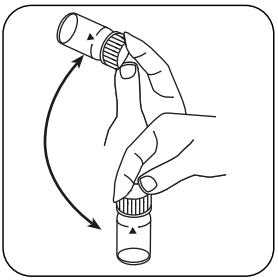
加入 **ALKA-M-PHOTOMETER 片剂**。



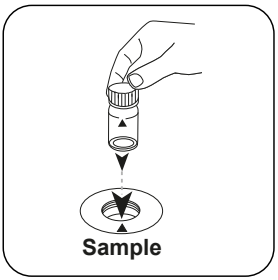
用轻微的扭转压碎片剂。



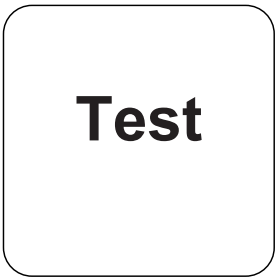
密封比色杯。



通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。



按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 **酸容量** $K_{S4.3}$。

化学方法

酸性 /指示剂

附錄

源于
DIN 38409 - H 7-2

T 氯 M100

0.01 - 6.0 mg/L Cl_2 [a] CL6

DPD

材料
所需材料（部分可選）：

ZH

试剂	包装单位	货号
DPD No.1	片剂 / 100	511050BT
DPD No.1	片剂 / 250	511051BT
DPD No.1	片剂 / 500	511052BT
DPD No.3	片剂 / 100	511080BT
DPD No.3	片剂 / 250	511081BT
DPD No.3	片剂 / 500	511082BT
DPD No.1 高钙 [e]	片剂 / 100	515740BT
DPD No.1 高钙 [e]	片剂 / 250	515741BT
DPD No.1 高钙 [e]	片剂 / 500	515742BT
DPD No.3 高钙 [e]	片剂 / 100	515730BT
DPD No.3 高钙 [e]	片剂 / 250	515731BT
DPD No.3 高钙 [e]	片剂 / 500	515732BT
DPD No.4	片剂 / 100	511220BT
DPD No.4	片剂 / 250	511221BT
DPD No.4	片剂 / 500	511222BT
DPD No.3 Evo	片剂 / 100	511420BT
DPD No.3 Evo	片剂 / 250	511421BT
DPD No.3 Evo	片剂 / 500	511422BT
DPD No.4 Evo	片剂 / 100	511970BT
DPD No.4 Evo	片剂 / 250	511971BT
DPD No.4 Evo	片剂 / 500	511972BT

現有標準

标题	包装单位	货号
ValidCheck 氯 1.5 mg/l	1 片	48105510

取样

1. 在样本制备中，通过移液和摇动来避免氯的排气。
2. 取样后必须立即进行分析。

准备

1. 清洗比色杯：
   由于许多家用清洁剂（例如洗碗用洗涤剂）含有还原剂，所以测定的氯结果可能会不足。为了排除这种测量误差，玻璃器皿应无氯。为此，将玻璃器皿在次氯酸钠溶液（0.1 g/L）下存放 1 小时，然后用去离子水（软化水）彻底冲洗。
2. 对于游离氯和总氯的单独测定，使用一套相应单独的比色杯是有意义的（参见 EN ISO 7393-2，第 5.3 段）。
3. DPD 显色发生在 pH 值在 6.2 至 6.5 时。因此该试剂含有用于调节 pH 值的缓冲液。但在分析前（用 0.5 mol/L 硫酸或 1 mol/L 氢氧化钠溶液）必须将强碱性或酸性水的 pH 范围调节到 6 和 7 之间。

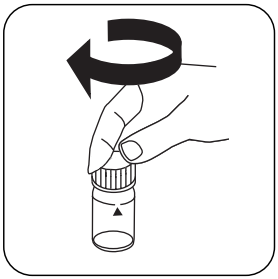
备注

1. Evo片剂可以作为相应标准片剂的替代品（如DPD No.3 Evo代替DPD No.3）。

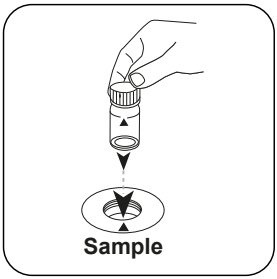
进行测定 余氯 片剂法

选择设备中的方法。

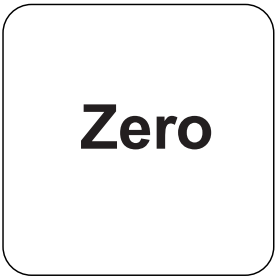
用 **10 mL 样本**填充 24 mm 比色杯。



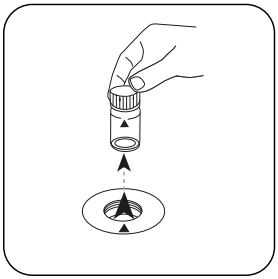
密封比色杯。



将**样本比色杯**放入测量轴中。注意定位。

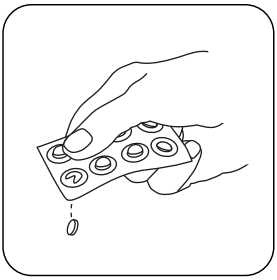


按下 **ZERO** 按钮。

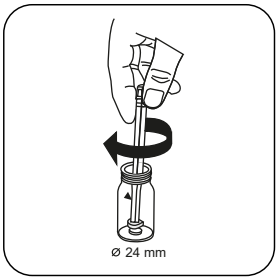


从测量轴上取下比色杯。

将比色杯倒空。

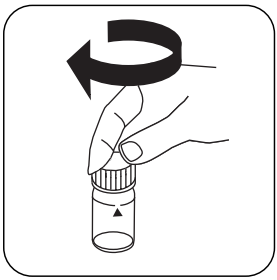


加入 **DPD No. 1 片剂** 。

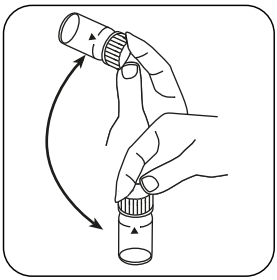


用轻微的扭转压碎片剂。

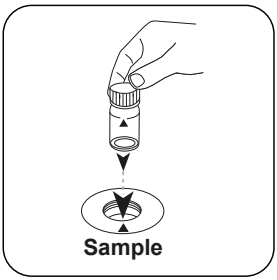
用**样本**将比色杯填充至 **10 mL 刻度**处。



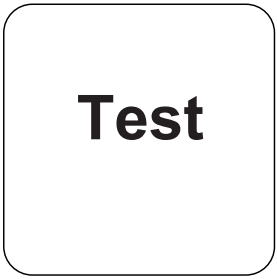
密封比色杯。



通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。



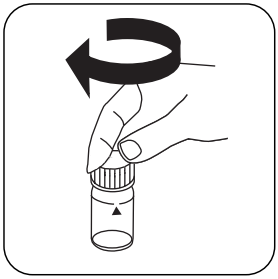
按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 mg / l 余氯。

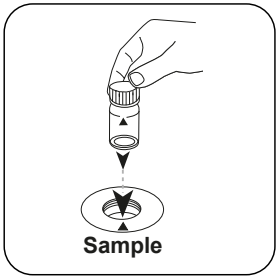
进行测定 总氯 片剂法

选择设备中的方法。

用 **10 mL 样本**填充 24 mm 比色杯。

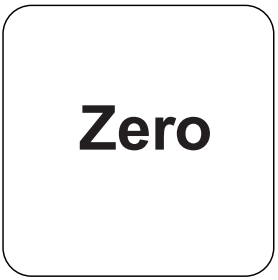


密封比色杯。

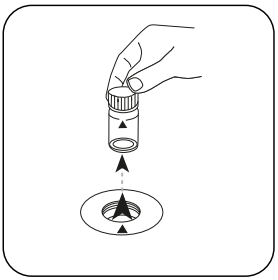


将**样本比色杯**放入测量轴中。注意定位。

ZH

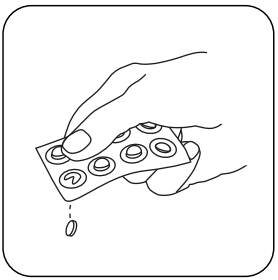


按下 **ZERO** 按钮。

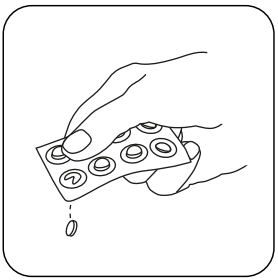


从测量轴上取下比色杯。

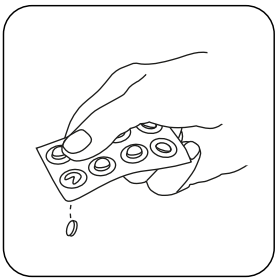
将比色杯倒空。



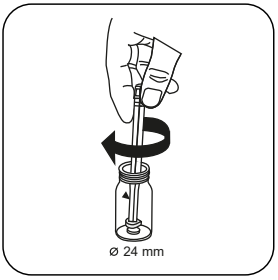
加入 **DPD No. 1 片剂** 。



加入 **DPD No. 3 片剂** 。



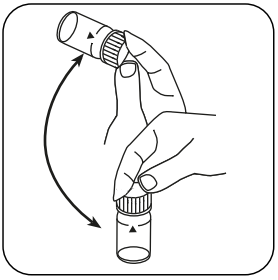
作为DPD 1号和3号片剂的替代品，可以添加1个DPD 4号片剂。



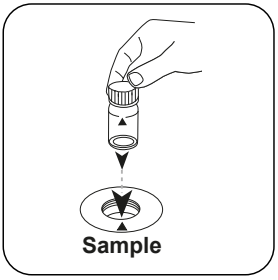
用轻微的扭转压碎片剂。

用**样本**将比色杯填充至 **10 mL 刻度**处。

密封比色杯。

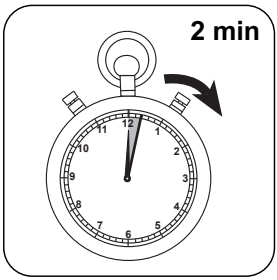


通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。

按下 **TEST** (XD: **START**) 按钮。



等待 2 分钟反应时间 。

反应时间结束后，自动进行测量。

结果在显示屏上显示为 mg / l 总氯。

化学方法

DPD

附錄

ZH

干扰说明

持续干扰

- 存在于样本中的所有氧化剂都像氯一样反应，导致多重结果。

可消除干扰

- 铜和铁（III）的干扰必须通过 EDTA 消除。
- 对于高钙含量*和/或高电导率*的样本，使用试剂片可能会导致样本浑浊和相关的测量误差。在这种情况下，可选用试剂片 DPD 编号1 高钙和试剂片 DPD 编号3 高钙。
  *不能给出精确值，因为浑浊的形成取决于样本水的类型和组成。
- 在使用片剂时，高于 10 mg/L 氯的浓度可导致测量范围内的结果高达 0 mg/L。氯浓度过高时应用无氯水稀释样本。将 10 mL 稀释的样本与试剂混合并重复测量（可信度测试）。

干擾	從/ [mg/l]
CrO_4^{2-}	0.01
MnO_2	0.01

方法验证

检出限	0.02 mg/L
测定下限	0.06 mg/L
测量上限	6 mg/L
灵敏度	2.05 mg/L / Abs
置信范围	0.04 mg/L
标准偏差	0.019 mg/L
变异系数	0.87 %

一致性

EN ISO 7393-2

[a] 测定余氯，总氯和结合氯 | [e] 替代试剂，取代DPD No.1/No.3试剂，用于由高浓度钙离子和/或高电导率引起的浑浊水样分析

L 氯 M101

0.02 - 4.0 mg/L Cl_2 [a)] CL6

DPD

材料
所需材料（部分可選）：

ZH

试剂	包装单位	货号
DPD 1 缓冲溶液，蓝瓶	15 mL	471010
DPD 1 缓冲溶液	100 mL	471011
DPD 1 缓冲溶液，6 件装	1 片	471016
DPD 1 试剂溶液，绿瓶	15 mL	471020
DPD 1 试剂溶液	100 mL	471021
DPD 1 试剂溶液，6 件装	1 片	471026
DPD 3 溶液，红瓶	15 mL	471030
DPD 3 溶液	100 mL	471031
DPD 3 溶液，6 件装	1 片	471036
DPD 试剂套件	1 片	471056

現有標準

标题	包装单位	货号
ValidCheck 氯 1.5 mg/l	1 片	48105510

取样

1. 在样本制备中，通过移液和摇动来避免氯的排气。
2. 取样后必须立即进行分析。

准备

1. 清洗比色杯：
   由于许多家用清洁剂（例如洗碗用洗涤剂）含有还原剂，所以测定的氯结果可能会不足。为了排除这种测量误差，玻璃器皿应无氯。为此，将玻璃器皿在次氯酸钠溶液（0.1 g/L）下存放 1 小时，然后用去离子水（软化水）彻底冲洗。
2. 对于游离氯和总氯的单独测定，使用一套相应单独的比色杯是有意义的（参见 EN ISO 7393-2，第 5.3 段）。
3. DPD 显色发生在 pH 值在 6.2 至 6.5 时。因此该试剂含有用于调节 pH 值的缓冲液。但在分析前（用 0.5 mol/l 硫酸或 1 mol/l 氢氧化钠溶液）必须将强碱性或酸性水的 pH 范围调节到 6 和 7 之间。

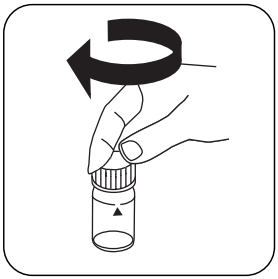
备注

1. 使用后滴瓶必须立即用相同颜色的瓶盖重新密封。
2. 将试剂盒冷藏在 +6 °C至 + 10 °C。

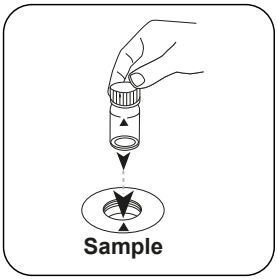
进行测定 余氯 水剂法

选择设备中的方法。

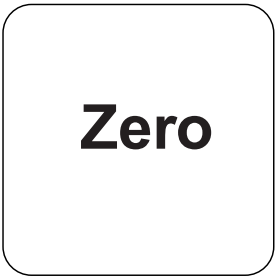
用 **10 mL 样本**填充 24 mm 比色杯。



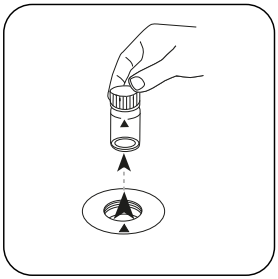
密封比色杯。



将**样本比色杯**放入测量轴中。注意定位。

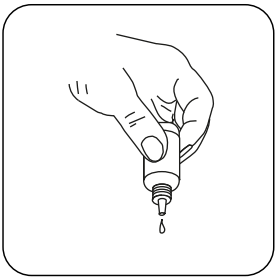


按下 **ZERO** 按钮。

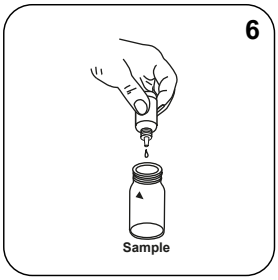


从测量轴上取下比色杯。

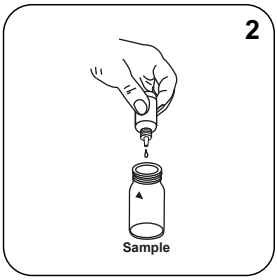
倒空比色杯。



垂直握住滴瓶，慢慢加入相同大小的滴剂。

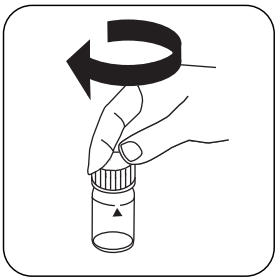


将 **6 滴 DPD 1 Buffer Solution** 添加到样本比色杯中。

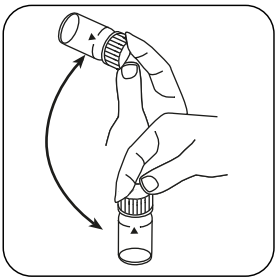


将 **2 滴 DPD 1 Reagent Solution** 添加到样本比色杯中。

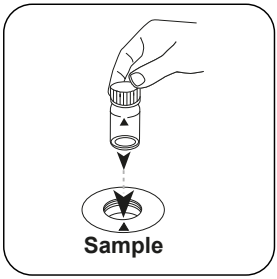
用**样本**将比色杯填充至**10 mL 刻度**处。



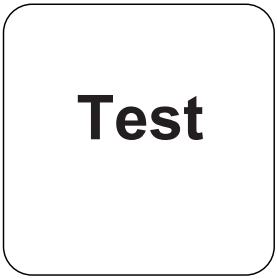
密封比色杯。



通过旋转混合内容物。



将**样本比色杯**放入测量轴中。注意定位。



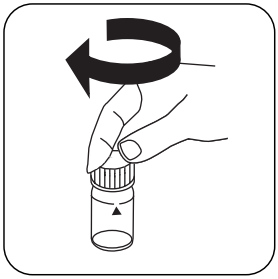
按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 mg / l 余氯。

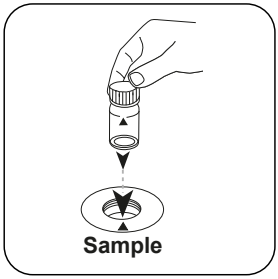
进行测定 总氯 水剂法

选择设备中的方法。

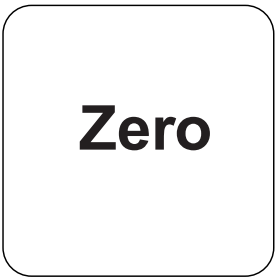
用 **10 mL 样本**填充 24 mm 比色杯。



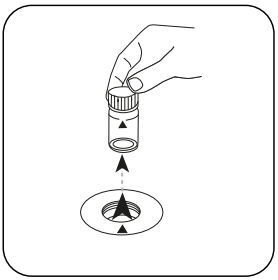
密封比色杯。



将**样本比色杯**放入测量轴中。注意定位。

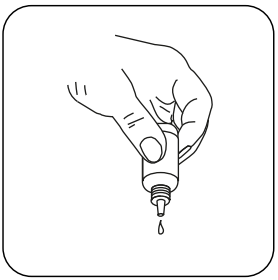


按下 **ZERO** 按钮。

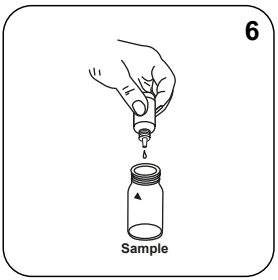


从测量轴上取下比色杯。

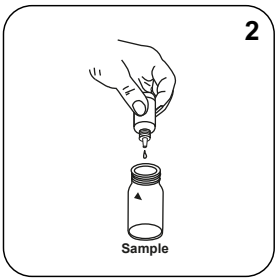
倒空比色杯。



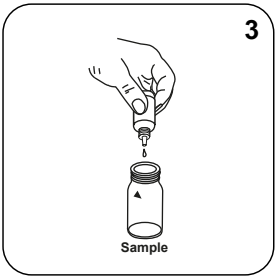
垂直握住滴瓶，慢慢加入相同大小的滴剂。



将 **6 滴 DPD 1 Buffer Solution** 添加到样本比色杯中。



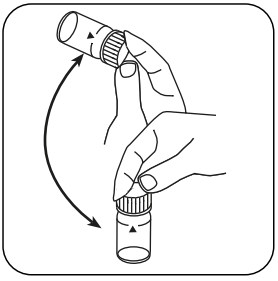
将 **2 滴 DPD 1 Reagent Solution** 添加到样本比色杯中。



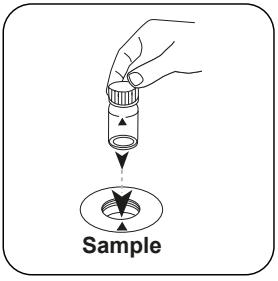
将 **3 滴 DPD 3 Solution** 添加到样本比色杯中。

用**样本**将比色杯填充至 **10 mL 刻度**处。

密封比色杯。

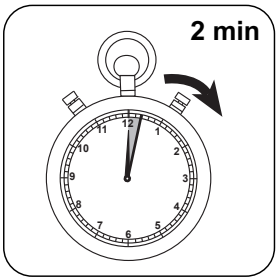


通过旋转混合内容物。



将**样本比色杯**放入测量轴中。注意定位。

按下 **TEST** (XD: **START**) 按钮。



等待 2 分钟反应时间 。

反应时间结束后，自动进行测量。

结果在显示屏上显示为 mg / l 总氯。

化学方法

DPD

附錄

ZH

干扰说明

持续干扰

- 存在于样本中的所有氧化剂都像氯一样反应，导致多重结果。

可消除干扰

- 铜和铁（III）的干扰必须通过 EDTA 消除。
- 在使用液剂时，高于 4 mg/L 氯的浓度可导致测量范围内的结果高达 0 mg/L。在这种情况下应用无氯水稀释样本。将 10 ml 稀释的样本与试剂混合并重复测量（可信度测试）。

干擾	從/ [mg/l]
CrO_4^{2-}	0,01
MnO_2	0,01

一致性

EN ISO 7393-2

[a] 测定余氯，总氯和结合氯

HR T 氯 M103

0.1 - 10 mg/L Cl_2 [a] CL10

DPD

材料
所需材料（部分可選）：

ZH

试剂	包装单位	货号
DPD No.1 HR	片剂 / 100	511500BT
DPD No.1 HR	片剂 / 250	511501BT
DPD No.1 HR	片剂 / 500	511502BT
DPD No.3 HR Evo	片剂 / 100	511920BT
DPD No.3 HR Evo	片剂 / 250	511921BT
DPD No.3 HR Evo	片剂 / 500	511922BT
DPD No.3 HR	片剂 / 100	511590BT
DPD No.3 HR	片剂 / 250	511591BT
DPD No.3 HR	片剂 / 500	511592BT
套件 DPD No.1 HR/No.3 HR#	各100次	517791BT
套件 DPD No.1 HR/No.3 HR#	各250次	517792BT
DPD No.1 高钙 [e]	片剂 / 100	515740BT
DPD No.1 高钙 [e]	片剂 / 250	515741BT
DPD No.1 高钙 [e]	片剂 / 500	515742BT
DPD No.3 高钙 [e]	片剂 / 100	515730BT
DPD No.3 高钙 [e]	片剂 / 250	515731BT
DPD No.3 高钙 [e]	片剂 / 500	515732BT

取样

1. 在样本制备中，通过移液和摇动来避免氯的排气。
2. 取样后必须立即进行分析。

准备

1. 清洗比色杯：
   由于许多家用清洁剂（例如洗碗用洗涤剂）含有还原剂，所以测定的氯结果可能会不足。为了排除这种测量误差，玻璃器皿应无氯。为此，将玻璃器皿在次氯酸钠溶液（0.1 g/L）下存放 1 小时，然后用去离子水（软化水）彻底冲洗。
2. 对于游离氯和总氯的单独测定，使用一套相应单独的比色杯是有意义的（参见 EN ISO 7393-2，第 5.3 段）。
3. DPD 显色发生在 pH 值在 6.2 至 6.5 时。因此该试剂含有用于调节 pH 值的缓冲液。但在分析前（用 0.5 mol/L 硫酸或 1 mol/L 氢氧化钠溶液）必须将强碱性或酸性水的 pH 范围调节到 6 和 7 之间。

备注

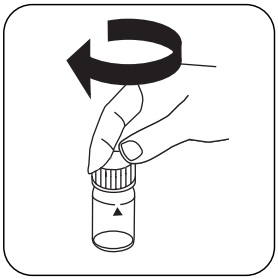
1. Evo片剂可以作为相应标准片剂的替代品（如DPD No.3 Evo代替DPD No.3）。

ZH

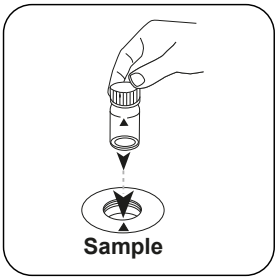
进行测定 余氯 HR 片剂法

选择设备中的方法。

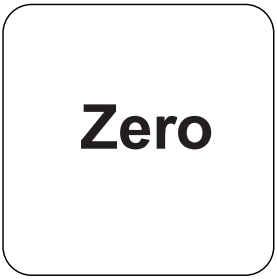
用 **10 mL 样本**填充 24 mm 比色杯。



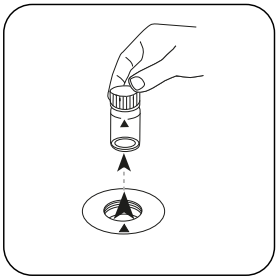
密封比色杯。



将**样本比色杯**放入测量轴中。注意定位。

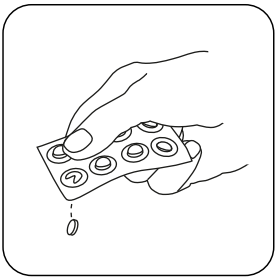


按下 **ZERO** 按钮。

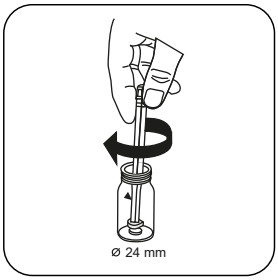


从测量轴上取下比色杯。

将比色杯倒空。

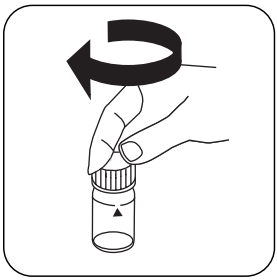


加入 **DPD No. 1 HR 片剂**。

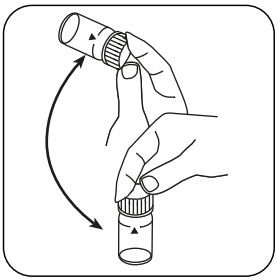


用轻微的扭转压碎片剂。

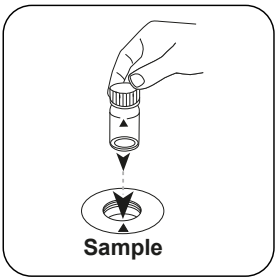
用**样本**将比色杯填充至 **10 mL 刻度**处。



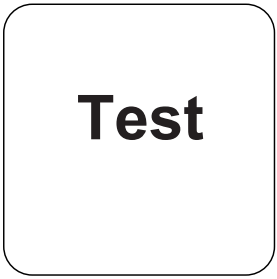
密封比色杯。



通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。



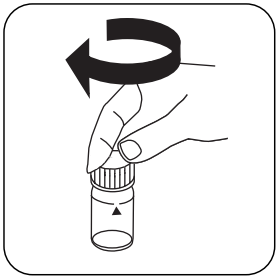
按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 mg / l 余氯。

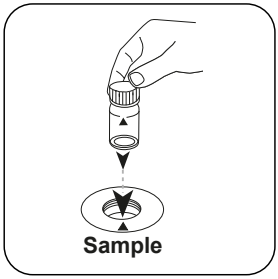
进行测定 总氯 HR 片剂法

选择设备中的方法。

用 **10 mL 样本**填充 24 mm 比色杯。

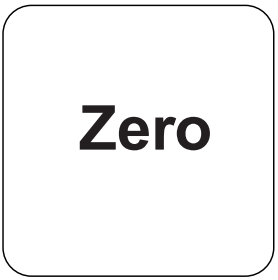


密封比色杯。

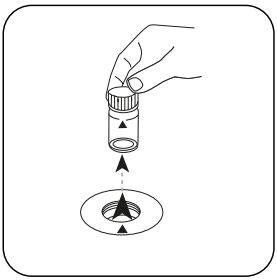


将**样本比色杯**放入测量轴中。注意定位。

ZH

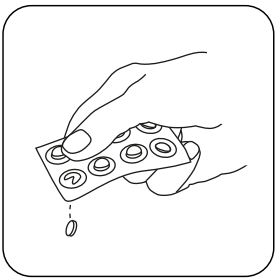


按下 **ZERO** 按钮。

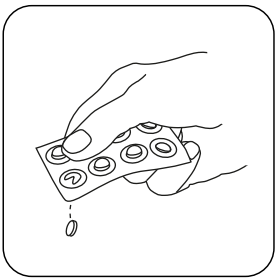


从测量轴上取下比色杯。

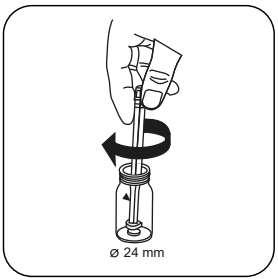
将比色杯倒空。



加入 **DPD No. 1 HR 片剂**。

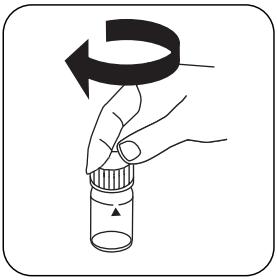


加入 **DPD No. 3 HR 片剂**。

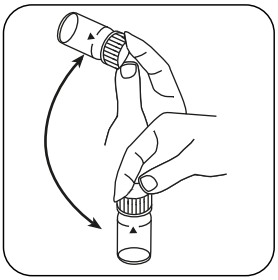


用轻微的扭转压碎片剂。

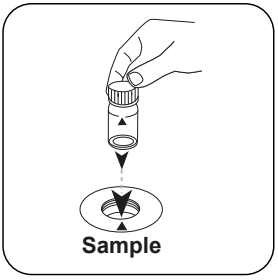
用**样本**将比色杯填充至 **10 mL 刻度**处。



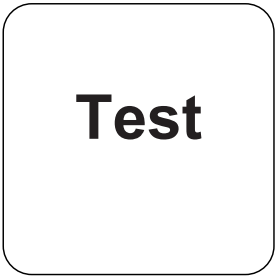
密封比色杯。



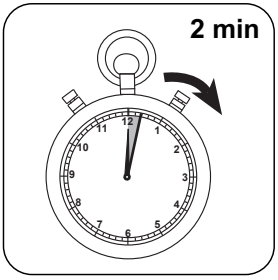
通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。



按下 **TEST** (XD: **START**) 按钮。



等待 **2 分钟反应时间** 。

反应时间结束后，自动进行测量。

结果在显示屏上显示为 mg / l 总氯。

化学方法

DPD

附錄

干扰说明

持续干扰

- 存在于样本中的所有氧化剂都像氯一样反应，导致多重结果。

可消除干扰

- 铜和铁（III）的干扰必须通过 EDTA 消除。
- 对于高钙含量*和/或高电导率*的样本，使用试剂片可能会导致样本浑浊和相关的测量误差。在这种情况下，可选用试剂片 DPD 编号1 高钙和试剂片 DPD 编号3 高钙。
  *不能给出精确值，因为浑浊的形成取决于样本水的类型和组成。

一致性

EN ISO 7393-2

[a] 测定余氯，总氯和结合氯 | [e] 替代试剂，取代DPD No.1/No.3试剂，用于由高浓度钙离子和/或高电导率引起的浑浊水样分析 | [f] i含搅拌棒, 10cm

T pH 值 M330

6.5 - 8.4 pH PH

苯酚红

材料
所需材料（部分可選）：

ZH

试剂	包装单位	货号
酚红光度计	片剂 / 100	511770BT
酚红光度计	片剂 / 250	511771BT
酚红光度计	片剂 / 500	511772BT

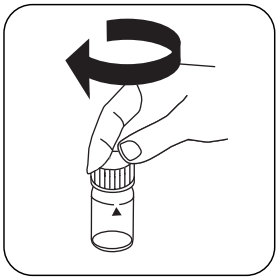
备注

1. 对于光度 pH 值测定，只应使用标有 PHOTOMETER 的带有黑色烫印的 PHENOL RED 片剂。

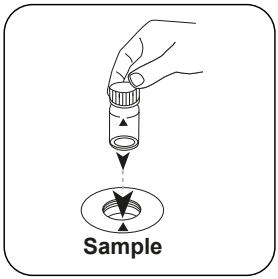
进行测定 pH 值片剂

选择设备中的方法。

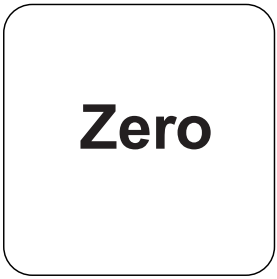
用 **10 mL 样本**填充 24 mm 比色杯。



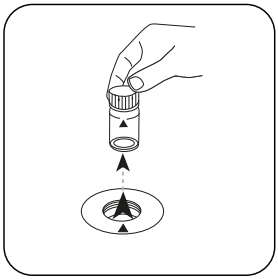
密封比色杯。



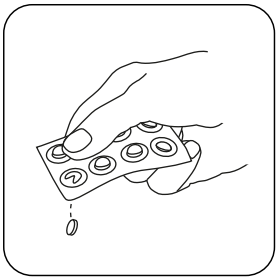
将**样本比色杯**放入测量轴中。注意定位。



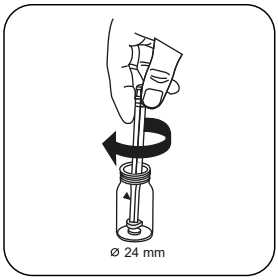
按下 **ZERO** 按钮。



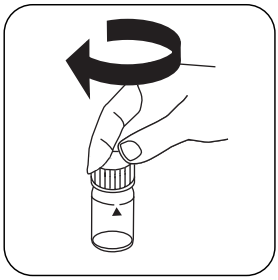
从测量轴上取下比色杯。



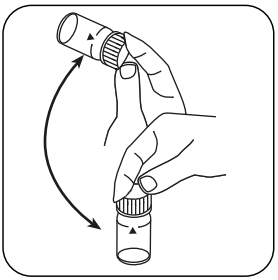
加入 **PHENOL RED PHOTOMETER 片剂**。



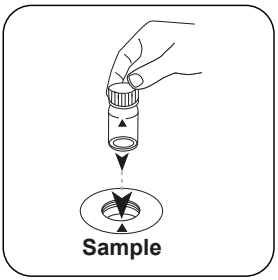
用轻微的扭转压碎片剂。



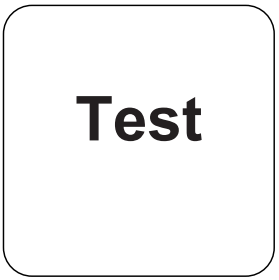
密封比色杯。



通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。



按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 pH 值。

化学方法

苯酚红

附錄

干扰说明

持续干扰

1. 碳酸盐硬度*低的水样可能会得出错误的 pH 值。
   *$K_{S4,3}$ < 0,7 mmol/l ≙ 总碱度 < 35 mg/L $CaCO_3$.

可消除干扰

1. pH 值低于 6.5 和高于 8.4 可导致测量范围内的结果。建议使用可信度测试（pH 计）。
2. 盐误差：
   对于盐含量高达 2 g/L，试剂片的盐含量不会引起明显的盐误差。对于较高的盐含量，测量值应进行如下校正：

样本的盐含量以 g/L 为单位	30（海水）	60	120	180
校正	-0,15[1)]	-0,21[2)]	-0,26[2)]	-0,29[2)]

[1)] 根据 Kolthoff (1922)
[2)] 根据 Parson 和 Douglas (1926)

参考文献

Colorimetric Chemical Analytical Methods, 9th Edition, London

L pH 值 M331

6.5 - 8.4 pH PH

苯酚红

材料
所需材料（部分可選）：

ZH

试剂	包装单位	货号
酚红溶液	15 mL	471040
酚红溶液	100 mL	471041
酚红溶液 6 件装	1 片	471046

准备

1. 由于液滴大小不同，测量结果可能会比使用片剂时有更大的偏差。
   使用移液管（0.18 ml 相当于 6 滴）时这种偏差可以最小化。

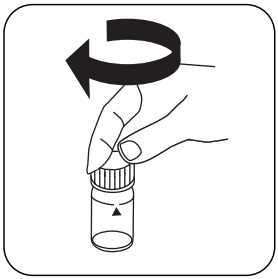
备注

1. 使用后滴瓶必须立即用相同颜色的瓶盖重新密封。
2. 将试剂冷藏在 +6 °C 至 + 10 °C。

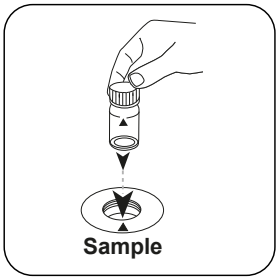
进行测定 pH 值液剂

选择设备中的方法。

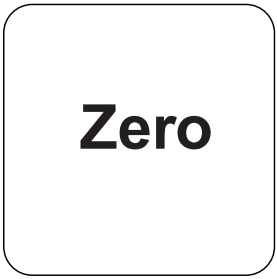
用 **10 mL 样本**填充 24 mm 比色杯。



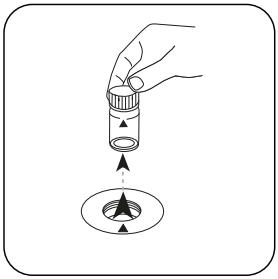
密封比色杯。



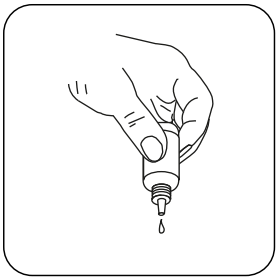
将**样本比色杯**放入测量轴中。注意定位。



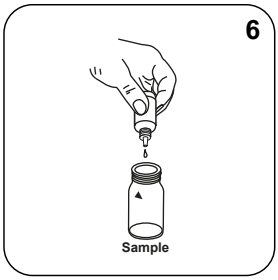
按下 **ZERO** 按钮。



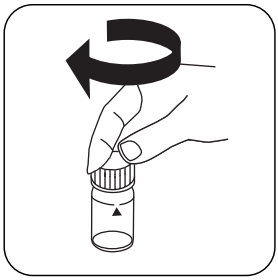
从测量轴上取下比色杯。



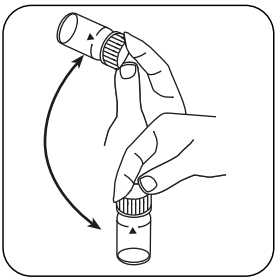
垂直握住滴瓶，慢慢加入相同大小的滴剂。



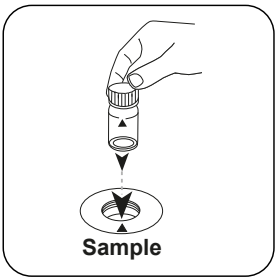
将 **6 滴 PHENOL Red-Lösung** 添加到样本比色杯中。



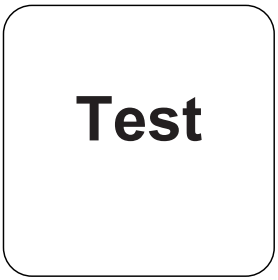
密封比色杯。



通过旋转混合内容物。



将**样本比色杯**放入测量轴中。注意定位。



按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 pH 值。

化学方法

苯酚红

附錄

干扰说明

可消除干扰

1. 盐误差：通过盐含量校正样本的测量值（平均值）：
2.

样本盐含量	校正
30 g/L （海水）	-0,15[1)]
60 g/L	-0,21[2)]
120 g/L	-0,26[2)]
180 g/L	-0,29[2)]

[1)] 根据 Kolthoff (1922)　[2)] 根据 Parson 和 Douglas (1926)

3. 分析氯化水时存在的残余氯含量会影响液体试剂的显色反应。在添加 PHENOL RED 溶液之前，向样本溶液中加入一小块硫代硫酸钠晶体（$Na_2S_2O_3 \cdot 5\ H_2O$）来防止这种情况。

参考文献

Colorimetric Chemical Analytical Methods, 9th Edition, London

T 尿素 M390

0.1 - 2.5 mg/L Urea Ur1

靛酚/ 尿酸

材料
所需材料（部分可選）：

ZH

试剂	包装单位	货号
尿素试剂 1	15 mL	459300
尿素试剂 2	10 mL	459400
氨 No.1	片剂 / 100	512580BT
氨 No.1	片剂 / 250	512581BT
氨 No.2	片剂 / 100	512590BT
氨 No.2	片剂 / 250	512591BT
套件氨 No.1/No.2#	各100次	517611BT
套件氨 No.1/No.2#	各250次	517612BT
铵调制粉	粉剂 / 26 g	460170
尿素预处理 (compensates for the interference of free Chlorine up to 2 mg/l)	片剂 / 100	516110BT
尿素试剂套件	1 组	517800BT

准备

1. 样本温度必须在 20 °C 至 30 °C 之间。
2. 取样后不得迟于 1 小时进行分析。
3. 分析海水样本时必须在加入 AMMONIA No.1 片剂之前将两勺铵调节粉末加入到样本中并通过晃动来溶解。

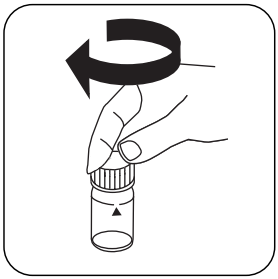
备注

1. AMMONIA No.1 片剂只有在加入 AMMONIA No.2 片剂后才能完全溶解。
2. 尿素测定中包括铵和氯胺。

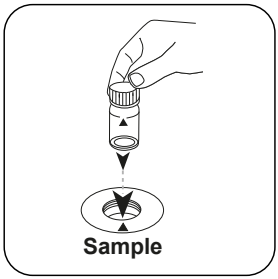
进行测定 尿素片剂和液剂

选择设备中的方法。

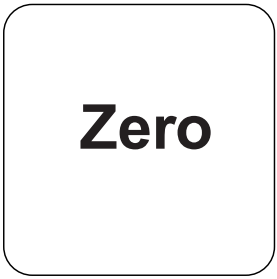
用 **10 mL 样本**填充 24 mm 比色杯。



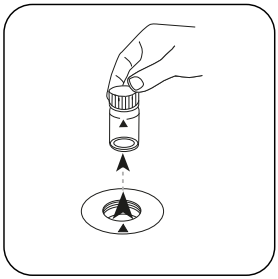
密封比色杯。



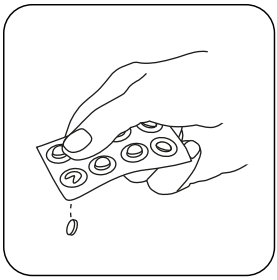
将**样本比色杯**放入测量轴中。注意定位。



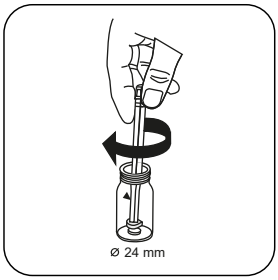
按下 **ZERO** 按钮。



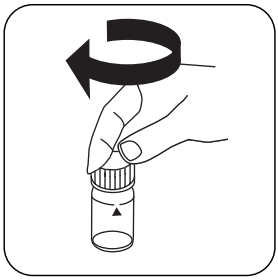
从测量轴上取下比色杯。



在游离氯（HOCl）的存在下，加入**一片 UREA PRETREAT 片剂**。

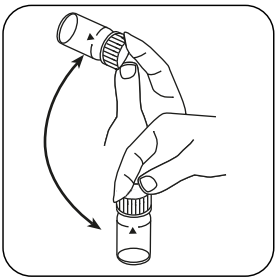


用轻微的扭转压碎片剂。

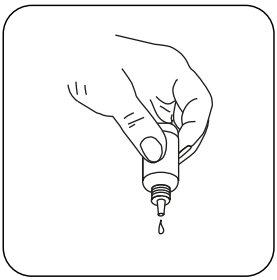


密封比色杯。

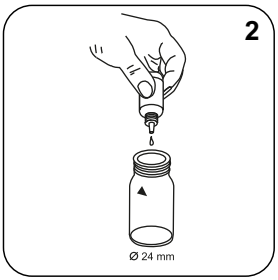
ZH



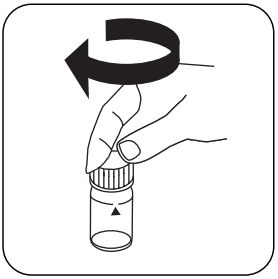
通过旋转溶解片剂。



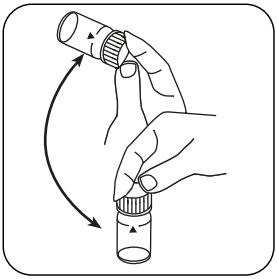
垂直握住滴瓶，慢慢加入相同大小的滴剂。



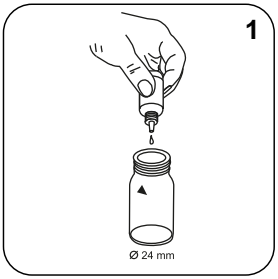
加入 **2 滴 Urea Reagenz 1**。



密封比色杯。

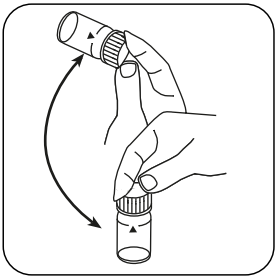


通过旋转混合内容物。

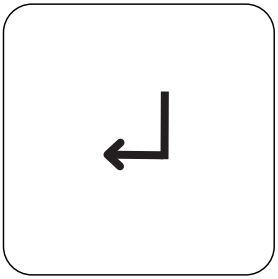


加入 **1 滴 Urea Reagenz 2**。

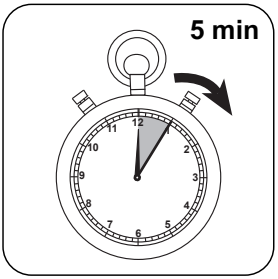
密封比色杯。



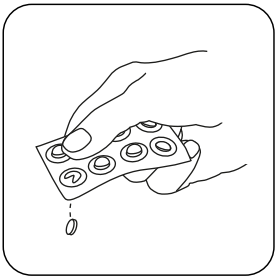
通过旋转混合内容物。



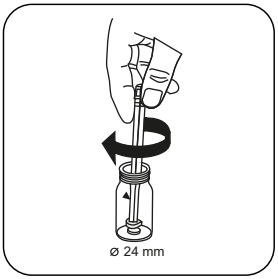
按下 **ENTER** 按钮。



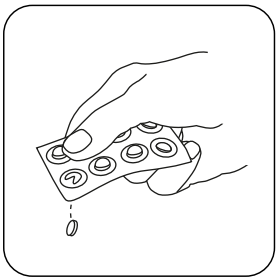
等待 **5 分钟反应时间** 。



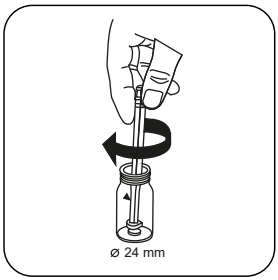
加入 **AMMONIA No.1 片剂** 。



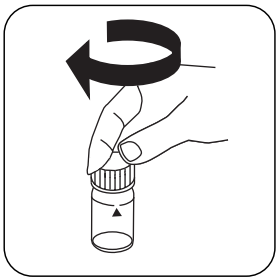
用轻微的扭转压碎片剂。



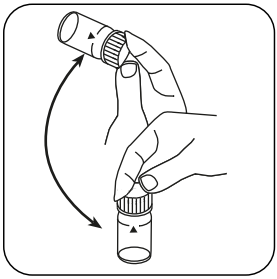
加入 **AMMONIA No.2 片剂**。



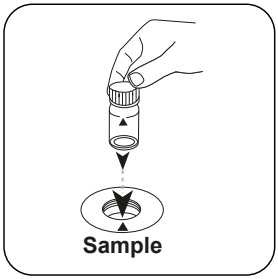
用轻微的扭转压碎片剂。



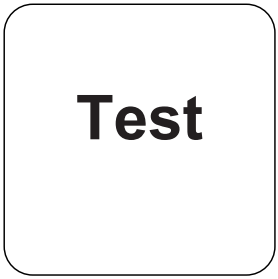
密封比色杯。



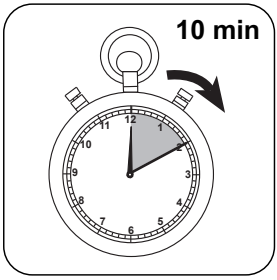
通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。



按下 **TEST** (XD: **START**) 按钮。



等待 **10 分钟反应时间**。

反应时间结束后，自动进行测量。

结果在显示屏上显示为 mg / l 尿素。

化学方法

靛酚/ 尿酸

附錄

ZH

干扰说明

持续干扰

- 高于 2 mg/L 尿素的浓度可导致测量范围内的结果。在这种情况下应用不含尿素的水稀释水样，并重复测量（可信度测试）。

可消除干扰

- 一片 UREA PRETREAT 片剂可消除高达 2 mg/L 游离氯的干扰（两片高达 4 mg/L，三片高达 6 mg/L）。

干擾	從/ [mg/l]
Cl_2	2

参考文献

R.J.Creno, R.E.Wenk, P. Bohling, Automated Micromeasurement of Urea Using Urease and the Berthelot Reaction, American Journal of Clinical Pathology (1970), 54 (6), p. 828-832

i含搅拌棒, 10cm

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