Lovibond® Water Testing

Tintometer® Group

Water Treatment Engineers Test Kit Advanced

56I701500

Alkalinity (P, M, OH) | Aluminium | Bromine | Chloride | Chlorine | Conductivity | Copper | Glycol | Hardness | Hardness, total | Hardness Calcium | Hydrogen Peroxide | Iron | Molybdate | Nitrite | pH | Phosphate | Phosphonate | PTSA | Sulfite | Tannin

Engineers Kit System (Advanced)

Monitoring of water quality in closed circuits, evaporative cooling systems and boiler systems is an essential part of any water treatment Engineers daily tasks.

It has been proven that testing industrial waters on a regular basis can mitigate risks and system issues before they become problematic; including early detection of corrosion, scale and biofouling. This early detection allows water treatment professionals to make assessments of system efficacy and integrity in a timely manner, enabling decisions on treatment programs to achieve optimal system performance

This test kit provides the user with the primary tests in order to complete their daily tasks.

Note:

1. Further instructions can be found with the corresponding product.

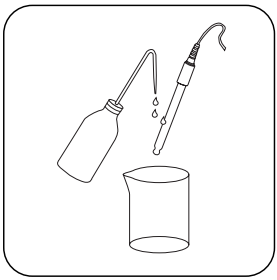
pH

-2 - 16

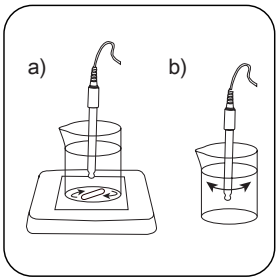
EN

Notes

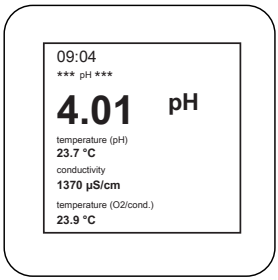
1. The description of the calibration, the preparation of the buffer solutions and the device settings are described in the detailed operating instructions. Detailed operating instructions are enclosed with the device.
2. Care should therefore be taken to ensure that:
   Faults, such as those caused by electrostatic charge, are avoided.
   Plug contacts are kept clean and dry.
   Electrodes are not immersed beyond the length of the shaft.
   The electrode is calibrated sufficiently often – the frequency of calibration depends on the electrode and its use.
   A suitable electrode is used.



Rinse the electrode with distilled or deionised water and carefully wipe with a paper towel.



Immerse the pH electrode including temperature sensor in the calibration solution. Ensure sufficient flow, e.g. by a) use a magnetic stirrer with a stirring fish (recommended) b) Sway the pH electrode in the solution.



The pH value can be read in operating mode. Stop stirring while doing this.

Alkalinity (P, M, OH) 56I700130

50 - 2400 mg/L $CaCO_3$

EN

Material

Reagents	Packaging Unit	Part Number
Alkalinity 4.5 Indicator TA4	65 mL	56L013865
Alkalinity LR Titrant TA3	65 mL	56L013965
Alkalinity HR Titrant PA2/TA2	65 mL	56L013665
Acidity / Alkalinity P Indicator PA1	65 mL	56L013565
Alkalinity OH Reagent PA3	65 mL	56L013765

The following accessories are required.

Accessories	Packaging Unit	Part Number
Syringe, plastic, 20 mL	1 pc.	56A006501
Titration jar with cap, plastic, 60 mL	1 pc.	56A006701

Preparation

Alkalinity Relationships:

The separate contributions to alkalinity from free caustic, carbonate and bicarbonate can be estimated using the P & M alkalinity relationship in the table below.

If	OH	CO_3	HCO_3
P = 0	0	0	M
P < M/2	0	2P	M-2P
P = M/2	0	2P	0
P > M/2	2P-M	2(M-P)	0
P = M	M	0	0

Notes

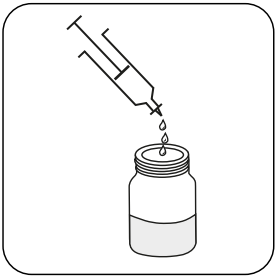
1. Alkalinity P: The P refers to phenolphthalein the indicator originally used for titrating P Alkalinity. The colour change occurs at pH 8.3. Less hazardous alternatives are now used.
2. Alkalinity M: The M refers to methyl orange, the indicator originally used for titrating Total Alkalinity. Nowadays 4.5 indicator is used but old M terminology has remained.
3. Alkalinity OH: Barium chloride precipitates with carbonate ions to produce a white precipitate in the test. the remaining alkalinity present in the same sample attributed to the presence of hydroxide ions (OH).

Sampling

Select the sample volume from the table according to the expected measuring range and read off the factor to calculate the result.

Expected Range	Titrant used	Sample Size	Factor
50-150 mg/L	Alkalinity LR Titrant TA3	40 mL	5
100-300 mg/L	Alkalinity LR Titrant TA3	20 mL	10
200-600 mg/L	Alkalinity LR Titrant TA3	10 mL	20
200-600 mg/L	Alkalinity HR Titrant PA2TA2	40 mL	20
400-1200 mg/L	Alkalinity HR Titrant PA2TA2	20 mL	40
800-2400 mg/L	Alkalinity HR Titrant PA2TA2	10 mL	80

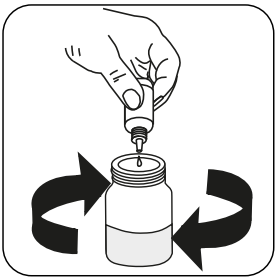
Determination of Alkalinity-P



Attention!Select the appropriate sample volume according to the instructions in the chapter Sampling.

Add drops of **Acidity / Alkalinity P Indicator PA1** to give a **pink** colour. Note: If sample remains colourless, report the P Alkalinity as zero.

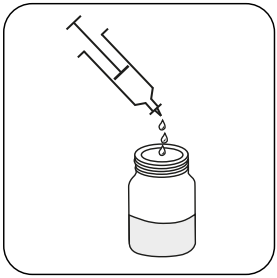
Attention! Record the number of drops that will be added.
Note: Make sure to swirl the jar after adding each drop!



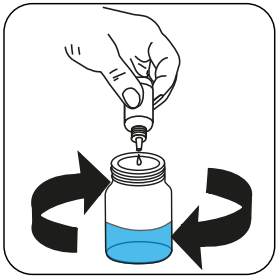
Add **Alkalinity LR Titrant TA3 or Alkalinity HR Titrant PA2/TA2** drop by drop to the sample until discolouration turns from **pink** to **colourless**.

Calculate test result: P Alkalinity (as $CaCO_3$) mg/L = Number of drops x factor (see table)

Determination of Alkalinity-M



Attention!Select the appropriate sample volume according to the instructions in the chapter Sampling.



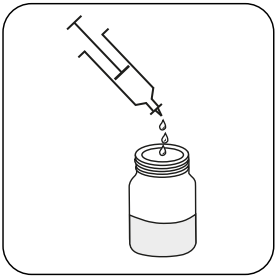
Add drops of **Alkalinity 4.5 Indicator TA4** to give a **pure blue** colour.

Attention! Record the number of drops that will be added.
Note: Make sure to swirl the jar after adding each drop!

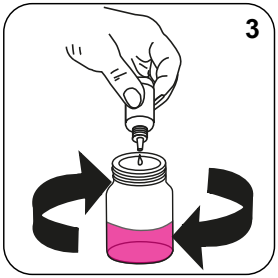
Add **Alkalinity LR Titrant TA3 or Alkalinity HR Titrant PA2/TA2** drop by drop to the sample until colouration turns from **blue** to **orange/yellow** .

Calculate test result: Total Alkalinity (as $CaCO_3$) mg/L = Number of drops x factor (see table)

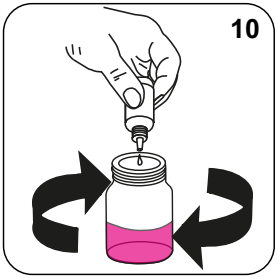
Determination of Alkalinity-OH



Attention!Select the appropriate sample volume according to the instructions in the chapter Sampling.

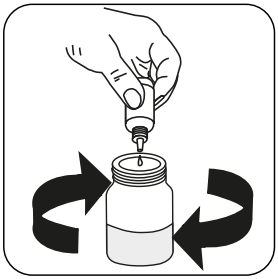


Add **3** drops of **Acidity / Alkalinity P Indicator PA1** to give a **pink** colour.



Add **10 drops Alkalinity OH Reagent**. Note: If sample remains colourless, report the P Alkalinity as zero.

Attention! Record the number of drops that will be added.
Note: Make sure to swirl the jar after adding each drop!



Add **Alkalinity LR Titrant TA3 or Alkalinity HR Titrant PA2/TA2** drop by drop to the sample until discolouration turns from **pink** to **colourless**.

Calculate test result: OH Alkalinity (as $CaCO_3$) mg/L = Number of drops x factor (see table)

Chloride 56I700190

20 - 12000 mg/L Cl^-

EN

Material

Reagents	Packaging Unit	Part Number
Chloride LR Titrant CC2	65 mL	56L014265
Chloride HR Titrant BC2	65 mL	56L014165
Chloride Indicator BC1/CC1	65 mL	56L714065

The following accessories are required.

Accessories	Packaging Unit	Part Number
Syringe, plastic, 20 mL	1 pc.	56A006501
Titration jar with cap, plastic, 60 mL	1 pc.	56A006701
Syringe, plastic, 5 mL	1 pc.	56A008501

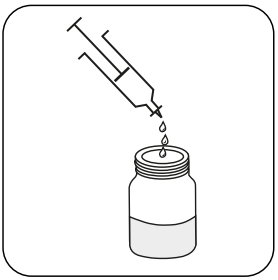
Notes

1. Alkaline samples such as boiler water will require neutralisation prior to testing.
2. Colours may vary depending on sample and test conditions.
3. Dilute samples of less than 10 mL to approximately 10-20 mL with distilled or deionised (chloride free) water.

Sampling

Select the sample volume from the table according to the expected measuring range and read off the factor to calculate the result.

Expected Range	Titrant used	Sample Size	Factor
20-75 mg/L	Chloride LR Titrant CC2	40 mL	2.5
50-150 mg/L	Chloride LR Titrant CC2	20 mL	5
100-400 mg/L	Chloride LR Titrant CC2	10 mL	10
100-400 mg/L	Chloride HR Titrant BC2	40 mL	10
200-600 mg/L	Chloride HR Titrant BC2	20 mL	20
400-1000 mg/L	Chloride HR Titrant BC2	10 mL	40
800-3000 mg/L	Chloride HR Titrant BC2	5 mL [3]	80
2000-6000 mg/L	Chloride HR Titrant BC2	2 mL [3]	200
4000-12000 mg/L	Chloride HR Titrant BC2	1 mL [3]	400



Attention!Select the appropriate sample volume according to the instructions in the chapter Sampling.

Add **10** drops of **Chloride Indicator BC1/CC 1 (Potassium Chromate)** to give a **yellow** colour.

Attention! Record the number of drops that will be added.
Note: Make sure to swirl the jar after adding each drop!

Add **Chloride LR Titrant CC2 or Chloride HR Titrant BC2** drop by drop to the sample until colouration turns from **yellow** to **orange/brown** .

Calculate test result: Chloride (as Cl^-) mg/L = Number of drops x factor (see table)

Hardness Calcium 56I700270

5 - 600 mg/L $CaCO_3$

EN

Material

Reagents	Packaging Unit	Part Number
Hardness Calcium Buffer CH2	65 mL	56L014465
Hardness Calcium Indicator CH1P	Powder / 20 g	56P021620
Hardness LR Titrant TH3	65 mL	56L016265
Hardness HR Titrant TH4	65 mL	56L014565
Hardness Total Indicator TH1P	Powder / 40 g	56P028340
Hardness Total Buffer TH2	65 mL	56L016065

The following accessories are required.

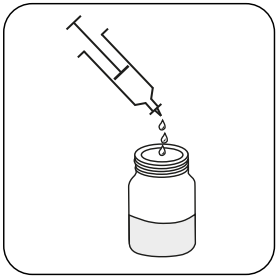
Accessories	Packaging Unit	Part Number
Syringe, plastic, 20 mL	1 pc.	56A006501
Titration jar with cap, plastic, 60 mL	1 pc.	56A006701

Sampling

Select the sample volume from the table according to the expected measuring range and read off the factor to calculate the result.

Expected Range	Titrant used	Sample Size	Factor
5-15 mg/L	Hardness LR Titrant TH3	40 mL	0.5
10-30 mg/L	Hardness LR Titrant TH3	20 mL	1
20-60 mg/L	Hardness LR Titrant TH3	10 mL	2
50-150 mg/L	Hardness HR Titrant TH4	40 mL	5
100-300 mg/L	Hardness HR Titrant TH4	20 mL	10
200-600 mg/L	Hardness HR Titrant TH4	10 mL	20

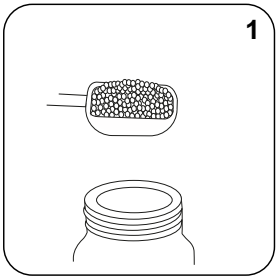
Determination of Hardness Calcium



Attention!Select the appropriate sample volume according to the instructions in the chapter Sampling.

Add **4** drops of **Hardness Calcium Buffer CH2** per **10 mL** of sample.

Swirl to mix.

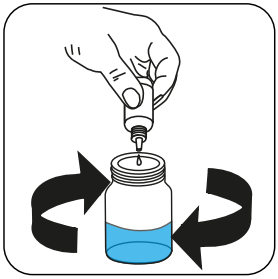


Add **1 measuring scoop(s) Hardness Calcium Indicator CH1P** .

Swirl to mix.

The sample will turn **wine red** .

Attention! Record the number of drops that will be added.
Note: Make sure to swirl the jar after adding each drop!



Add **Hardness LR Titrant TH3 or Hardness HR Titrant TH4** drop by drop to the sample until colouration turns from **wine red** to **blue**.

Calculate test result: Total Hardness (as $CaCO_3$) mg/L = Number of drops x factor (see table)

Hardness, total 56I700280

5 - 600 mg/L $CaCO_3$

EN

Material

Reagents	Packaging Unit	Part Number
Hardness Total Buffer TH2	65 mL	56L016065
Hardness Total Indicator TH1P	Powder / 40 g	56P028340
Hardness LR Titrant TH3	65 mL	56L016265
Hardness HR Titrant TH4	65 mL	56L014565

The following accessories are required.

Accessories	Packaging Unit	Part Number
Syringe, plastic, 20 mL	1 pc.	56A006501
Titration jar with cap, plastic, 60 mL	1 pc.	56A006701

Notes

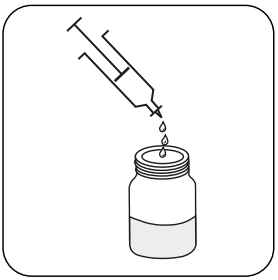
1. Colours may vary depending on sample and test conditions.
2. More than 1 ppm copper in the sample will prevent the pure blue endpoint from occurring.
3. To remove copper interference, add 1 drop of Iron Reagent FE6 before the addition of Hardness Total Buffer TH2. Iron Reagent FE6 is not supplied as standard in the hardness test pack, but can be purchased separately. (56L006365)

Sampling

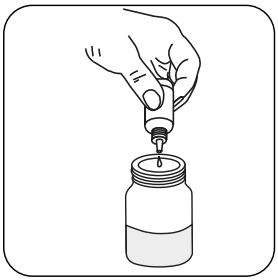
Select the sample volume from the table according to the expected measuring range and read off the factor to calculate the result.

Expected Range	Titrant used	Sample Size	Factor
5-15 mg/L $CaCO_3$	Hardness LR Titrant TH3	40 mL	0.5
10-30 mg/L $CaCO_3$	Hardness LR Titrant TH3	20 mL	1
20-60 mg/L $CaCO_3$	Hardness LR Titrant TH3	10 mL	2
50-150 mg/L $CaCO_3$	Hardness HR Titrant TH4	40 mL	5
100-300 mg/L $CaCO_3$	Hardness HR Titrant TH4	20 mL	10
200-600 mg/L $CaCO_3$	Hardness HR Titrant TH4	10 mL	20

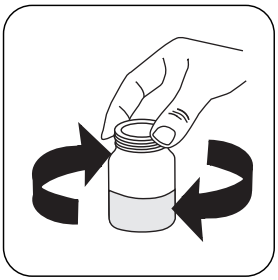
EN



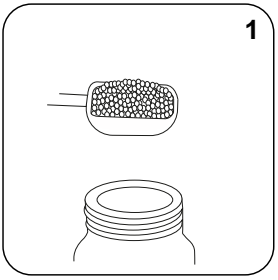
Attention!Select the appropriate sample volume according to the instructions in the chapter Sampling.



Add **4** drops of **Hardness Total Buffer TH2** per **10 mL** of sample.



Swirl to mix.

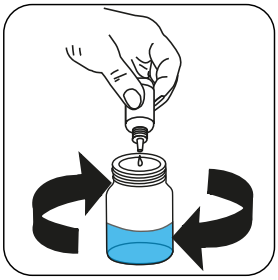


Add **1 measuring scoop(s) Hardness Total Indicator TH1P** .

Swirl to mix.

The sample will turn **wine red** .

Attention! Record the number of drops that will be added.
Note: Make sure to swirl the jar after adding each drop!



Add **Hardness LR Titrant TH3 or Hardness HR Titrant TH4** drop by drop to the sample until colouration turns from **wine red** to **blue**.

Calculate test result: Total Hardness (as $CaCO_3$) mg/L = Number of drops x factor (see table)

Hydrogen Peroxide 56I700290

15 - 500 mg/L H_2O_2

EN

Material

Reagents	Packaging Unit	Part Number
Hydrogen Peroxide Buffer HP1	65 mL	56L041565
Hydrogen Peroxide HR Titrant HP2	65 mL	56L719965
Hydrogen Peroxide LR Titrant HP3	65 mL	56L649665

The following accessories are required.

Accessories	Packaging Unit	Part Number
Syringe, plastic, 20 mL	1 pc.	56A006501
Titration jar with cap, plastic, 60 mL	1 pc.	56A006701

Notes

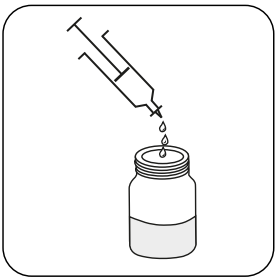
1. Colours may vary depending on sample and test conditions.
2. Other oxidising agents such as raw water residual chlorine will be included in the result but is not significant compared with the usual high concentration of peroxide employed in sanitising operations.

Sampling

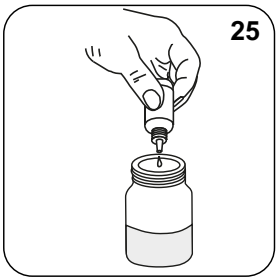
Select the sample volume from the table according to the expected measuring range and read off the factor to calculate the result.

Expected Range	Titrant used	Sample Size	Factor
1-12.5 mg/L	Hydrogen Peroxide LR Titrant HP3	40 mL	0.5
2-25 mg/L	Hydrogen Peroxide LR Titrant HP3	20 mL	1
4-50 mg/L	Hydrogen Peroxide LR Titrant HP3	10 mL	2
15-125 mg/L	Hydrogen Peroxide HR Titrant HP2	40 mL	5
25-250 mg/L	Hydrogen Peroxide HR Titrant HP2	20 mL	10
50-500 mg/L	Hydrogen Peroxide HR Titrant HP2	10 mL	20

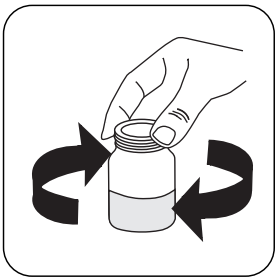
EN



Attention!Select the appropriate sample volume according to the instructions in the chapter Sampling.

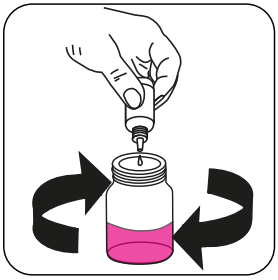


Add **25 drops Hydrogen Peroxide Buffer HP1**.



Swirl to mix.

Attention! Record the number of drops that will be added.
Note: Make sure to swirl the jar after adding each drop!



Add **Hydrogen Peroxide HR Titrant HP2 or Hydrogen Peroxide LR Titrant HP3** drop by drop to the sample until colouration turns from **colourless** to **pink**.

The color should persist for at least **30** seconds.

Calculate test result: Hydrogen Peroxide (as H_2O_2) mg/L = Number of drops x factor (see table)

Nitrite 56I700300

10 - 2000 mg/L $NaNO_2$

EN

Material

Reagents	Packaging Unit	Part Number
Nitrite Indicator N1	65 mL	56L017165
Nitrite Titrant N2	65 mL	56L017265

The following accessories are required.

Accessories	Packaging Unit	Part Number
Syringe, plastic, 20 mL	1 pc.	56A006501
Test Tube 5/10 mL + Cap	1 pc.	56A600401
Titration jar with cap, plastic, 60 mL	1 pc.	56A006701
Plastic syringe, 1 ml	1 pc.	56A013501

Notes

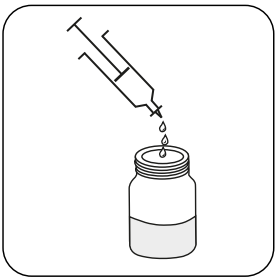
1. Colours may vary depending on sample and test conditions.
2. This test can be used to determine the nitrite reserve in cooling systems. Note that other reducing agents such as sulphite and ascorbic acid will increase the observed result.
3. Results from this test are expressed as sodium nitrite ($NaNO_2$). To convert from mg/L as sodium nitrite to mg/L as nitrite (NO_2), multiply the result obtained by 0.67.

Sampling

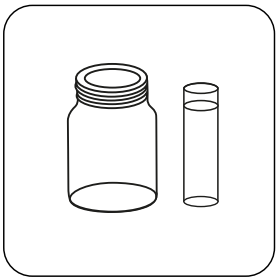
Select the sample volume from the table according to the expected measuring range and read off the factor to calculate the result.

Expected Range	Titrant used	Sample Size	Factor
10-40 mg/L	5 drops of Nitrite Indicator N1	40 mL	1.25
25-100 mg/L	4 drops of Nitrite Indicator N1	20 mL	2.5
50-150 mg/L	3 drops of Nitrite Indicator N1	10 mL	5
100-400 mg/L	2 drops of Nitrite Indicator N1	5 mL	10
300-1000 mg/L	1 drop of Nitrite Indicator N1	2 mL	25
500-2000+ mg/L	1 drop of Nitrite Indicator N1	1 mL	50

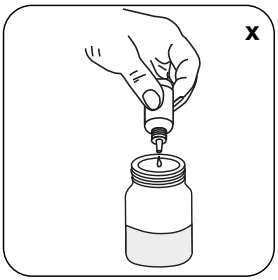
EN



Attention!Select the appropriate sample volume according to the instructions in the chapter Sampling.



Use a titration jar for larger samples or test tube for smaller samples (5 mL or less).

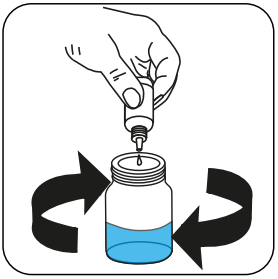


Add **X** drops of **Nitrite Indicator N1** reagent to the sample, according to the selected sample volume (see table in the notes).

Swirl to mix.

The sample will turn **orange (if nitrite is present)**.

Attention! Record the number of drops that will be added.
Note: Make sure to swirl the jar after adding each drop!



Add **Nitrite Titrant N2** drop by drop to the sample until colouration turns from **orange** to **blue**.

The color should persist for at least **10** seconds.

Calculate test result: Nitrite (as $NaNO_2$) mg/L = Number of drops x factor (see table)

Phosphonate 56I700320

0 - 20 mg/L HEDP

EN

Material

Reagents	Packaging Unit	Part Number
Phosphonate Neutraliser P1/2	65 mL	56L070465
Phosphonate Indicator P4L	65 mL	56L017565
Phosphonate pH Adjuster P3	65 mL	56L718365
Phosphonate Titrant P5	65 mL	56L017665

The following accessories are required.

Accessories	Packaging Unit	Part Number
Syringe, plastic, 20 mL	1 pc.	56A006501
Titration jar with cap, plastic, 60 mL	1 pc.	56A006701

Notes

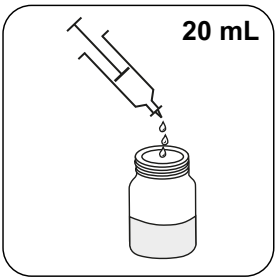
1. **Carry out the test on the Treated Water (Result A) and then on Untreated Water (Result B).**
2. Colours may vary depending on sample and test conditions.
3. This test is suitable for measuring AMP and HEDP type products.
4. Good results have also been obtained with PBSAM.
5. For accurate results the test should be calibrated to each product at typical system dose levels.
6. Standards should be prepared in water as similar as possible to system water (e.g. hard or soft).
7. Add factors into table.
8. Samples less than 20 mL should be diluted to approximately 20 mL with deionized water.

Sampling

Select the sample volume from the table according to the expected measuring range and read off the factor to calculate the result.

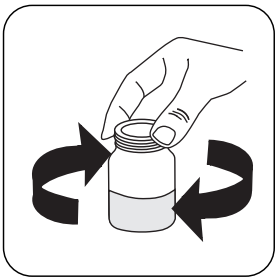
Expected Range	Titrant used	Sample Size	Factor
	Phosphonate Titrant P5		
	Phosphonate Titrant P5		
	Phosphonate Titrant P5		

EN

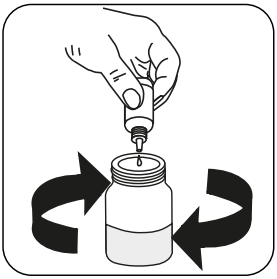


Fill the jar with **20 mL** of the sample.

Add **sufficient** drops of **Phosphonate Neutraliser P1/2** to give a **yellow** colour.

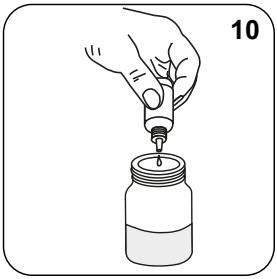


Swirl to mix.



Add drops of **Phosphonate pH Adjuster P3** until the sample is colourless .

Swirl to mix.

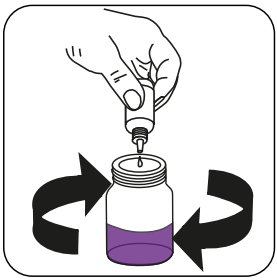


Add **10 drops Phosphonate Indicator P4L**.

Swirl to mix.

The sample will turn **light green** .

Attention! Record the number of drops that will be added.
Note: Make sure to swirl the jar after adding each drop!



Add **Phosphonate Titrant P5** drop by drop to the sample until colouration turns through **grey** to **purple**.

Perform this test with treated (Result A) and untreated water (Result B).

Calculate test result: Product mg/L = Number of drops (result A - result B) x factor (see table)

Sulphite 56I700360

25 - 150 mg/L Na_2SO_3

EN

Material

Reagents	Packaging Unit	Part Number
Sulphite Indicator S1	Powder / 40 g	56P018640
Sulphite Titrant S2	65 mL	56L018765

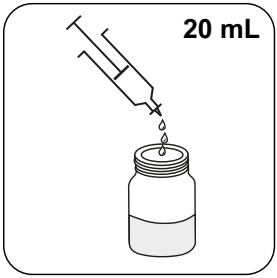
The following accessories are required.

Accessories	Packaging Unit	Part Number
Syringe, plastic, 20 mL	1 pc.	56A006501
Titration jar with cap, plastic, 60 mL	1 pc.	56A006701

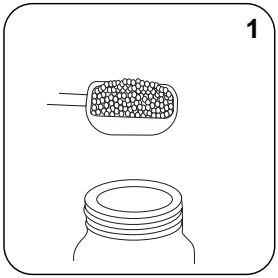
Notes

1. Colours may vary depending on sample and test conditions.
2. Catalysed sulphite reacts quickly with atmospheric oxygen when hot, so the sample should be cooled during collection with the minimum of contact with air. It should be tested immediately after it has cooled. Care should be taken when obtaining samples.
3. Ignore any undissolved material after powder/tablet addition.
4. For concentrations of sodium sulphite above 150 mg/L take a 10 mL sample and use a factor of 10 (i.e. each drop of **Sulphite Titrant S2** used = 10mg/L Na_2SO_3).
5. Sulphite reserve may be expressed in different ways. To convert readings from sodium sulphite multiply the result obtained by the following factors.
   Sodium sulphite to sodium metabisulphite x 0.8
   Sodium sulphite to sulphite x 0.63

Determination of Sodium sulphite in boiler water



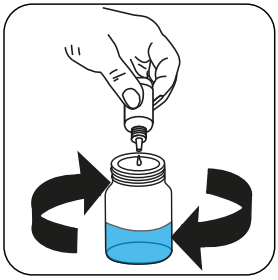
Fill the jar with **20 mL** of the cooled sample.



Add **1 measuring scoop(s) Sulphite Indicator S1** .

Swirl to mix.

Attention! Record the number of drops that will be added.
Note: Make sure to swirl the jar after adding each drop!



Add **Sulphite Titrant S2** drop by drop to the sample until colouration turns from **colourless** to **blue**.

Calculate test result: Sulphite (as Na_2SO_3) mg/L = Number of drops x 5

Tannin 56I700370

50 - 300 mg/L Tannin

EN

Material

Reagents	Packaging Unit	Part Number
Tannin Indicator TN1	Powder / 50 g	56P014650
Tannin Titrant TN2	65 mL	56L019965

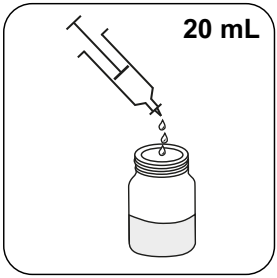
The following accessories are required.

Accessories	Packaging Unit	Part Number
Syringe, plastic, 20 mL	1 pc.	56A006501
Titration jar with cap, plastic, 60 mL	1 pc.	56A006701

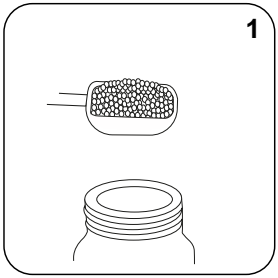
Notes

1. Colours may vary depending on sample and test conditions.
2. Tannin is the name for lignin type compounds and therefore the factor in this method is of a general nature in line with the type of products in general use.
3. It is not necessary for all of the Tannin Indicator TN1 to dissolve.

Determination of Tannin in boiler water



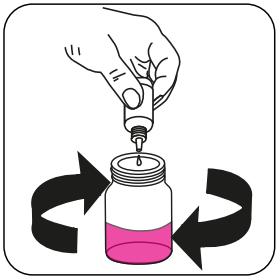
Fill the jar with **20 mL** of the cooled sample.



Add **1 measuring scoop(s) Tannin Indicator TN1** .

Swirl to mix.

Attention! Record the number of drops that will be added.
Note: Make sure to swirl the jar after adding each drop!



Add **Tannin Titrant TN2** drop by drop to the sample until colouration turns from **colourless** to **pink**.

The color should persist for at least **10** seconds.

Calculate test result: Tannin (as Tannin) mg/L = Number of drops x 10

Glycol

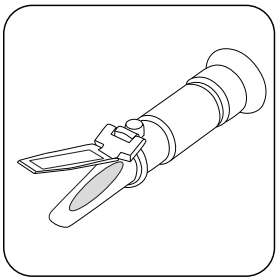
% PEG/MEG

Glycol/ Refractometer

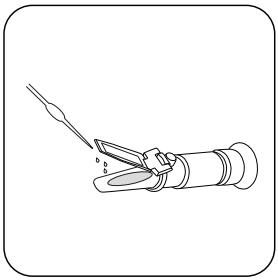
EN

Notes

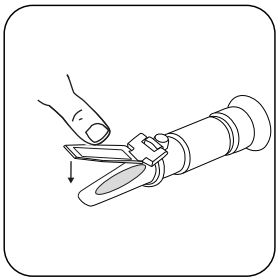
1. The description of the calibration is described in the detailed operating instructions. A detailed instruction manual is enclosed with the device.
2. Point the front end of the refractometer towards a bright light source when you want to take a reading.
3. After the measurement, wipe the measuring solution on the surface of the prism and the cover plate with a damp cotton cloth. Never immerse the device in water or hold it under running water as water may enter the device.
4. After drying, the refractometer should be stored safely. The refractometer is an optical measuring instrument and therefore very sensitive. Please handle it with care. Do not touch or scratch the optical surfaces. The refractometer should be stored in a dry, clean environment to prevent moisture and dust. Please avoid strong shaking.



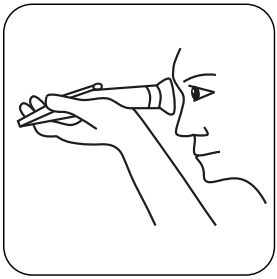
Lift the prism cover.



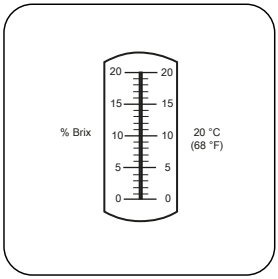
Place a few drops of the sample on the prism face.



Close the daylight plate and press it lightly.



Look through the eyepiece at the measuring scale.



Read the result at scale of light/dark boundary.

Aluminium T M40

0.01 - 0.3 mg/L Al AL

Eriochrom Cyanine R

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Aluminium No. 1	Tablet / 100	515460BT
Aluminium No. 1	Tablet / 250	515461BT
Aluminium No. 2	Tablet / 100	515470BT
Aluminium No. 2	Tablet / 250	515471BT
Set Aluminium No. 1/No. 2 100 Pc.#	100 each	517601BT
Set Aluminium No. 1/No. 2 250 Pc.#	250 each	517602BT

Preparation

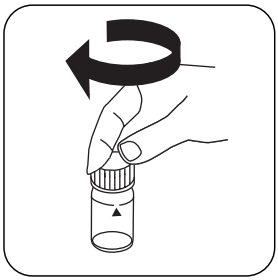
1. To get accurate results the sample temperature must be between 20 °C and 25 °C.
2. To avoid errors caused by contamination, rinse the vial and the accessories with Hydrochloric acid (approx. 20%) before the analysis. Then rinse them with deionised water.

Determination of Aluminium with Tablet

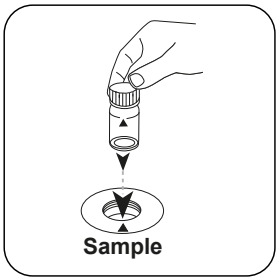
Select the method on the device.

For this method, a ZERO measurement does not have to be carried out every time on the following devices: XD 7000, XD 7500

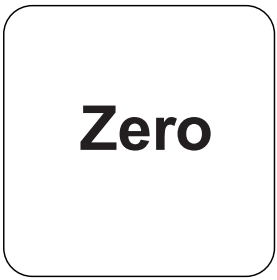
Fill 24 mm vial with **10 mL sample**.



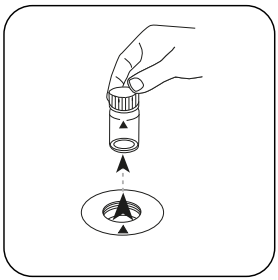
Close vial(s).



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

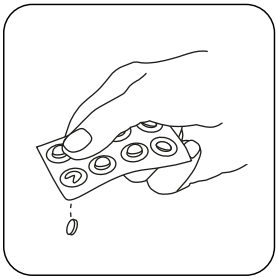


Press the **ZERO** button.

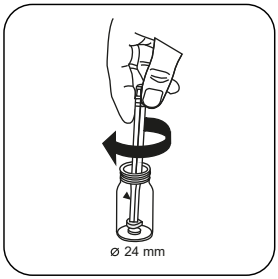


Remove the vial from the sample chamber.

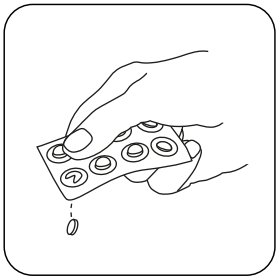
For devices that require **no ZERO measurement** , **start here**.



Add **ALUMINIUM No. 1 tablet** .

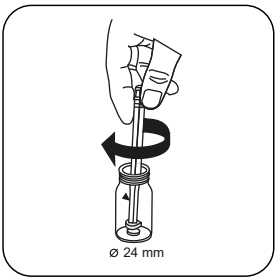


Crush tablet(s) by rotating slightly and dissolve.

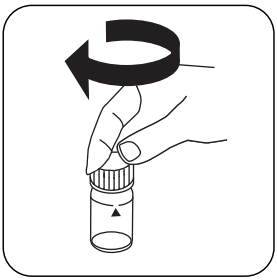


Add **ALUMINIUM No. 2 tablet** .

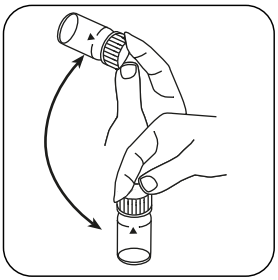
EN



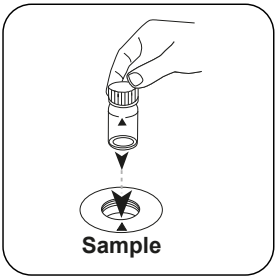
Crush tablet(s) by rotating slightly.



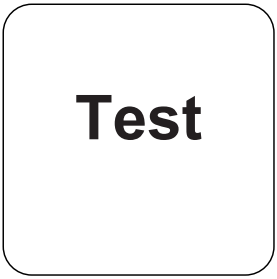
Close vial(s).



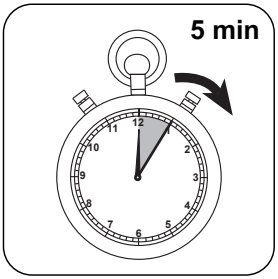
Dissolve tablet(s) by inverting.



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



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



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

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

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

including stirring rod, 10 cm

Bromine T M80

0.05 - 13 mg/L Br_2 Br

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. 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

Preparation

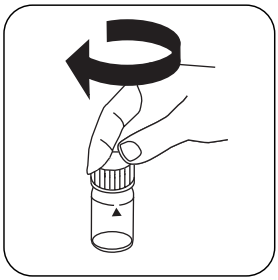
1. Cleaning of vials:
   As many household cleaners (e.g. dishwasher detergent) contain reducing substances, the subsequent determination of oxidising agents (e.g. ozone and chlorine) may show lower results. To avoid measurement errors, the glassware used should be free of chlorine consumption. To achieve 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. When preparing the sample, Bromine outgassing, e.g. through the pipette or shaking, must be avoided. The analysis must take place immediately after taking the sample.
3. Strong alkaline or acidic water samples must be adjusted between pH 6 and pH 7 before the analysis (use 0.5 mol/l Sulphuric acid or 1 mol/l Sodium hydroxide).

Determination of Bromine with Tablet

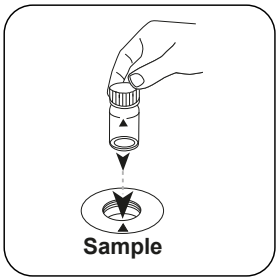
Select the method on the device.

For this method, a ZERO measurement does not have to be carried out every time on the following devices: XD 7000, XD 7500

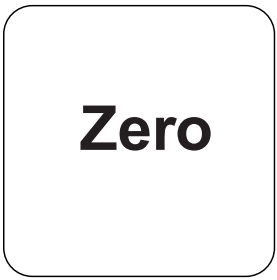
Fill 24 mm vial with **10 mL sample**.



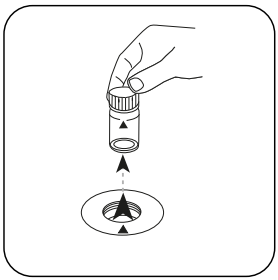
Close vial(s).



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



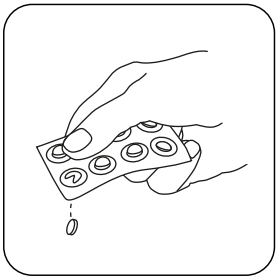
Press the **ZERO** button.



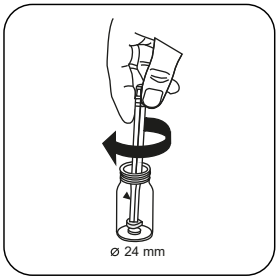
Remove the vial from the sample chamber.

Empty vial except for a few drops.

For devices that require **no ZERO measurement** , **start here**.

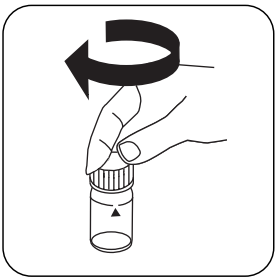


Add **DPD No. 1 tablet** .

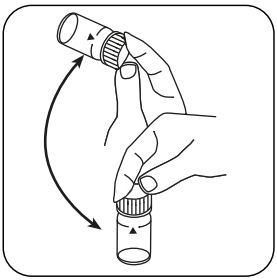


Crush tablet(s) by rotating slightly.

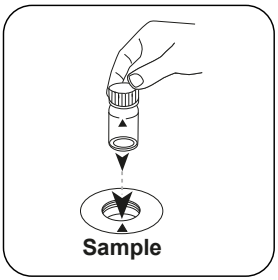
Fill up vial with **sample** to the **10 mL mark**.



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 Bromine appears on the display.

Persistant Interferences

1. All oxidising agents in the samples react like bromine, which leads to higher results.
2. Concentrations above 22 mg/L Bromine can lead to results within the measuring range of up to 0 mg/L. In this case, the water sample must be diluted. 10 ml of the diluted sample should be mixed with the reagent and the measurement taken again (plausibility test).

[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 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

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).

Determination of free chlorine with tablet

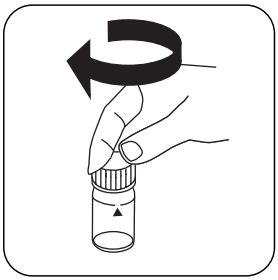
Select the method on the device.

In addition, choose the test: free

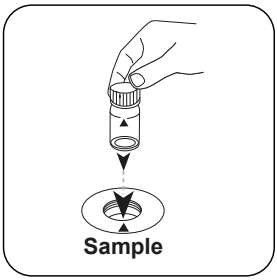
For this method, a ZERO measurement does not have to be carried out every time on the following devices: XD 7000, XD 7500

EN

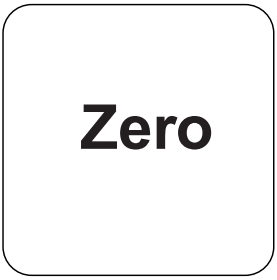
Fill 24 mm vial with **10 mL sample**.



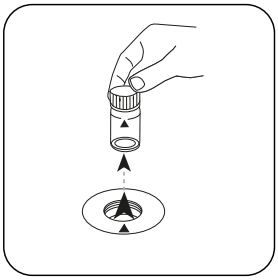
Close vial(s).



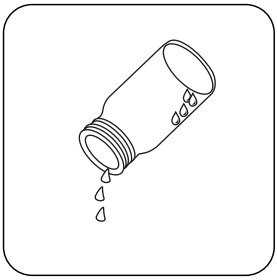
Place **sample vial** in the sample chamber. Pay attention to the positioning.



Press the **ZERO** button.

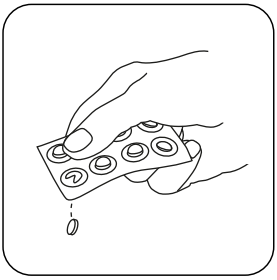


Remove the vial from the sample chamber.

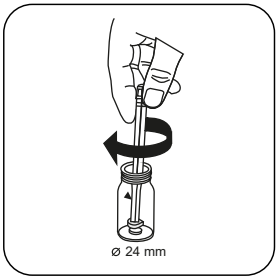


Empty vial except for a few drops.

For devices that require **no ZERO measurement** , **start here**.

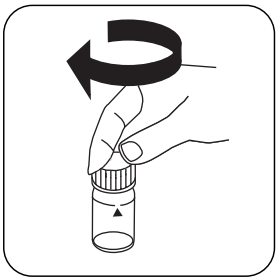


Add **DPD No. 1 tablet** .

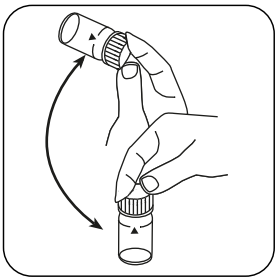


Crush tablet(s) by rotating slightly.

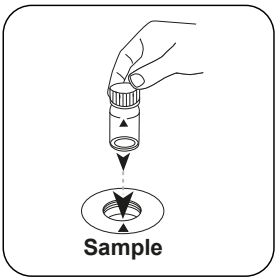
Fill up vial with **sample** to the **10 mL mark**.



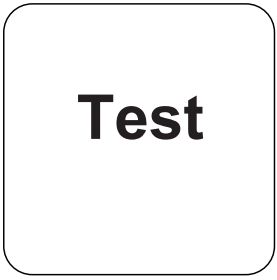
Close vial(s).



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.

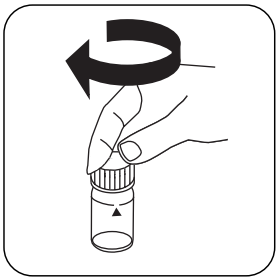
Determination of total Chlorine with tablet

Select the method on the device.

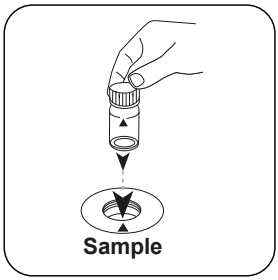
In addition, choose the test: total

For this method, a ZERO measurement does not have to be carried out every time on the following devices: XD 7000, XD 7500

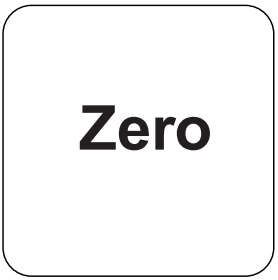
Fill 24 mm vial with **10 mL sample**.



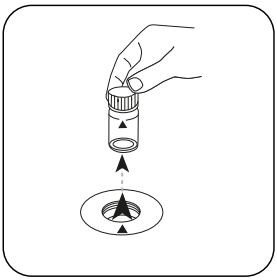
Close vial(s).



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



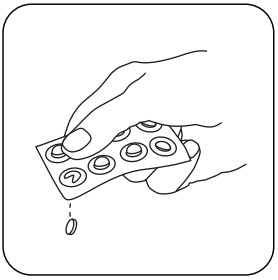
Press the **ZERO** button.



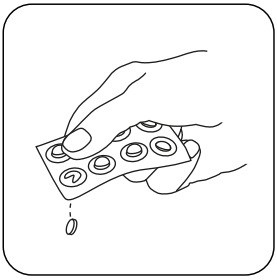
Remove the vial from the sample chamber.

Empty vial except for a few drops.

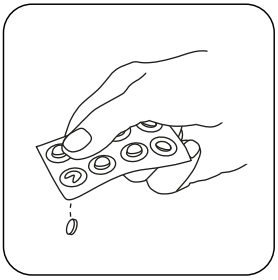
For devices that require **no ZERO measurement** , **start here**.



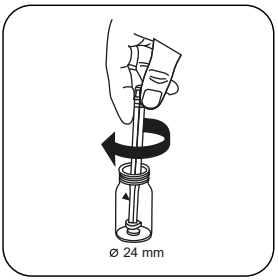
Add **DPD No. 1 tablet** .



Add **DPD No. 3 tablet** .

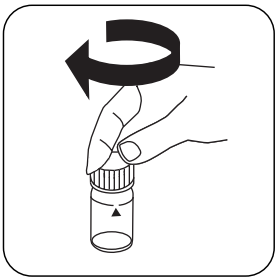


As an alternative to DPD No. 1 and No. 3 tablets, a DPD No. 4 tablet can be added.

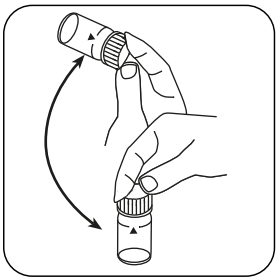


Crush tablet(s) by rotating slightly.

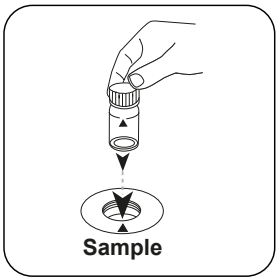
Fill up vial with **sample** to the **10 mL mark**.



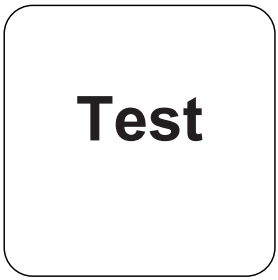
Close vial(s).



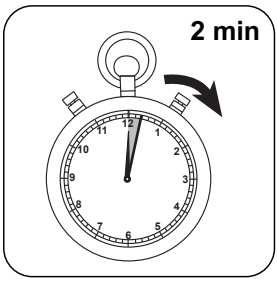
Dissolve tablet(s) by inverting.



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.

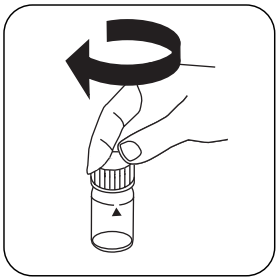
Determination of Chlorine differentiated with tablet

Select the method on the device.

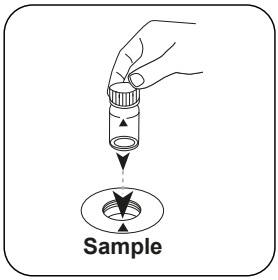
In addition, choose the test: differentiated

For this method, a ZERO measurement does not have to be carried out every time on the following devices: XD 7000, XD 7500

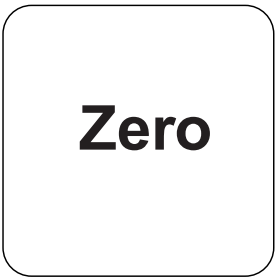
Fill 24 mm vial with **10 mL sample**.



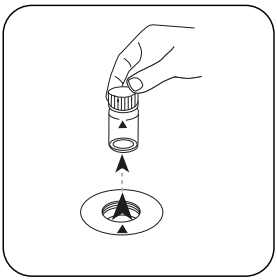
Close vial(s).



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



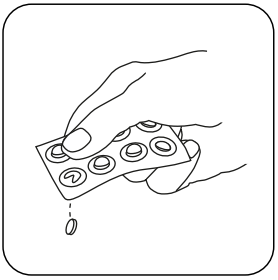
Press the **ZERO** button.



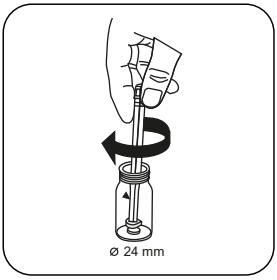
Remove the vial from the sample chamber.

Empty vial except for a few drops.

For devices that require **no ZERO measurement** , **start here**.



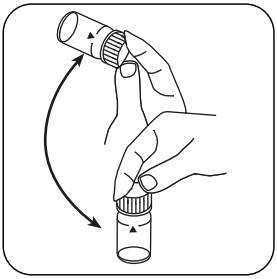
Add **DPD No. 1 tablet** .



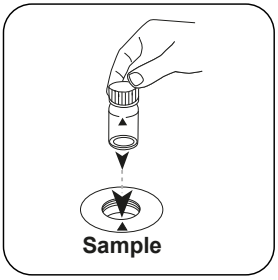
Crush tablet(s) by rotating slightly.

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

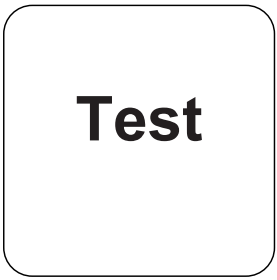
Close vial(s).



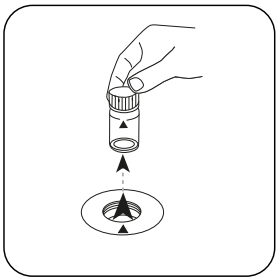
Dissolve tablet(s) by inverting.



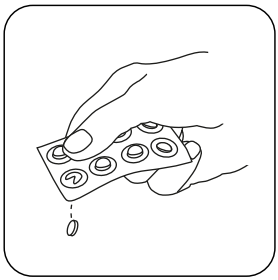
Place **sample vial** in the sample chamber. Pay attention to the positioning.



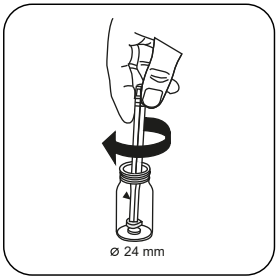
Press the **TEST** (XD: **START**)button.



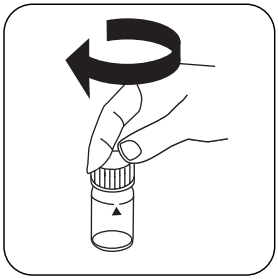
Remove the vial from the sample chamber.



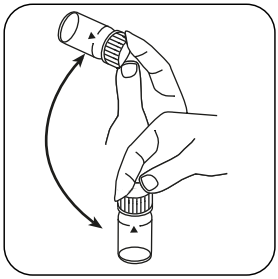
Add **DPD No. 3 tablet** .



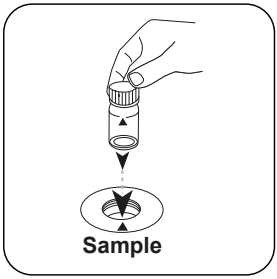
Crush tablet(s) by rotating slightly.



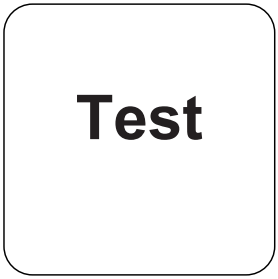
Close vial(s).



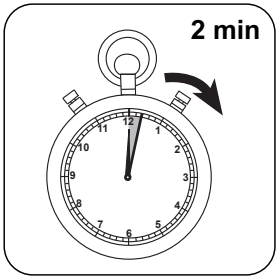
Dissolve tablet(s) by inverting.



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



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



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

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

The result in mg/L free chlorine, mg/l combined chlorine, mg/l total chlorine appears on the display.

Persistant Interferences

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

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

EN

[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

Copper T M150

0.05 - 5 mg/L Cu[a)] Cu

Biquinoline

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Copper No. 1	Tablet / 100	513550BT
Copper No. 1	Tablet / 250	513551BT
Copper No. 2	Tablet / 100	513560BT
Copper No. 2	Tablet / 250	513561BT
Set Copper No. 1/No. 2 100 Pc.[#]	100 each	517691BT
Set Copper No. 1/No. 2 250 Pc.[#]	250 each	517692BT

Preparation

1. Strong alkaline or acidic water samples must be adjusted to pH 4 to 6 before analysis.

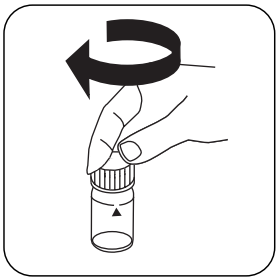
Determination of Copper, free with tablet

Select the method on the device.

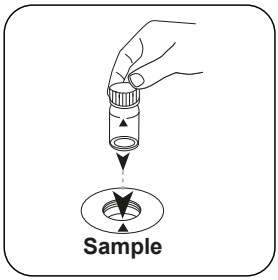
In addition, choose the test: free

For this method, a ZERO measurement does not have to be carried out every time on the following devices: XD 7000, XD 7500

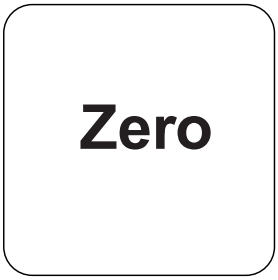
Fill 24 mm vial with **10 mL sample**.



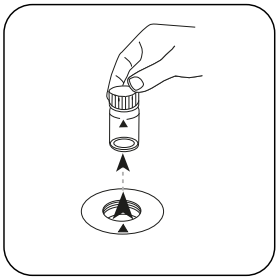
Close vial(s).



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

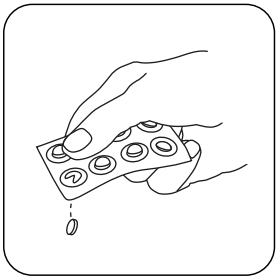


Press the **ZERO** button.

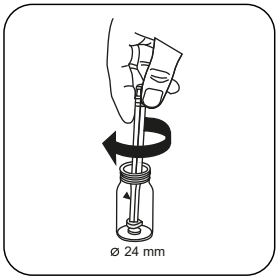


Remove the vial from the sample chamber.

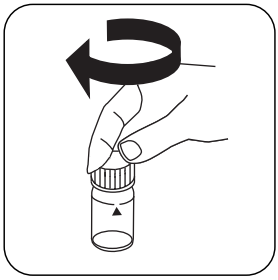
For devices that require **no ZERO measurement** , **start here**.



Add **COPPER No. 1 tablet** .

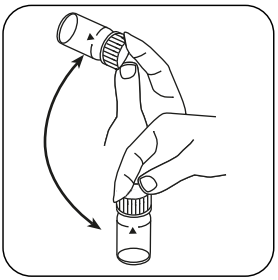


Crush tablet(s) by rotating slightly.

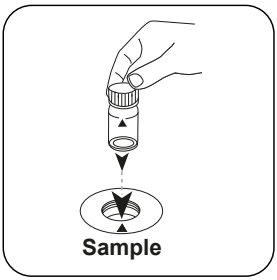


Close vial(s).

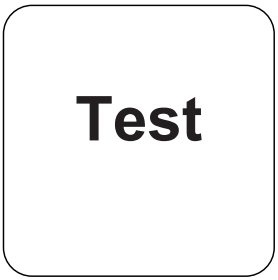
EN



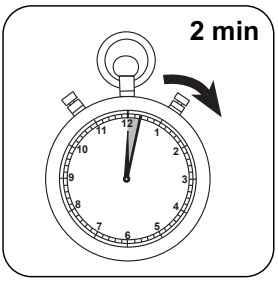
Dissolve tablet(s) by inverting.



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



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



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

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

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

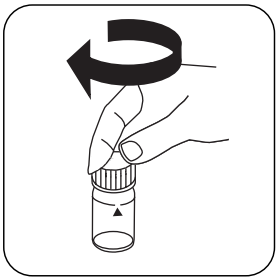
Determination of Copper, total with tablet

Select the method on the device.

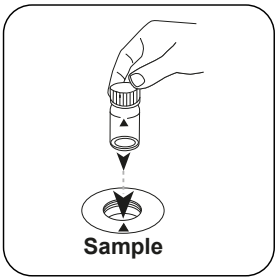
In addition, choose the test: total

For this method, a ZERO measurement does not have to be carried out every time on the following devices: XD 7000, XD 7500

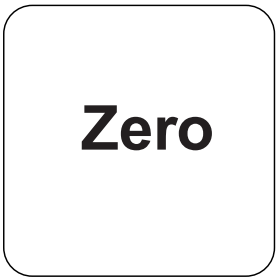
Fill 24 mm vial with **10 mL sample**.



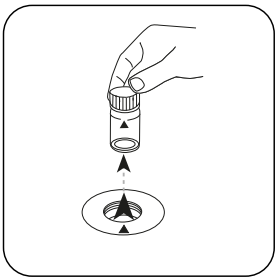
Close vial(s).



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

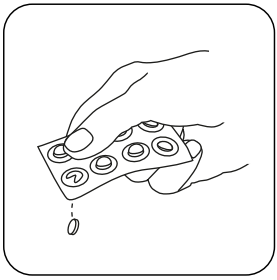


Press the **ZERO** button.

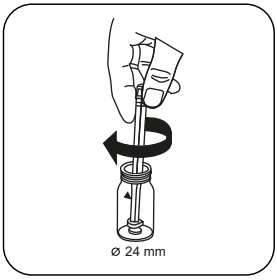


Remove the vial from the sample chamber.

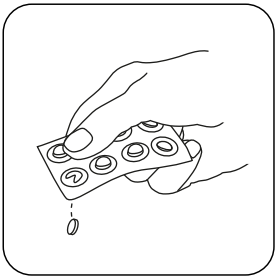
For devices that require **no ZERO measurement** , **start here**.



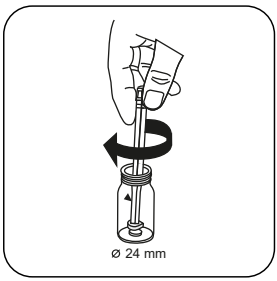
Add **COPPER No. 1 tablet** .



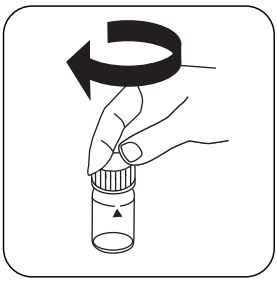
Crush tablet(s) by rotating slightly and dissolve.



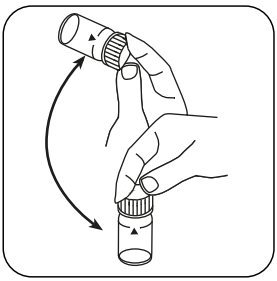
Add **COPPER No. 2 tablet** .



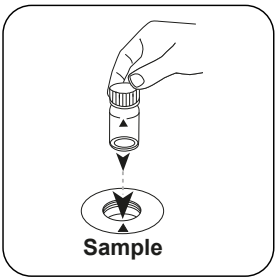
Crush tablet(s) by rotating slightly.



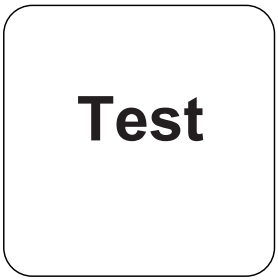
Close vial(s).



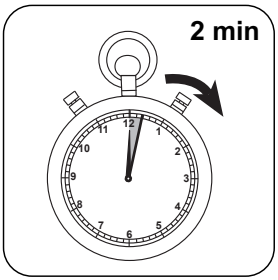
Dissolve tablet(s) by inverting.



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



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



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

EN

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

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

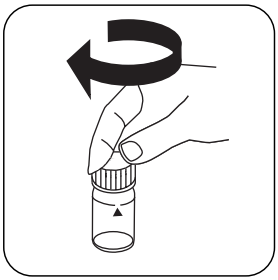
Determination of Copper, differentiated determination with Tablet

Select the method on the device.

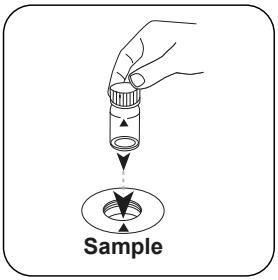
In addition, choose the test: differentiated

For this method, a ZERO measurement does not have to be carried out every time on the following devices: XD 7000, XD 7500

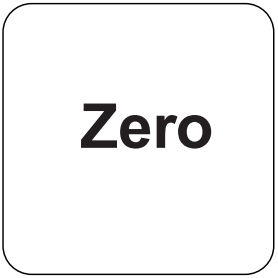
Fill 24 mm vial with **10 mL sample**.



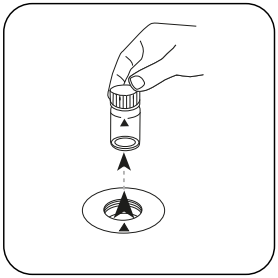
Close vial(s).



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

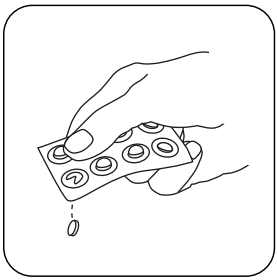


Press the **ZERO** button.

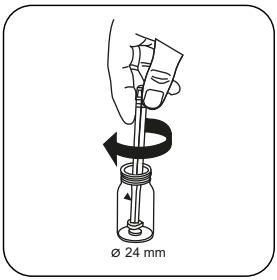


Remove the vial from the sample chamber.

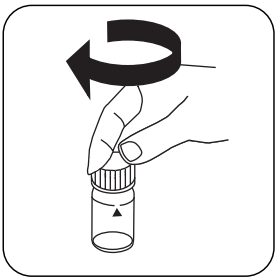
For devices that require **no ZERO measurement** , **start here**.



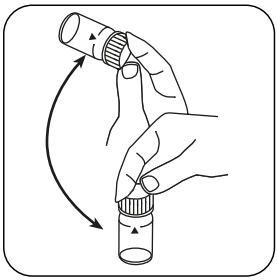
Add **COPPER No. 1 tablet** .



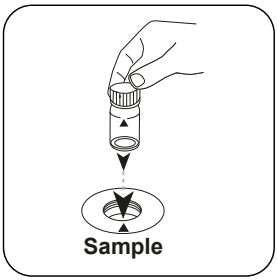
Crush tablet(s) by rotating slightly.



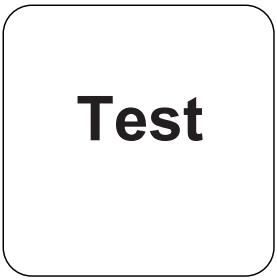
Close vial(s).



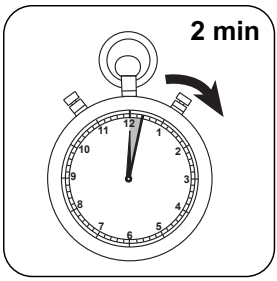
Dissolve tablet(s) by inverting.



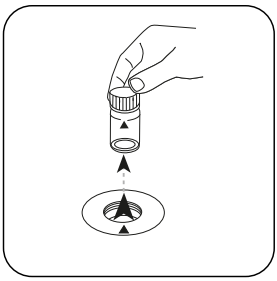
Place **sample vial** in the sample chamber. Pay attention to the positioning.



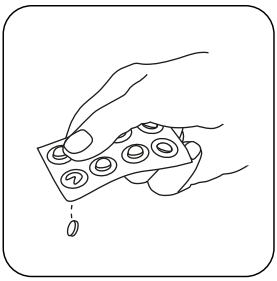
Press the **TEST** (XD: **START**)button.



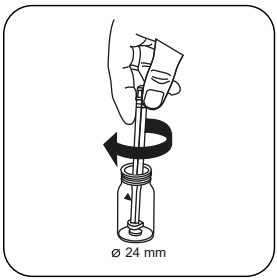
Wait for **2 minute(s) reaction time**.



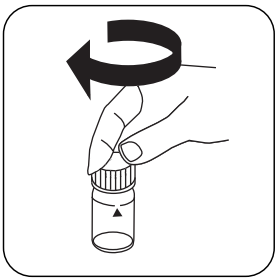
Remove the vial from the sample chamber.



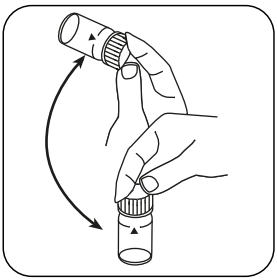
Add **COPPER No. 2 tablet** .



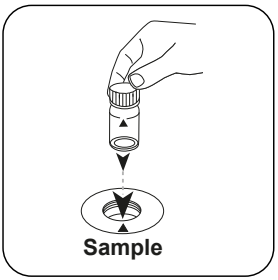
Crush tablet(s) by rotating slightly.



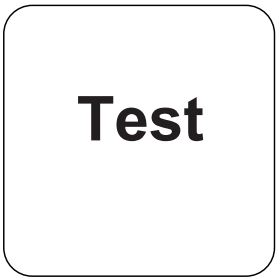
Close vial(s).



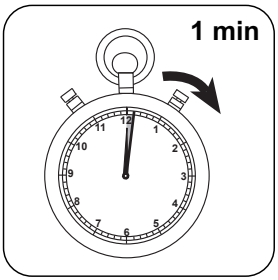
Dissolve tablet(s) by inverting.



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



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



Wait for **1 minute(s) reaction time**.

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

The result in mg/L free Copper; combined Copper; total Copper appears on the display.

Persistant Interferences

1. Cyanide CN^- and Silver Ag^+ interfere with the test result.

[a] determination of free, combined and total | # including stirring rod, 10 cm

Iron LR L (A) M225

0.03 - 2 mg/L Fe FE

Ferrozine / Thioglycolate

EN

Material

Required material (partly optional):

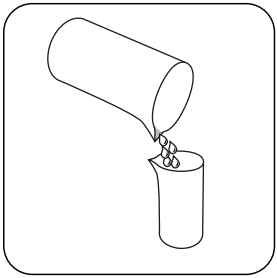
Reagents	Packaging Unit	Part Number
Acidity / Alkalinity P Indicator PA1	65 mL	56L013565
Hardness Calcium Buffer CH2	65 mL	56L014465
KP962-Ammonium Persulphate Powder	Powder / 40 g	56P096240
KS63-FE6-Thioglycolate/Molybdate HR RGT	30 mL	56L006330
Iron Reagent FE6	65 mL	56L006365
Iron Reagent FE5	65 mL	56L006165
Iron LR Reagent Set	1 pc.	56R018990

Preparation

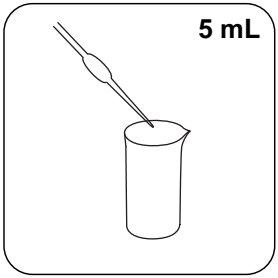
1. If there are strong complexing agents in the sample, the response time must be extended until no further colour development is seen. However, very strong iron complexes are not included in the measurement. In this event, the complexing agent must be destroyed by means of oxidation with acid/persulphate and the sample also neutralised to pH 6–9.
2. For the measurement of total iron, both suspended and dissolved, the sample must be boiled with acid/persulphate. It must be neutralised back to pH 6–9 and refilled to the original volume with deionised water.

Digestion

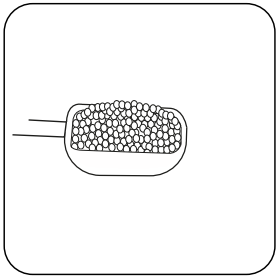
Total iron consists of suspended, soluble and complexed iron. The sample must be not filtered before measuring. To ensure homogenisation of the sample, deposed particles must be evenly distributed immediately prior to sampling by forcible shaking. A filtration of the sample is necessary for the determination of total soluble iron (including the complex iron compounds).The equipment required for the determination of total iron and reagents are not included in the standard delivery.



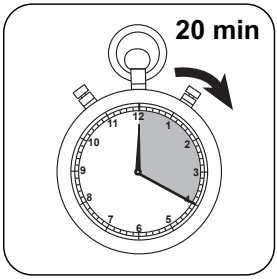
Fill a suitable digestion vessel with **50 mL homogenised sample**.



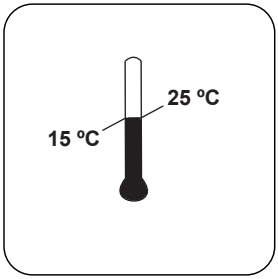
Add **5 mL 1:1 Hydrochloric acid**.



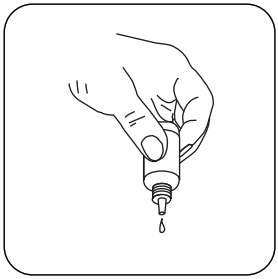
Add **a measuring scoop KP 962 (Ammonium Persulfat Powder)** .



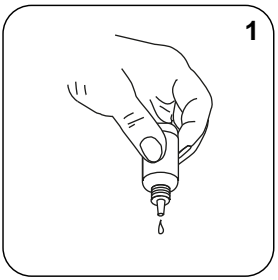
Boil the sample for **20 minutes** . A sample volume of about 25 mL should be retained;
If necessary, fill with deionised water.



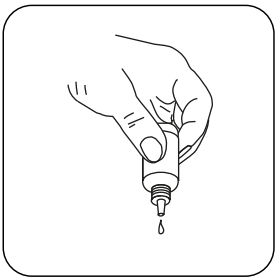
Allow the sample to cool to room temperature.



Hold cuvettes vertically and add equal drops by pressing slowly.



Add **1 drops Acidity / Alkalinity P Indicator PA1**.



Add **Hardness Calcium Buffer CH2** drop by drop to the same sample until colouration turns from light pink to red. **(Note: make sure to swirl the vial after adding each drop!)**

Fill the sample with **deionised water to 50 mL** .

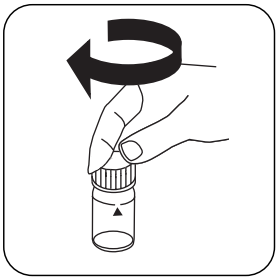
Determination of Iron, total LR (A) with liquid reagent

Select the method on the device.

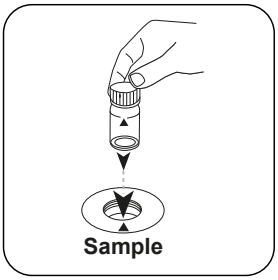
For testing of **Iron, total LR,** carry out the described **digestion**.

For this method, a ZERO measurement does not have to be carried out every time on the following devices: XD 7000, XD 7500

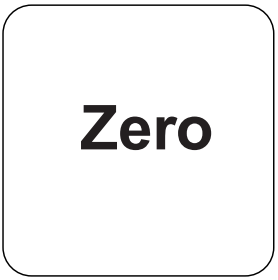
Fill 24 mm vial with **10 mL deionised water** .



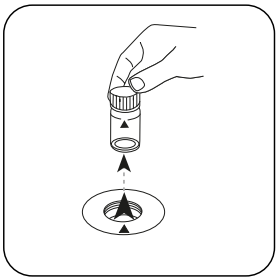
Close vial(s).



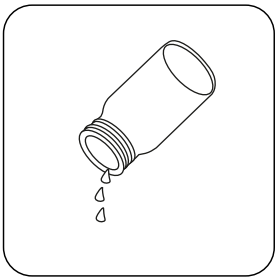
Place **sample vial** in the sample chamber. Pay attention to the positioning.



Press the **ZERO** button.



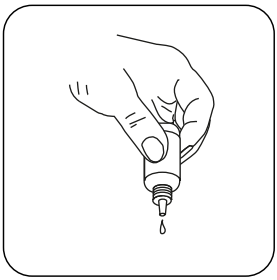
Remove the vial from the sample chamber.



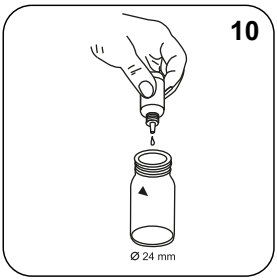
Empty vial.

For devices that require **no ZERO measurement** , **start here**.

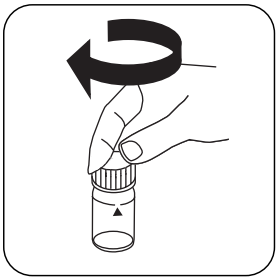
Fill 24 mm vial with **10 mL prepared sample** .



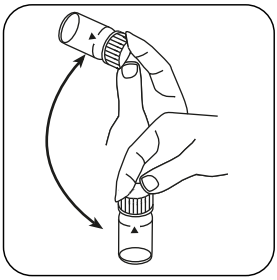
Hold cuvettes vertically and add equal drops by pressing slowly.



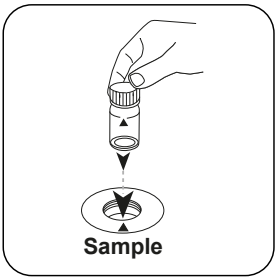
Add **10 drops Iron Reagent FE5**.



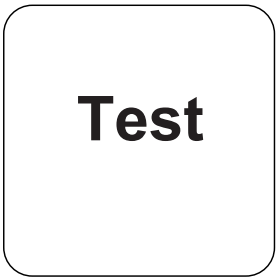
Close vial(s).



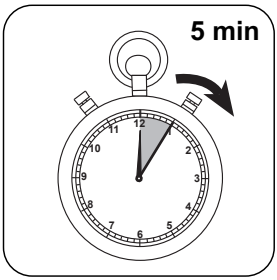
Invert several times to mix the contents.



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



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



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

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

The result in mg/L total Iron or when using a filtrated sample, in mg/l totale soluble Iron appears on the display.

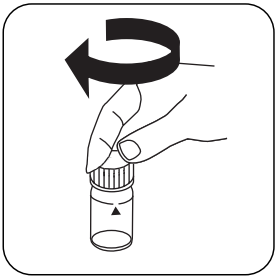
Determination of Iron LR (A) with liquid reagent

Select the method on the device.

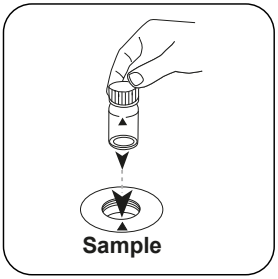
For this method, a ZERO measurement does not have to be carried out every time on the following devices: XD 7000, XD 7500

For determination of total dissolved iron the sample must be filtered prior to the test (pore size 0,45 µm). Otherwise, iron particles and suspended iron are measured.

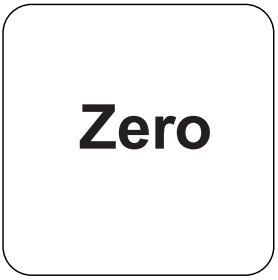
Fill 24 mm vial with **10 mL prepared sample** .



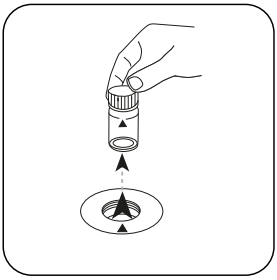
Close vial(s).



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

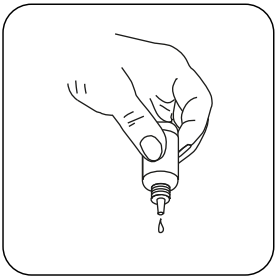


Press the **ZERO** button.

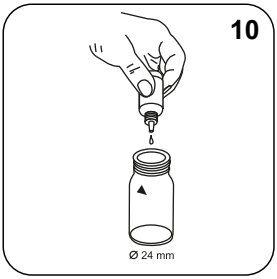


Remove the vial from the sample chamber.

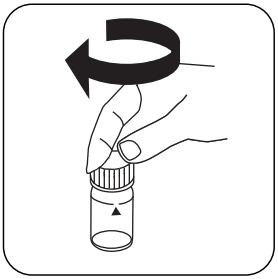
For devices that require **no ZERO measurement** , **start here**.



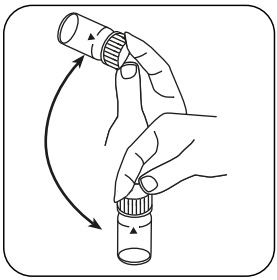
Hold cuvettes vertically and add equal drops by pressing slowly.



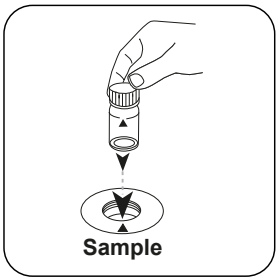
Add **10 drops Iron Reagent FE5**.



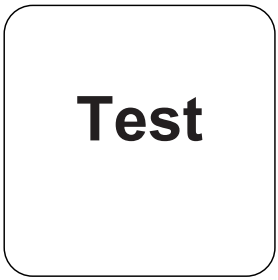
Close vial(s).



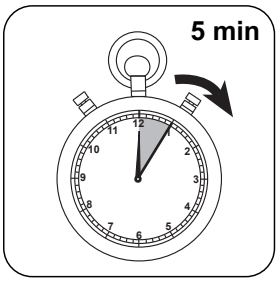
Invert several times to mix the contents.



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



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



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

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

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

Interference	from / [mg/L]
Co	8
Cu	2
Oxalat	500
CN^-	10

NO_2^-

Iron HR L M227

0.1 - 10 mg/L Fe

Thioglycolate

EN

Material

Required material (partly optional):

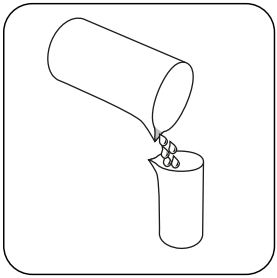
Reagents	Packaging Unit	Part Number
KP962-Ammonium Persulphate Powder	Powder / 40 g	56P096240
Acidity / Alkalinity P Indicator PA1	30 mL	56L013530
Acidity / Alkalinity P Indicator PA1	65 mL	56L013565
Hardness Calcium Buffer CH2	65 mL	56L014465
Calcium Hardness Buffer CH2	5 x 65 mL mL	56L014472
Iron HR Reagent Set	1 pc.	56R023590

Preparation

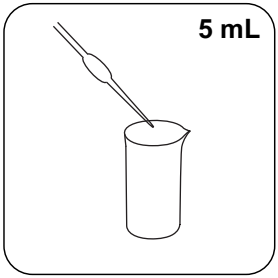
1. If there are strong complexing agents in the sample, the response time must be extended until no further colour development is seen. However, very strong iron complexes are not included in the measurement. In this event, the complexing agent must be destroyed by means of oxidation with acid/persulphate and the sample also neutralised to pH 6–9.
2. For the measurement of total iron, both suspended and dissolved, the sample must be boiled with acid/persulphate. It must be neutralised back to pH 6–9 and refilled to the original volume with deionised water.

Digestion

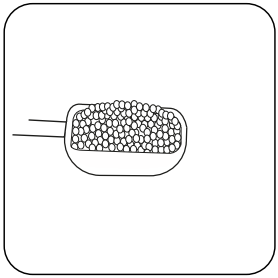
Total iron consists of suspended, soluble and complexed iron. The sample must be not filtered before measuring. To ensure homogenisation of the sample, deposed particles must be evenly distributed immediately prior to sampling by forcible shaking. A filtration of the sample is necessary for the determination of total soluble iron (including the complex iron compounds).The equipment required for the determination of total iron and reagents are not included in the standard delivery.



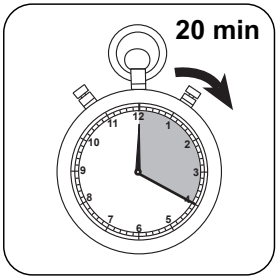
Fill a suitable digestion vessel with **50 mL homogenised sample**.



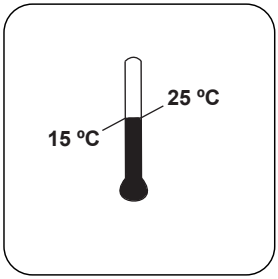
Add **5 mL 1:1 Hydrochloric acid**.



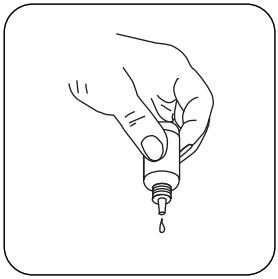
Add **a measuring scoop KP 962 (Ammonium Persulphat Powder)** .



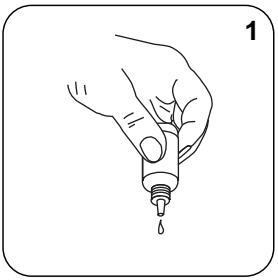
Boil the sample for **20 minutes** . A sample volume of about 25 mL should be retained;
If necessary, fill with deionised water.



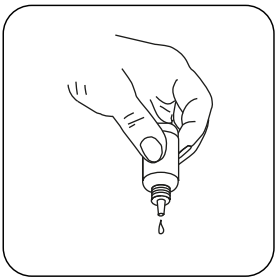
Allow the sample to cool to room temperature.



Hold cuvettes vertically and add equal drops by pressing slowly.



Add **1 drops Acidity / Alkalinity P Indicator PA1**.



Add **Hardness Calcium Buffer CH2** drop by drop to the same sample until colouration turns from light pink to red. **(Note: make sure to swirl the vial after adding each drop!)**

Fill the sample with **deionised water to 50 mL** .

EN

Determination of Iron, total HR with liquid reagent

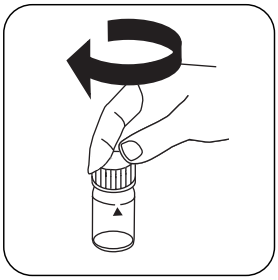
Select the method on the device.

For testing of **Iron, total HR with liquid reagent,** carry out the described **digestion**.

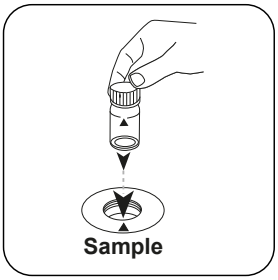
For this method, a ZERO measurement does not have to be carried out every time on the following devices: XD 7000, XD 7500

Total iron consists of suspended, soluble and complexed iron. The sample must be not filtered before measuring. To ensure homogenisation of the sample, deposed particles must be evenly distributed immediately prior to sampling by forcible shaking. A filtration of the sample is necessary for the determination of total soluble iron (including the complex iron compounds).The equipment required for the determination of total iron and reagents are not included in the standard delivery.

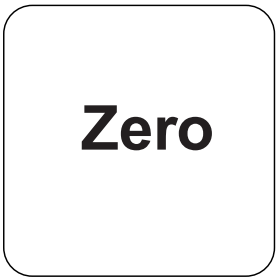
Fill 24 mm vial with **10 mL deionised water** .



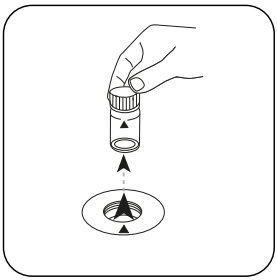
Close vial(s).



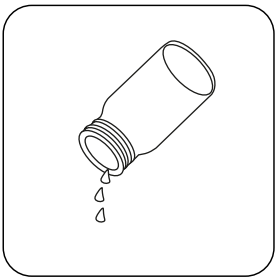
Place **sample vial** in the sample chamber. Pay attention to the positioning.



Press the **ZERO** button.



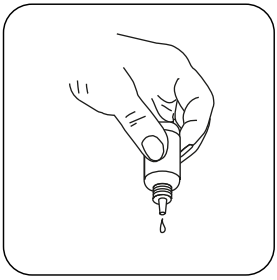
Remove the vial from the sample chamber.



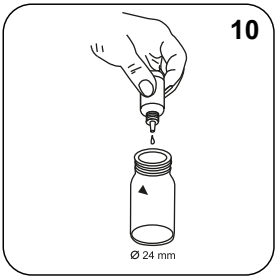
Empty vial.

For devices that require **no ZERO measurement** , **start here**.

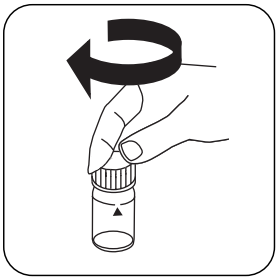
Fill 24 mm vial with **10 mL prepared sample** .



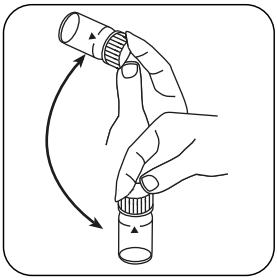
Hold cuvettes vertically and add equal drops by pressing slowly.



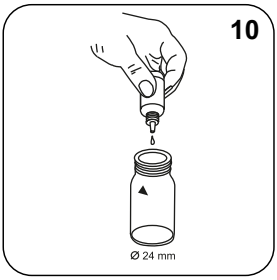
Add **10 drops Iron Reagent FE6**.



Close vial(s).

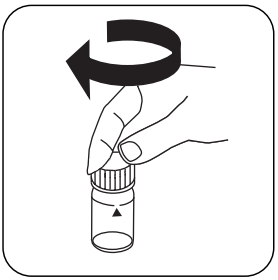


Invert several times to mix the contents.

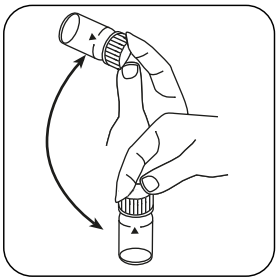


Add **10 drops Hardness Total Buffer TH2**.

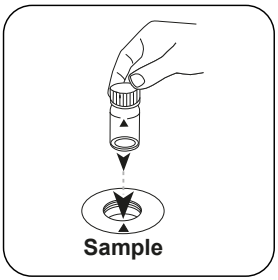
EN



Close vial(s).

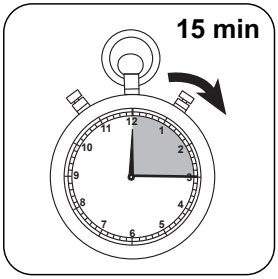


Invert several times to mix the contents.



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

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



Wait for **15 minute(s) reaction time**.

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

The result in mg/L total Iron or when using a filtrated sample, in mg/l totale soluble Iron appears on the display.

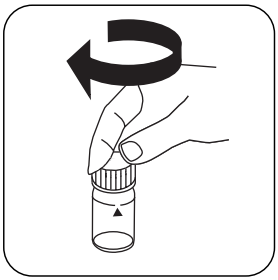
Determination of Iron HR with Liquid Reagent

Select the method on the device.

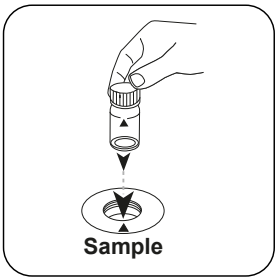
For this method, a ZERO measurement does not have to be carried out every time on the following devices: XD 7000, XD 7500

For determination of dissolved iron the sample must be filtered prior to the test (pore size 0,45 µm). Otherwise, iron particles and suspended iron are measured.

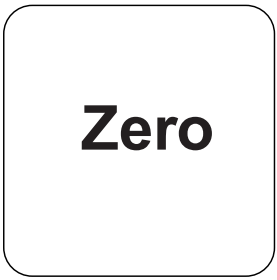
Fill 24 mm vial with **10 mL sample**.



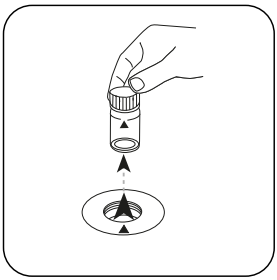
Close vial(s).



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

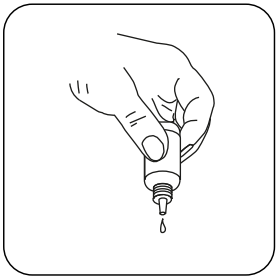


Press the **ZERO** button.

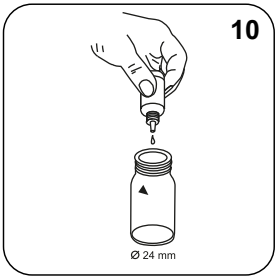


Remove the vial from the sample chamber.

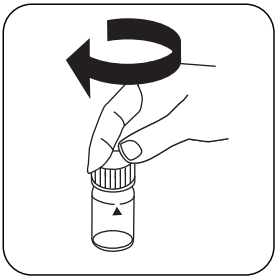
For devices that require **no ZERO measurement** , **start here**.



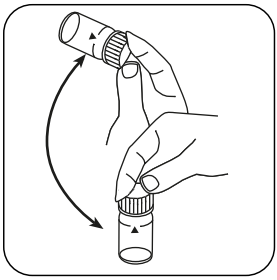
Hold cuvettes vertically and add equal drops by pressing slowly.



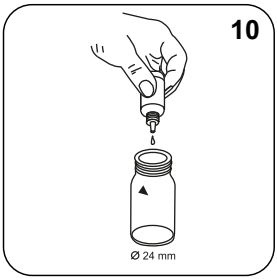
Add **10 drops Iron Reagent FE6**.



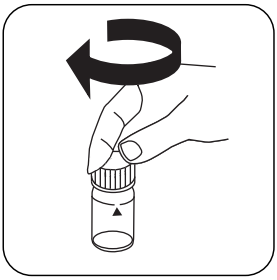
Close vial(s).



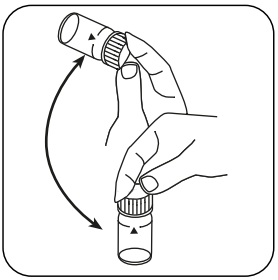
Invert several times to mix the contents.



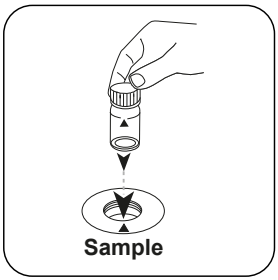
Add **10 drops Hardness Total Buffer TH2**.



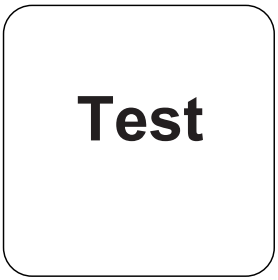
Close vial(s).



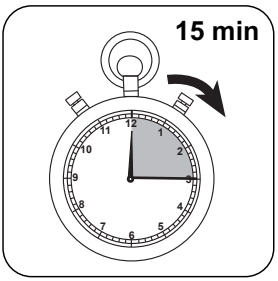
Invert several times to mix the contents.



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



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



Wait for **15 minute(s) reaction time**.

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

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

Molybdate T **M250**

1 - 50 mg/L MoO_4 **Mo3**

Thioglycolate

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Molybdate HR No. 1	Tablet / 100	513060BT
Molybdate HR No. 1	Tablet / 250	513061BT
Molybdate HR No. 2	Tablet / 100	513070BT
Molybdate HR No. 2	Tablet / 250	513071BT
Set Molybdate No. 1/No. 2 100 Pc.#	100 each	517631BT
Set Molybdate No. 1/No. 2 250 Pc.#	250 each	517632BT

Notes

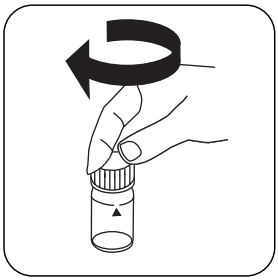
1. The tablets must be added in the correct sequence.

Determination of Molybdate HR with Tablet

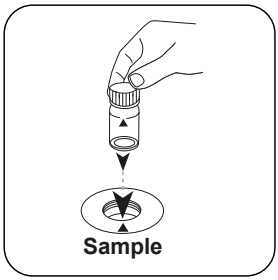
Select the method on the device.

For this method, a ZERO measurement does not have to be carried out every time on the following devices: XD 7000, XD 7500

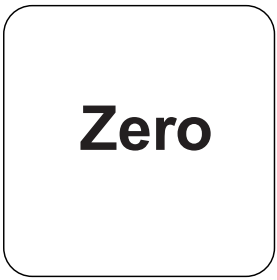
Fill 24 mm vial with **10 mL sample**.



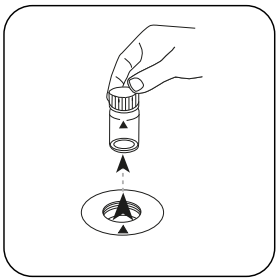
Close vial(s).



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



Press the **ZERO** button.

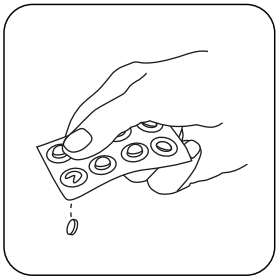


Remove the vial from the sample chamber.

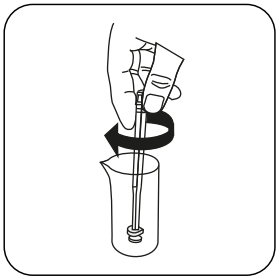
Empty vial.

For devices that require **no ZERO measurement** , **start here**.

Put **20 mL sample** in 100 mL measuring beaker

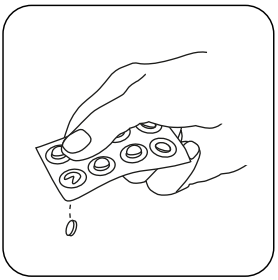


Add **MOLYBDATE HR No. 1 tablet** .

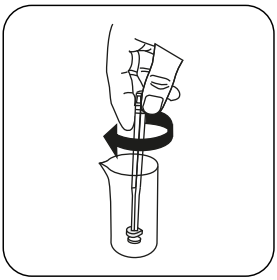


Crush tablet(s) by rotating slightly.

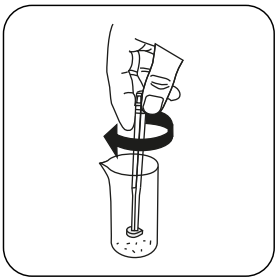
EN



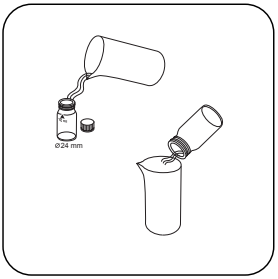
Add **MOLYBDATE HR No. 2 tablet** .



Crush tablet(s) by rotating slightly.

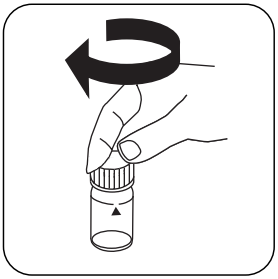


Dissolve the tablets using a clean stirring rod.

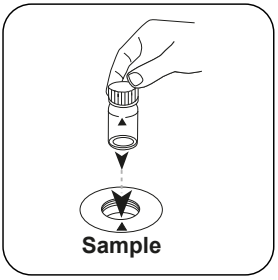


Rinse out vial with prepared sample .

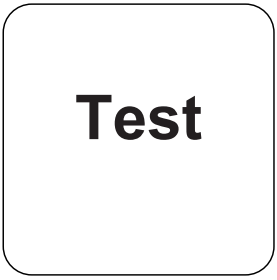
Fill up vial with **sample** to the **10 mL mark**.



Close vial(s).



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



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

The result in mg/L Molybdate/ Molybdenum appears on the display.

including stirring rod, 10 cm

Phosphate HR T M321

0.33 - 26 mg/L P

Vanadomolybdate

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Set Phosphate No. 1 HR/No. 2 HR 100 Pc. #	100 each	517661BT
Phosphate HR P1	Tablet / 100	515810BT
Phosphate HR P2	Tablet / 100	515820BT

Preparation

1. Strongly buffered samples or samples with extreme pH values should be adjusted to between pH 6 and pH 7 before the analysis (use 1 mol/l Sulphuric acid or 1 mol/l Sodium hydroxide).
2. Ortho-Phosphate ions react with the reagent to form an intense yellow colour. Phosphate, which is found in organic and condensed, inorganic (meta-, pyro- and polyphosphate) forms, must therefore be converted into ortho-phosphate ions prior to analysis. The pretreatment of the sample with acid and heat creates the conditions for the hydrolysis of the condensed, inorganic forms. Organically bound phosphate can be converted into ortho-phosphate ions by heating with acid and Persulphate.
   The amount of organically bound phosphate can be calculated:
   mg/L organic Phosphate = mg/L Phosphate, total - mg/L Phosphate, can be hydrolysed in acid.

Notes

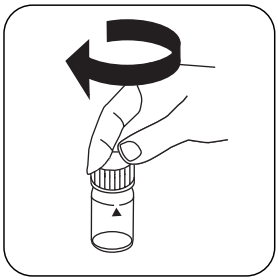
1. Only ortho-phosphate ions react.
2. For samples under 5 mg/L PO_4 it is recommended to analyse the water sample using Method 320 ”Phosphate ortho LR with Tablet“.

Determination of Phosphate, ortho HR with Tablet

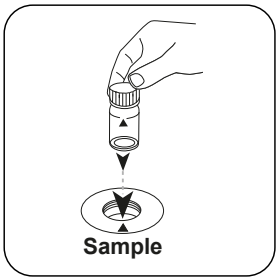
Select the method on the device.

For this method, a ZERO measurement does not have to be carried out every time on the following devices: XD 7000, XD 7500

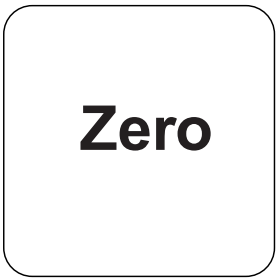
Fill 24 mm vial with **10 mL sample**.



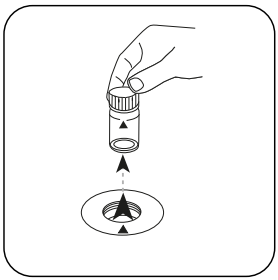
Close vial(s).



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

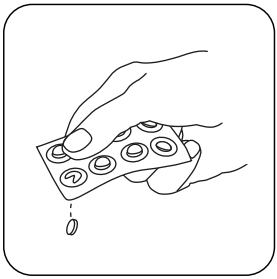


Press the **ZERO** button.

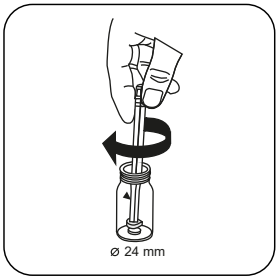


Remove the vial from the sample chamber.

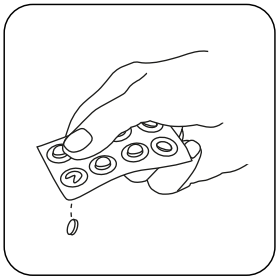
For devices that require **no ZERO measurement** , **start here**.



Add **PHOSPHATE HR P1 tablet** .

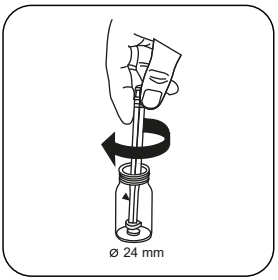


Crush tablet(s) by rotating slightly.

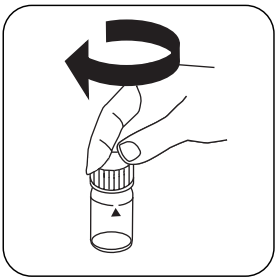


Add **PHOSPHATE HR P2 tablet** .

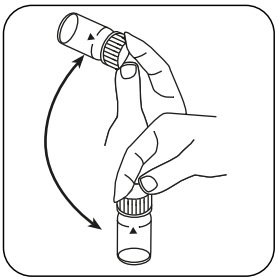
EN



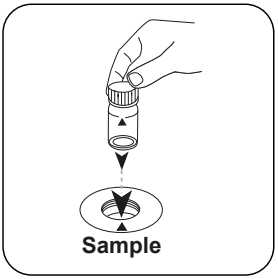
Crush tablet(s) by rotating slightly.



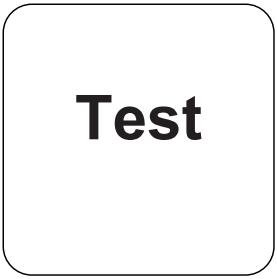
Close vial(s).



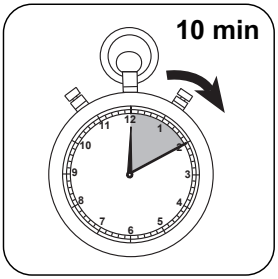
Dissolve tablet(s) by inverting.



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 ortho-Phosphate appears on the display.

Interference	from / [mg/L]
Al	200
AsO_4^{3-}	in all quantities
Cr	100
Cu	10
Fe	100
Ni	300
H_2S	in all quantities
SiO_2	50
$Si(OH)_4$	10
S^{2-}	in all quantities
Zn	80

including stirring rod, 10 cm

PTSA M501

10 - 400 ppb

Fluorescence

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
PTSA standard addition solution, 1000 ppb	1 pc.	461210

Preparation

1. Before use, clean the vials and the accessories.
2. The outside of the vial must be clean and dry before starting the analysis. Clean the outside of the vials with a towel. Fingerprints or other marks will be removed.
3. The photometre is already factory calibrated, or the instrument was calibrated by the user. It is recommended to verify calibration accuracy by a Standard measurement:

- when in doubt about last calibration or accuracy of results
- once a mounth
  The verification measurement shall be done like a sample measurement.

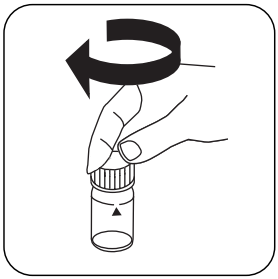
Notes

1. Use only vials with black lids for PTSA measurements.
2. Large temperature differences between the instrument and the environment can lead to errors. For best results, perform tests with sample temperatures between 20 °C (68 °F) and 25 °C (77 °F).
3. Vials and caps should be cleaned thoroughly **after each analysis** to prevent interferences.
4. To ensure maximum accuracy of test results, always use the reagent system supplied by the instrument manufacturer.
5. Do not pour used standards back into the bottle.
6. Spiking procedure possible (see Instruction Manual Photometer).

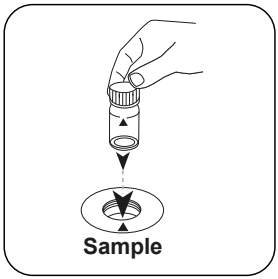
Determination of PTSA

Select the method on the device.

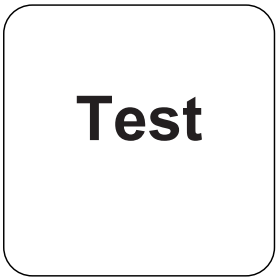
Fill PTSA mm vial with **10 mL sample**.



Close vial(s).



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



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

The result in ppb PTSA appears on the display.

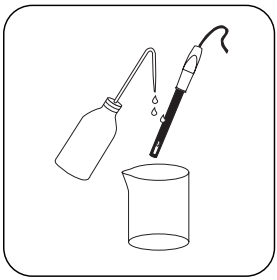
Conductivity SD 335

0 - 200 mS/cm

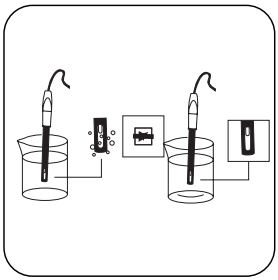
The following accessories are required.

EN

Accessories	Packaging Unit	Part Number
LC 12 for SD 320 / SD 325 Con, up to 200 mS/cm	1 pc.	19805040



Rinse the electrode with distilled or deionised water and then with the sample.



Immerse the measuring cell in the sample. During measurement, ensure that there are no air bubbles on the electrode surface and that the electrode, as well as the temperature sensor, are sufficiently surrounded by the sample.

The measurement value can now be read off from the display. In the parameter configuration you can change the conductivity to TDS or salinity if required.

Hardness (Yes/No) Y/N

8 - 20 mg/L $CaCO_3$

EN

Material

Reagents	Packaging Unit	Part Number
Hardness Yes/No	Tablet / 100	515360BT

Sampling

1. Let the sample water flow for 30 seconds before taking the sample.

Notes

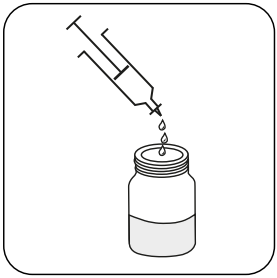
1. Colours may vary depending on sample and test conditions.
2. This test may be used to determine the performance of a softener unit by measuring the total hardness of softened water taken from the outlet. It is important to monitor hardness levels regularly as hardness breakthrough is indicative of exhausted resin and regeneration would be required.
3. Test result:
   Green Sample Colour : Hardness is less than the threshold level
   Red Sample Colour : Hardness is more than the threshold level

Sampling

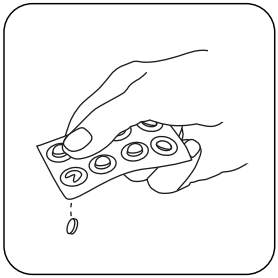
Select the sample volume from the table according to the expected measuring range and read off the factor to calculate the result.

Expected Range	Titrant used	Sample Size	Factor
10 mg/L	1 Tablette Hardness Yes/No	20 mL	
20 mg/L	1 Tablette Hardness Yes/No	10 mL	
16 mg/L	2 Tabletten Hardness Yes/No	25 mL	
8 mg/L	1 Tablette Hardness Yes/No	25 mL	

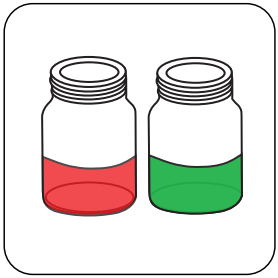
Determination of Hardness (Yes/No)



Attention!Select the appropriate sample volume according to the instructions in the chapter Sampling.



Add **x Hardness Yes/No tablet(s)**. **(See chapter Sampling under Titrant in the table.)**



The sample will turn **red or green (See chapter Notes.)**.

Read the test result: Note the color of the sample (red or green) (see Notes).

Härte, Ja/Nein 56I

8 - 20 mg/L $CaCO_3$

DE

Material

Reagenzien	Form/Menge	Bestell-Nr.
Härte Yes/No	Tablette / 100	515360BT

Probenahme

1. Lassen Sie das Probenwasser vor der Probennahme 30 Sekunden lang fließen.

Anmerkungen

1. Mit diesem Test kann die Leistung einer Enthärtungsanlage bestimmt werden, indem die Gesamthärte des am Auslass entnommenen enthärteten Wassers gemessen wird. Es ist wichtig, den Härtegrad regelmäßig zu überwachen, da ein Härtedurchbruch auf ein erschöpftes Harz hinweist und eine Regeneration erforderlich wäre.
2. Testergebnis:
   Grüne Probenfarbe: Der Härtegrad liegt unter dem Grenzwert
   Rote Probenfarbe: Der Härtegrad liegt über dem Grenzwert

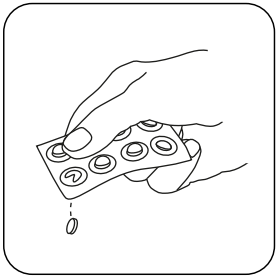
Probenahme

Select the sample volume from the table according to the expected measuring range and read off the factor to calculate the result.

Erwarteter Messbereich	Verwendeter Titrant	Probenvolumen	Faktor
10 mg/L	Hardness Yes/No	20 mL	1
20 mg/L	Hardness Yes/No	10 mL	1
16 mg/L	Hardness Yes/No	25 mL	2
8 mg/L	Hardness Yes/No	25 mL	1

Durchführung der Bestimmung Härte (Ja/Nein)

Achtung!Das passende Probenvolumen entsprechend der Tabelle in den Anmerkungen auswählen.



x Hardness Yes/No
Tabletten zugeben.
(Siehe Tabelle in den Anmerkungen)
Testergebnis ablesen:
Beachten Sie die Farbe der Probe (rot oder grün) (siehe Anmerkungen).

Alkalität (P, M, OH) 56I700130

50 - 2400 mg/L $CaCO_3$

DE

Material

Reagenzien	Form/Menge	Bestell-Nr.
KS138-TA4-4,5 Indikator	65 mL	56L013865
KS139-TA3 Alkanität LR Titrant	65 mL	56L013965
KS136-Alkanität HR Titrant	65 mL	56L013665
KS135 Pa1/Alk1-Phenolphthalein Sub-Alk P	65 mL	56L013565
KS137-Bariumchlorid Lösung	65 mL	56L013765

Es wird außerdem folgendes Zubehör benötigt.

Zubehör	Verpackungseinheit	Bestell-Nr.
Spritze, Plastik, 20 mL	1 St.	56A006501
Titrationsgefäß mit Deckel, Plastik, 60 mL	1 St.	56A006701

Anmerkungen

1. Das P bezieht sich auf Phenolphthalein, den ursprünglich für die Titration der P-Alkalinität verwendeten Indikator. Der Farbumschlag erfolgt bei pH 8,3. Heute werden weniger gefährliche Alternativen verwendet.
2. Das M steht für Methylorange, den Indikator, der ursprünglich für die Titration der Gesamtalkalität verwendet wurde. Heutzutage wird der Indikator 4,5 verwendet, aber die alte M-Terminologie ist erhalten geblieben.
3. Bariumchlorid fällt mit Karbonat-Ionen aus und bildet im Test einen weißen Niederschlag. Die verbleibende Alkalinität in derselben Probe ist auf das Vorhandensein von Hydroxid-Ionen (OH) zurückzuführen.

Probenahme

Select the sample volume from the table according to the expected measuring range and read off the factor to calculate the result.

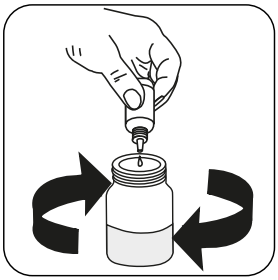
Erwarteter Messbereich	Verwendeter Titrant	Probenvolumen	Faktor
50-150 mg/L	Alkalinity LR Titrant TA3	40 mL	5
100-300 mg/L	Alkalinity LR Titrant TA3	20 mL	10
200-600 mg/L	Alkalinity LR Titrant TA3	10 mL	20
200-600 mg/L	Alkalinity HR Titrant PA2TA2	40 mL	20
400-1200 mg/L	Alkalinity HR Titrant PA2TA2	20 mL	40
800-2400 mg/L	Alkalinity HR Titrant PA2TA2	10 mL	80

Durchführung der Bestimmung Alkalität-p

Achtung!Das passende Probenvolumen entsprechend der Tabelle in den Anmerkungen auswählen.

Tropfenweise **Acidity / Alkalinity P Indicator PA1** hinzufügen, bis eine **pink** Färbung entsteht.
Wenn die Probe farblos bleibt, geben sie den P Alkalinität Wert als Null an.

Notieren Sie die Anzahl der Tropfen die hinzugefügt werden:



Tropfenweise **Alkalinity LR Titrant TA3 oder Alkalinity HR Titrant PA2/TA2** hinzufügen, bis die Probe farblos ist.

Testergebnis berechnen:
P Alkalinität (als $CaCO_3$) mg/L = Anzahl der Tropfen x Faktor (siehe Tabelle)

Durchführung der Bestimmung Alkalität-m

Achtung!Das passende Probenvolumen entsprechend der Tabelle in den Anmerkungen auswählen.

Tropfenweise **Alkalinity 4.5 Indicator TA4** hinzufügen, bis eine **blaue** Färbung entsteht.

Notieren Sie die Anzahl der Tropfen die hinzugefügt werden:

Tropfenweise **Alkalinity LR Titrant TA3 oder Alkalinity HR Titrant PA2/TA2** hinzufügen, bis eine **gelb/orange** Färbung entsteht.

Testergebnis berechnen:
Gesamtalkalität (als $CaCO_3$) mg/L = Anzahl der Tropfen x Faktor (siehe Tabelle)

Durchführung der Bestimmung Alkalität-OH

Achtung!Das passende Probenvolumen entsprechend der Tabelle in den Anmerkungen auswählen.

Tropfenweise **Acidity / Alkalinity P Indicator PA1** hinzufügen, bis eine **pink** Färbung entsteht.
Wenn die Probe farblos bleibt, geben sie den P Alkalinität Wert als Null an.

Notieren Sie die Anzahl der Tropfen die hinzugefügt werden:

Tropfenweise **Alkalinity LR Titrant TA3 oder Alkalinity HR Titrant PA2/TA2** hinzufügen, bis die Probe farblos ist.

Testergebnis berechnen:
OH Alkalinität (als $CaCO_3$) mg/L = Anzahl der Tropfen x Faktor (siehe Tabelle)

Chlorid 56I700190

20 - 12000 mg/L Cl^-

DE

Material

Reagenzien	Form/Menge	Bestell-Nr.
KS142-CC2-Chloride LR Titrant	65 mL	56L014265
KS141-BC2- Chloride HR Titrant	65 St.	56L014165

Es wird außerdem folgendes Zubehör benötigt.

Zubehör	Verpackungseinheit	Bestell-Nr.
Spritze, Plastik, 20 mL	1 St.	56A006501
Titrationsgefäß mit Deckel, Plastik, 60 mL	1 St.	56A006701
Plastikspritze, 5 mL	1 mL	56A008501

Anmerkungen

1. Alkalische Proben, wie z. B. Kesselwasser, müssen vor dem Test neutralisiert werden.

Probenahme

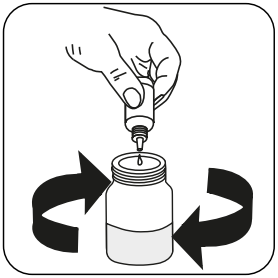
Select the sample volume from the table according to the expected measuring range and read off the factor to calculate the result.

Erwarteter Messbereich	Verwendeter Titrant	Probenvolumen	Faktor
20-75 mg/L	Chloride LR Titrant CC2	40 mL	2.5
50-150 mg/L	Chloride LR Titrant CC2	20 mL	5
100-400 mg/L	Chloride LR Titrant CC2	10 mL	10
100-400 mg/L	Chloride HR Titrant BC2	40 mL	10
200-600 mg/L	Chloride HR Titrant BC2	20 mL	20
400-1000 mg/L	Chloride HR Titrant BC2	10 mL	40
800-3000 mg/L	Chloride HR Titrant BC2	5 mL*	80
2000-6000 mg/L	Chloride HR Titrant BC2	2 mL*	200
4000-12000 mg/L	Chloride HR Titrant BC2	1 mL*	400

Achtung!Das passende Probenvolumen entsprechend der Tabelle in den Anmerkungen auswählen.

10 Tropfen **Chloride Indikator BC1/CC 1 (Kaliumchromat)** hinzufügen, bis eine **gelb** Färbung entsteht.

Notieren Sie die Anzahl der Tropfen die hinzugefügt werden:



Chloride LR Titrant CC2 oder Chloride HR Titrant BC2 tropfenweise der Probe zugeben bis die Färbung von **gelb** bis **orange/braun** umschlägt. **(Achtung: nach Zugabe jedes Tropfens das Probengefäß schwenken!)**

Testergebnis berechnen:
Chlorid (als Cl^-) mg/L = Anzahl der Tropfen x Faktor (siehe Tabelle)

Härte, Calcium 56I700270

5 - 600 mg/L $CaCO_3$

DE

Material

Reagenzien	Form/Menge	Bestell-Nr.
KS144-CH2-FC4-Calciumhärte Puffer	65 mL	56L014465
KP216- CH1P-Calciumhärte Indikator	Pulver / 20 g	56P021620
KS162-TH3-Härte LR Titrant	65 mL	56L016265
KS145-H-TH3-CH3-Härte HR Titrant	65 mL	56L014565
TH1P/THIP Total Hardness Indicator Powder 40g	Pulver / 40 g	56P028340
KS160-TH2-FE8-FC2-Härte, gesamt Puffer	65 mL	56L016065

Es wird außerdem folgendes Zubehör benötigt.

Zubehör	Verpackungseinheit	Bestell-Nr.
Spritze, Plastik, 20 mL	1 St.	56A006501
Titrationsgefäß mit Deckel, Plastik, 60 mL	1 St.	56A006701

Probenahme

Select the sample volume from the table according to the expected measuring range and read off the factor to calculate the result.

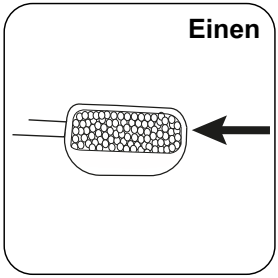
Erwarteter Messbereich	Verwendeter Titrant	Probenvolumen	Faktor
5-15 mg/L	Hardness LR Titrant TH3	40 mL	0.5
10-30 mg/L	Hardness LR Titrant TH3	20 mL	1
20-60 mg/L	Hardness LR Titrant TH3	10 mL	2
50-150 mg/L	Hardness HR Titrant TH4	40 mL	5
100-300 mg/L	Hardness HR Titrant TH4	20 mL	10
200-600 mg/L	Hardness HR Titrant TH4	10 mL	20

Durchführung der Bestimmung Härte, Calcium

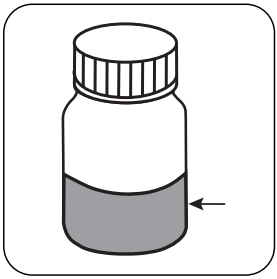
Achtung!Das passende Probenvolumen entsprechend der Tabelle in den Anmerkungen auswählen.

Pro 10 mL Probe 4 Tropfen Hardness Total Buffer TH2 hinzugeben.

Inhalt durch Umschwenken mischen.



Einen gestrichene Messlöffel Calcium Hardness Indicator CH1P zugeben.



Die Probe sollte sich **weinrot** färben **(die Probe schwenken!)**.

Notieren Sie die Anzahl der Tropfen die hinzugefügt werden:

Tropfenweise **Hardness LR Titrant TH3 oder Hardness HR Titrant TH4** hinzufügen, bis eine **rein blaue** Färbung entsteht.

Testergebnis berechnen:
Härte, gesamt (als $CaCO_3$) mg/L = Anzahl der Tropfen x Faktor (siehe Tabelle)

Härte, gesamt 56I700280

5 - 600 mg/L $CaCO_3$

DE

Material

Reagenzien	Form/Menge	Bestell-Nr.
KS160-TH2-FE8-FC2-Härte, gesamt Puffer	65 mL	56L016065
TH1P/THIP Total Hardness Indicator Powder 40g	Pulver / 40 g	56P028340
KS162-TH3-Härte LR Titrant	65 mL	56L016265
KS145-H-TH3-CH3-Härte HR Titrant	65 mL	56L014565

Es wird außerdem folgendes Zubehör benötigt.

Zubehör	Verpackungseinheit	Bestell-Nr.
Spritze, Plastik, 20 mL	1 St.	56A006501
Titrationsgefäß mit Deckel, Plastik, 60 mL	1 St.	56A006701

Anmerkungen

1. Mehr als 1 ppm Kupfer in der Probe verhindert das Erreichen des reinen blauen Endpunkts.
2. Um Kupferstörungen zu beseitigen, fügen Sie 1 Tropfen Eisenreagenz FE6 - Thioglykolat-Reagenz vor der Zugabe von Härtegesamtpuffer TH2 hinzu. KS63 wird nicht standardmäßig in der Härtetestpackung mitgeliefert, kann aber separat erworben werden.

Probenahme

Select the sample volume from the table according to the expected measuring range and read off the factor to calculate the result.

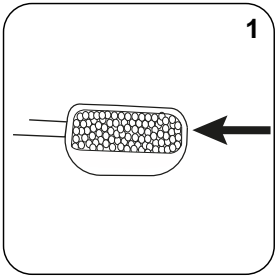
Erwarteter Messbereich	Verwendeter Titrant	Probenvolumen	Faktor
5-15 mg/L	Hardness LR Titrant TH3	40 mL	0.5
10-30 mg/L	Hardness LR Titrant TH3	20 mL	1
20-60 mg/L	Hardness LR Titrant TH3	10 mL	2
50-150 mg/L	Hardness LR Titrant TH4	40 mL	5
100-300 mg/L	Hardness LR Titrant TH4	20 mL	10
200-600 mg/L	Hardness LR Titrant TH4	10 mL	20

Durchführung der Bestimmung Härte gesamt

Achtung!Das passende Probenvolumen entsprechend der Tabelle in den Anmerkungen auswählen.

Pro 10 mL Probe 4 Tropfen Hardness Total Buffer TH2 hinzugeben.

Inhalt durch Umschwenken mischen.



1 gestrichene Messlöffel Hardness Total Indicator TH1P zugeben.

Die Probe sollte sich **weinrot** färben **(die Probe schwenken!)**.

Notieren Sie die Anzahl der Tropfen die hinzugefügt werden:

Tropfenweise **Hardness LR Titrant TH3 oder Hardness HR Titrant TH4** hinzufügen, bis eine **rein blaue** Färbung entsteht.

Testergebnis berechnen:
Härte, gesamt (als $CaCO_3$) mg/L = Anzahl der Tropfen x Faktor (siehe Tabelle)

Wasserstoffperoxid-Reagenzienpaket 56I700290

15 - 500 mg/L H_2O_2

DE

Material

Reagenzien	Form/Menge	Bestell-Nr.
Hydrogen Peroxide Puffer HP1	65 mL	56L041565
Hydrogen Peroxide HR Titrant HP2	65 mL	56L719965
Hydrogen Peroxide LR Titrant HP3	65 mL	56L649665

Es wird außerdem folgendes Zubehör benötigt.

Zubehör	Verpackungseinheit	Bestell-Nr.
Spritze, Plastik, 20 mL	1 St.	56A006501
Titrationsgefäß mit Deckel, Plastik, 60 mL	1 St.	56A006701

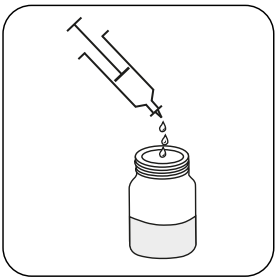
Anmerkungen

1. Die Farben können je nach Probe und Testbedingungen variieren.
2. Andere Oxidationsmittel, wie z. B. Restchlor aus dem Rohwasser, werden in das Ergebnis einbezogen, sind aber im Vergleich zu den üblichen hohen Konzentrationen von Peroxid, die bei der Desinfektionierung verwendet werden, nicht signifikant.
3. Die Tropfen des Hydrogen Peroxide HR Titrant HP2 oder Hydrogen Peroxide LR Titrant HP3 langsam unter Mischen zugeben. Verwenden Sie nicht mehr Titriermittel, als für eine mindestens 30 Sekunden andauernde Färbung erforderlich ist, da die Titration sonst ungenau ist.

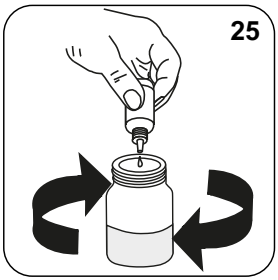
Probenahme

Select the sample volume from the table according to the expected measuring range and read off the factor to calculate the result.

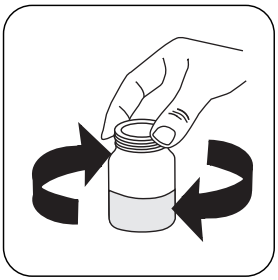
Erwarteter Messbereich	Verwendeter Titrant	Probenvolumen	Faktor
1-12.5 mg/L	Hydrogen Peroxide LR Titrant HP3	40 mL	0.5
2-25 mg/L	Hydrogen Peroxide LR Titrant HP3	20 mL	1
4-50 mg/L	Hydrogen Peroxide LR Titrant HP3	10 mL	2
15-125 mg/L	Hydrogen Peroxide HR Titrant HP2	40 mL	5
25-250 mg/L	Hydrogen Peroxide HR Titrant HP2	20 mL	10
50-500 mg/L	Hydrogen Peroxide HR Titrant HP2	10 mL	20



Achtung!Das passende Probenvolumen entsprechend der Anweisungen im Kapitel Probenahme auswählen.



25 Tropfen Hydrogen Peroxide Buffer HP1 zugeben.



Inhalt durch Umschwenken mischen.

Achtung! Notieren Sie die Anzahl der Tropfen die hinzugefügt werden: x Tropfen

Hydrogen Peroxide HR Titrant HP2 oder Hydrogen Peroxide LR Titrant HP3 tropfenweise der Probe zugeben bis die Färbung von **farblos** bis **rosa** umschlägt. **(Achtung: nach Zugabe jedes Tropfens das Probengefäß schwenken!)**

Die Farbe sollte mindestens **30** Sekunden lang bestehen bleiben.

Testergebnis berechnen:
Wasserstoffperoxid (als H_2O_2) mg/L = Anzahl der Tropfen x Faktor (siehe Tabelle)

Nitrit 56I700300

10 - 2000 mg/L $NaNO_2$

DE

Material

Reagenzien	Form/Menge	Bestell-Nr.
KS171-N1 Ferroin Indikator	65 mL	56L017165
KS172-N2-Nitrite Titrant	65 mL	56L017265

Es wird außerdem folgendes Zubehör benötigt.

Zubehör	Verpackungseinheit	Bestell-Nr.
Spritze, Plastik, 20 mL	1 St.	56A006501
Fernox Tube 5/10 ml +CAP	1 mL	56A600401
Titrationsgefäß mit Deckel, Plastik, 60 mL	1 St.	56A006701

Anmerkungen

1. Dieser Test kann zur Bestimmung der Nitritreserve in Kühlsystemen verwendet werden. Es ist zu beachten, dass andere Reduktionsmittel wie Sulfit und Ascorbinsäure das festgestellte Ergebnis erhöhen.
2. Die Ergebnisse dieses Tests werden als Natriumnitrit ($NaNO_2$) angegeben. Zur Umrechnung von mg/L als Natriumnitrit in mg/L als Nitrit (NO_2) ist das Ergebnis mit 0,67 zu multiplizieren.

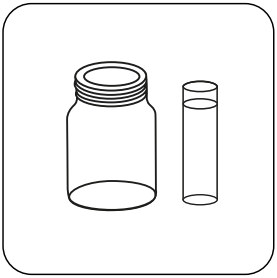
Probenahme

Select the sample volume from the table according to the expected measuring range and read off the factor to calculate the result.

Erwarteter Messbereich	Verwendeter Titrant	Probenvolumen	Faktor
10-40 mg/L	5 drops of Nitrite Indicator N1	40 mL	1.25
25-100 mg/L	4 drops of Nitrite Indicator N1	20 mL	2.5
50-150 mg/L	3 drops of Nitrite Indicator N1	10 mL	5
100-400 mg/L	2 drops of Nitrite Indicator N1	5 mL	10
300-1000 mg/L	1 drop of Nitrite Indicator N1	2 mL	25
500-2000+	1 drop of Nitrite Indicator N1	1 mL	50

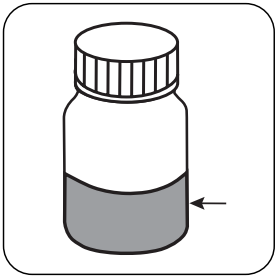
Achtung!Das passende Probenvolumen entsprechend der Tabelle in den Anmerkungen auswählen.

DE

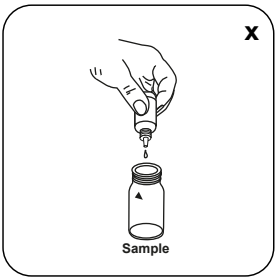


Verwenden Sie ein Titriergefäß für größere Proben oder ein Teströhrchen für kleinere Proben(5 mL oder weniger).

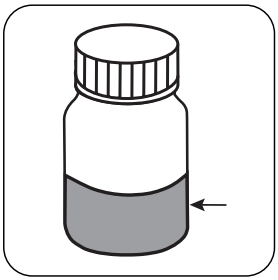
X Tropfen **Nitrite Indicator N1** Reagenz der Probe, entsprechend des ausgewählten Probevolumens, zugeben (siehe Tabelle in den Anmerkungen).



Die Probe sollte sich **orange** färben **(wenn Nitrite vorhanden sind)**.

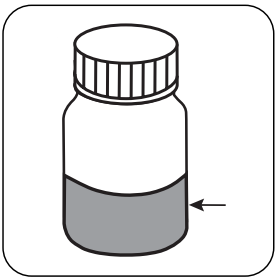


x Tropfen Nitrite Titrant N2 in die **Probenküvette** geben.



Bis die Farbe der Probe von **orange** auf **blau** wechselt.

Notieren Sie die Anzahl der Tropfen die hinzugefügt werden:



Die Farbe sollte mindestens **10** Sekunden lang bestehen bleiben.

Testergebnis berechnen:
Nitrit (als $NaNO_2$) mg/L = Anzahl der Tropfen x Faktor (siehe Tabelle)

Phosphonat 56I700320

4 - 20 mg/L HEDP

DE

Material

Reagenzien	Form/Menge	Bestell-Nr.
Phosphonate Neutraliser P1/2 - 65 mL	65 mL	56L070465
Phosphonate Indicator P4L - 65 mL	65 mL	56L017565
Phosphonate pH Adjuster P3 - 65 mL	65 mL	56L718365
KS176-P5-Phosphonate Titrant	1 St.	56L017665

Es wird außerdem folgendes Zubehör benötigt.

Zubehör	Verpackungseinheit	Bestell-Nr.
Spritze, Plastik, 20 mL	1 St.	56A006501
Titrationsgefäß mit Deckel, Plastik, 60 mL	1 St.	56A006701

Anmerkungen

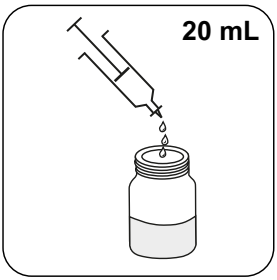
1. Dieser Test eignet sich für die Messung von Produkten des Typs AMP und HEDP.
2. Gute Ergebnisse wurden auch mit PBSAM erzielt.
3. Um genaue Ergebnisse zu erzielen, sollte der Test für jedes Produkt bei typischen Systemdosen kalibriert werden.
4. Die Standards sollten in Wasser hergestellt werden, das dem Systemwasser so ähnlich wie möglich ist (z. B. hart oder weich).
5. Führen Sie den Test mit dem behandelten Wasser (Ergebnis A) und anschließend mit dem unbehandelten Wasser (Ergebnis B) durch.

Probenahme

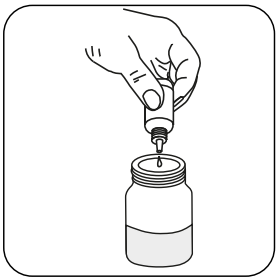
Select the sample volume from the table according to the expected measuring range and read off the factor to calculate the result.

Erwarteter Messbereich	Verwendeter Titrant	Probenvolumen	Faktor
	KS176 - P5 - Phosphonate Titrant		
	KS176 - P5 - Phosphonate Titrant		
	KS176 - P5 - Phosphonate Titrant		

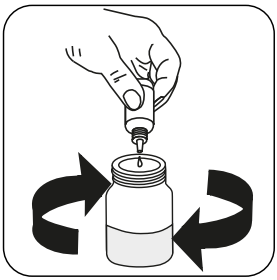
DE



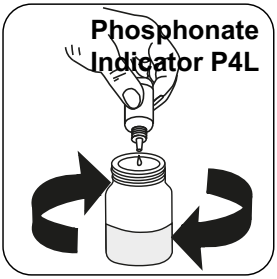
Das Probengefäß mit **20 mL Probe** füllen.



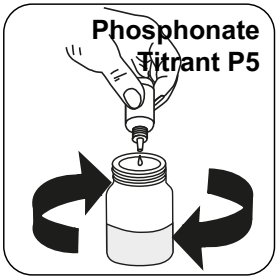
Tropfenweise **Phosphonate Neutraliser P1/2** hinzufügen, bis eine **gelbe** Färbung entsteht.



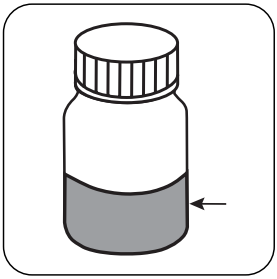
Tropfenweise **Phosphonate pH Adjuster P3** hinzufügen, bis die Probe farblos ist.



Phosphonate Indicator P4L Tropfen zugeben.



Phosphonate Titrant P5 Tropfen zugeben.



Bis die Farbe der Probe von **grau** auf **lila** wechselt.

Testergebnis berechnen:
Produkt mg/L = Anzahl der Tropfen (Ergebnis A - Ergebnis B) x Faktor (siehe Tabelle)

Sulfit 56I700360

25 - 150 mg/L Na_2SO_3

DE

Material

Reagenzien	Form/Menge	Bestell-Nr.
KP186-S1-Säure Stärke Indikator	Pulver / 40 g	56P018640
KS187-S2-Sulfite Titrant	65 mL	56L018765

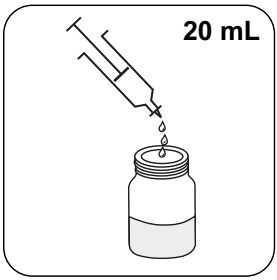
Es wird außerdem folgendes Zubehör benötigt.

Zubehör	Verpackungseinheit	Bestell-Nr.
Spritze, Plastik, 20 mL	1 St.	56A006501
Titrationsgefäß mit Deckel, Plastik, 60 mL	1 St.	56A006701

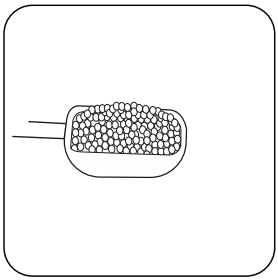
Anmerkungen

1. Das katalysierte Sulfit reagiert in heißem Zustand schnell mit Luftsauerstoff, daher sollte die Probe bei der Entnahme möglichst wenig mit Luft in Berührung kommen und gekühlt werden. Sie sollte sofort nach dem Abkühlen untersucht werden. Bei der Entnahme der Proben ist Vorsicht geboten.
2. Ungelöstes Material nach der Zugabe von Pulver/Tabletten ist zu ignorieren.
3. Bei Natriumsulfit-Konzentrationen über 150 mg/L wird eine 10-ml-Probe entnommen und ein Faktor von 10 verwendet (d. h. jeder Tropfen **Sulphite Titrant S2** = 10 mg/L Na_2SO_3).
4. Die Sulfitreserve kann auf verschiedene Weise ausgedrückt werden. Zur Umrechnung der Messwerte von Natriumsulfit multiplizieren Sie das erhaltene Ergebnis mit den folgenden Faktoren.
   Natriumsulfit zu Natriummetabisulfit x 0,8
   Natriumsulfit zu Sulfit x 0,63

Durchführung der Bestimmung Natriumsulfit in Kesselwasser



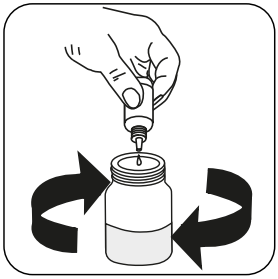
Das Probengefäß mit **20 mL Probe** füllen.



Einen Messlöffel Sulphite Indicator S1 zugeben.

Inhalt durch Umschwenken mischen.

Notieren Sie die Anzahl der Tropfen die hinzugefügt werden:



Sulphite Titrant S2 tropfenweise der Probe zugeben bis die Färbung von **farblos** bis **blau** umschlägt. **(Achtung: nach Zugabe jedes Tropfens das Probengefäß schwenken!)**

Testergebnis berechnen:
Sulfit (als Na_2SO_3) mg/L = Anzahl der Tropfen x 5

Tannin 56I700370

50 - 300 mg/L Tannin

DE

Material

Reagenzien	Form/Menge	Bestell-Nr.
KP146-TN1-CL1P-TO3-CD4-Sulphamic Säure	Pulver / 20 g	56P014650

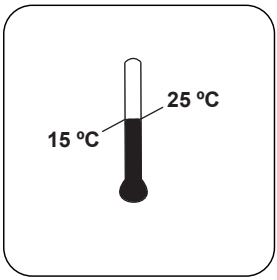
Es wird außerdem folgendes Zubehör benötigt.

Zubehör	Verpackungseinheit	Bestell-Nr.
Spritze, Plastik, 20 mL	1 St.	56A006501
Titrationsgefäß mit Deckel, Plastik, 60 mL	1 St.	56A006701

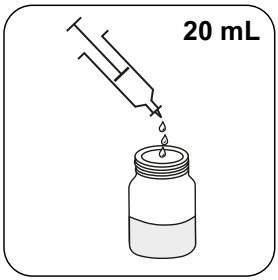
Anmerkungen

1. Tannin ist die Bezeichnung für Verbindungen vom Lignin-Typ, und daher ist der Faktor bei diesem Verfahren allgemeiner Natur, entsprechend der Art der allgemein verwendeten Produkte.
2. Falls erforderlich, kann der genaue Faktor für das verwendete Produkt gemäß dem Blatt "Bestimmung der Produktfaktoren - F" bestimmt werden, das auf Anfrage erhältlich ist.
3. Es ist nicht notwendig, dass sich der Tannin-Indikator TN1 vollständig auflöst.

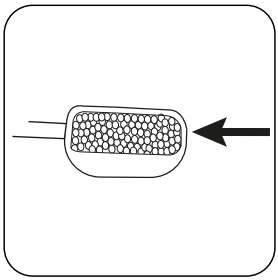
Durchführung der Bestimmung Tannin im Kesselwasser



Die Probe auf **Raumtemperatur** abkühlen lassen.



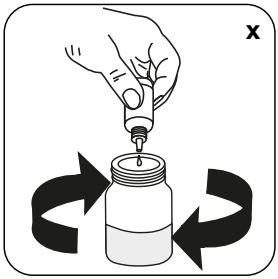
Das Probengefäß mit **20 mL Probe** füllen.



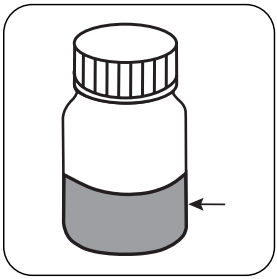
Einen gestrichenen Messlöffel Tannin Indicator TN1 zugeben.

Inhalt durch Umschwenken mischen.

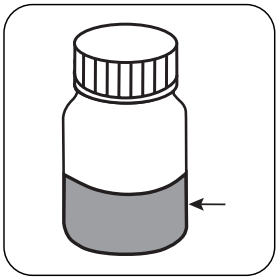
Notieren Sie die Anzahl der Tropfen die hinzugefügt werden:



x Tropfen Tannin Titrant TN2 zugeben.



Bis die Farbe der Probe von **farblos** auf **rosa** wechselt.



Die Farbe sollte mindestens **10** Sekunden lang bestehen bleiben.

Testergebnis berechnen:
Tannin (als Tannin) mg/L = Anzahl der Tropfen x 10

Aluminium T M40

0,01 - 0,3 mg/L Al AL

Eriochromcyanin R

DE

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
Aluminium No. 1	Tablette / 100	515460BT
Aluminium No. 1	Tablette / 250	515461BT
Aluminium No. 2	Tablette / 100	515470BT
Aluminium No. 2	Tablette / 250	515471BT
Set Aluminium No. 1/No. 2#	je 100	517601BT
Set Aluminium No. 1/No. 2#	je 250	517602BT

Vorbereitung

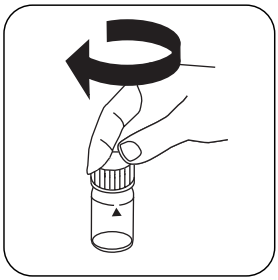
1. Zur Erzielung genauer Analyseergebnisse muss eine Probentemperatur von 20 °C bis 25 °C eingehalten werden.
2. Zur Vermeidung von Fehlern durch Verunreinigungen, die Küvette und das Zubehör vor der Analyse mit Salzsäurelösung (ca. 20%ig) und anschließend mit VE-Wasser spülen.

Durchführung der Bestimmung Aluminium mit Tablette

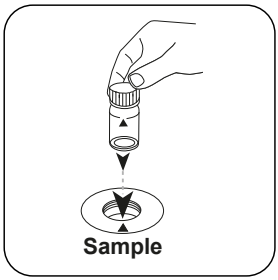
Die Methode im Gerät auswählen.

Für diese Methode muss bei folgenden Geräten nicht jedes mal eine ZERO-Messung durchgeführt werden: XD 7000, XD 7500

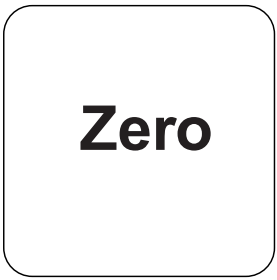
24-mm-Küvette mit **10 mL Probe** füllen.



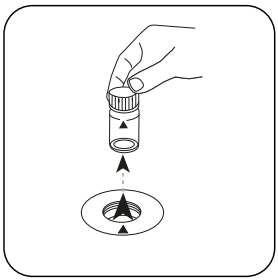
Küvette(n) verschließen.



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

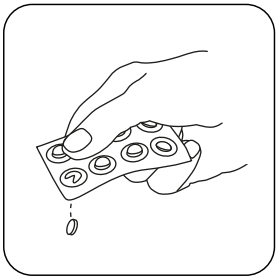


Taste **ZERO** drücken.

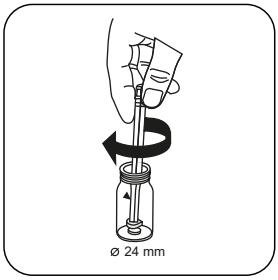


Küvette aus dem Messschacht nehmen.

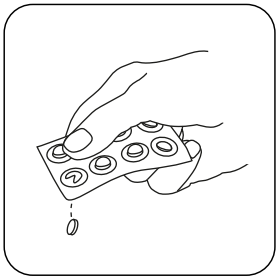
Bei Geräten, die **keine ZERO-Messung** erfordern, **hier beginnen**.



Eine **ALUMINIUM No. 1 Tablette** zugeben.



Die Tablette(n) unter leichter Drehung zerdrücken und lösen.



Eine **ALUMINIUM No. 2 Tablette** zugeben.

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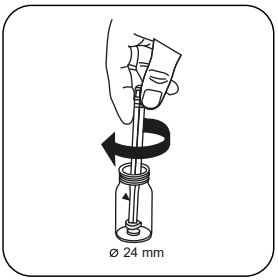
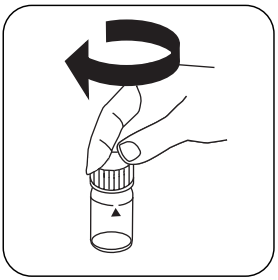
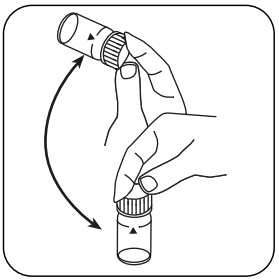


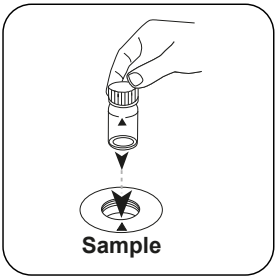
Tablette(n) unter leichter Drehung zerdrücken.



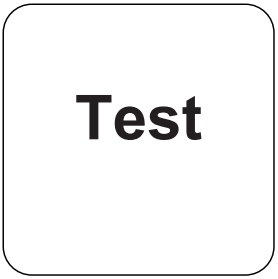
Küvette(n) verschließen.



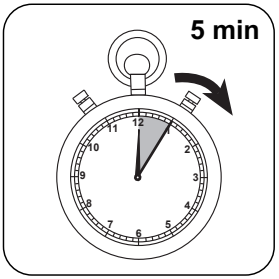
Tablette(n) durch Umschwenken lösen.



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



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



5 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

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

inklusive Rührstab

Brom T **M80**

0,05 - 13 mg/L Br_2 **Br**

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. 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

Vorbereitung

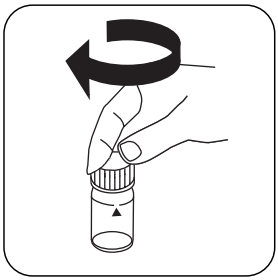
1. Reinigung der Küvetten:
   Da viele Haushaltsreiniger (z.B. Geschirrspülmittel) reduzierende Stoffe enthalten, kann es bei der nachfolgenden Bestimmung von Oxidationsmitteln (z.B. Ozon, Chlor) zu Minderbefunden kommen. Um diesen Messfehler auszuschließen, sollten die Glasgeräte chlorzehrungsfrei sein. Dazu weden die Glasgeräte für eine Stunde unter Natriumhypochloritlösung (0,1 g/L) aufbewahrt und danach gründlich mit VE-Wasser gespült.
2. Bei der Probenvorbereitung muss das Ausgasen von Brom, z.B. durch Pipettieren und Schütteln vermieden werden. Die Analyse muss unmittelbar nach der Probennahme erfolgen.
3. Stark alkalische oder saure Wässer müssen vor der Analyse in einen pH-Bereich zwischen 6 und 7 gebracht werden (mit 0,5 mol/l Schwefelsäure bzw. 1 mol/l Natronlauge).

Durchführung der Bestimmung Brom mit Tablette

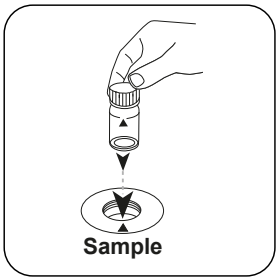
Die Methode im Gerät auswählen.

Für diese Methode muss bei folgenden Geräten nicht jedes mal eine ZERO-Messung durchgeführt werden: XD 7000, XD 7500

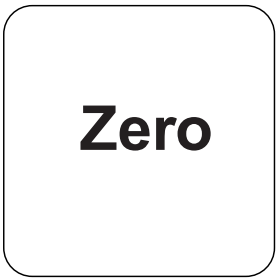
24-mm-Küvette mit **10 mL Probe** füllen.



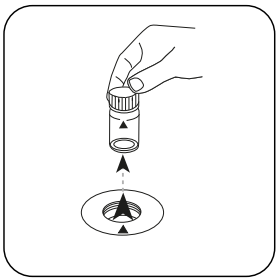
Küvette(n) verschließen.



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



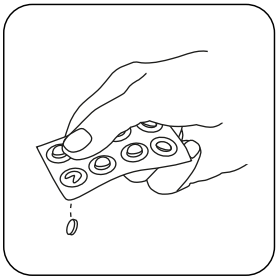
Taste **ZERO** drücken.



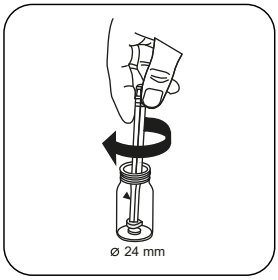
Küvette aus dem Messschacht nehmen.

Die Küvette bis auf einige Tropfen entleeren.

Bei Geräten, die **keine ZERO-Messung** erfordern, **hier beginnen**.

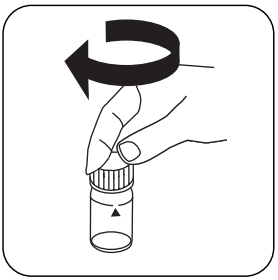


Eine **DPD No. 1 Tablette** zugeben.

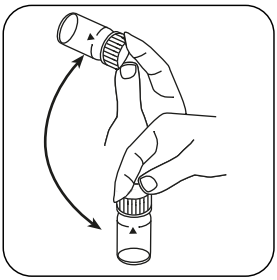


Tablette(n) unter leichter Drehung zerdrücken.

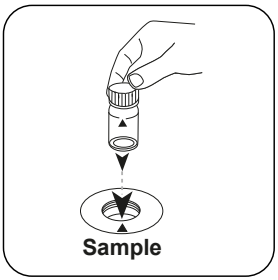
Küvette bis zur **10-mL-Marke** mit der **Probe** auffüllen.



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 Brom.

Permanente Störungen

1. Alle in den Proben vorhandenen Oxidationsmittel reagieren wie Brom, was zu Mehrbefunden führt.
2. Konzentrationen über 22 mg/L Brom können zu Ergebnissen innerhalb des Messbereiches bis hin zu 0 mg/L führen. In diesem Fall ist die Wasserprobe zu verdünnen. 10 ml der verdünnten Probe werden mit Reagenz zu versetzt und die Messung wiederholt (Plausibilitätstest).

[e)] Hilfsreagenz, alternativ zur DPD No. 1 / No. 3 bei Eintrübungen der Probe durch hohen Calciumionengehalt und/ oder hohe Leitfähigkeit

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

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

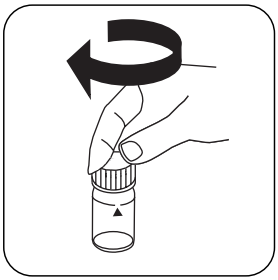
Die Methode im Gerät auswählen.

Wählen Sie zudem die Bestimmung: frei

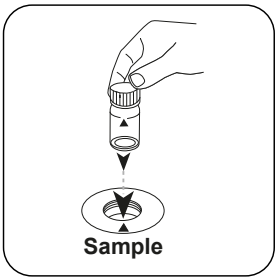
Für diese Methode muss bei folgenden Geräten nicht jedes mal eine ZERO-Messung durchgeführt werden: XD 7000, XD 7500

DE

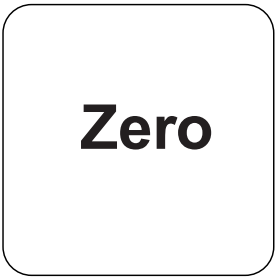
24-mm-Küvette mit **10 mL Probe** füllen.



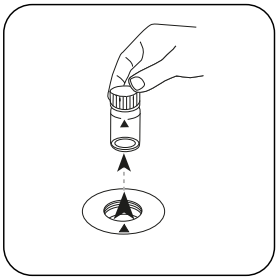
Küvette(n) verschließen.



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



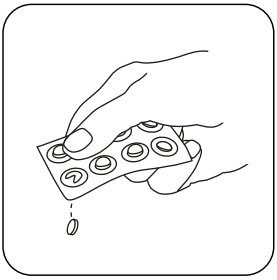
Taste **ZERO** drücken.



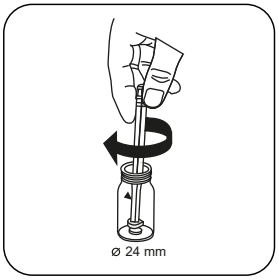
Küvette aus dem Messschacht nehmen.

Die Küvette bis auf einige Tropfen entleeren.

Bei Geräten, die **keine ZERO-Messung** erfordern, **hier beginnen**.

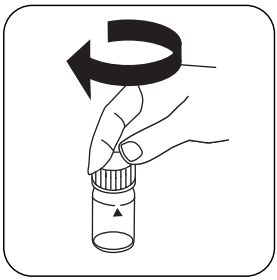


Eine **DPD No. 1 Tablette** zugeben.

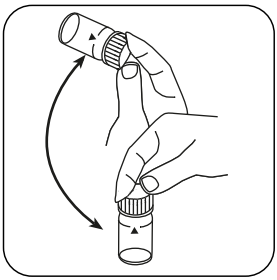


Tablette(n) unter leichter Drehung zerdrücken.

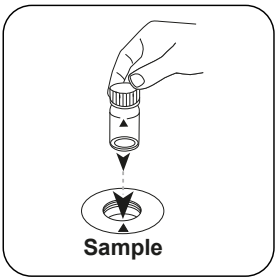
Küvette bis zur **10-mL-Marke** mit der **Probe** auffüllen.



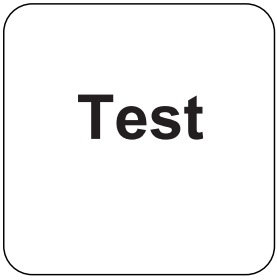
Küvette(n) verschließen.



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.

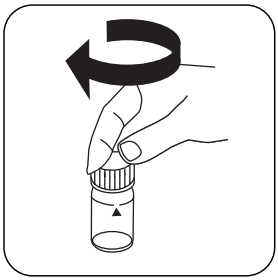
Durchführung der Bestimmung gesamt Chlor mit Tablette

Die Methode im Gerät auswählen.

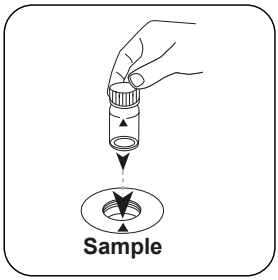
Wählen Sie zudem die Bestimmung: gesamt

Für diese Methode muss bei folgenden Geräten nicht jedes mal eine ZERO-Messung durchgeführt werden: XD 7000, XD 7500

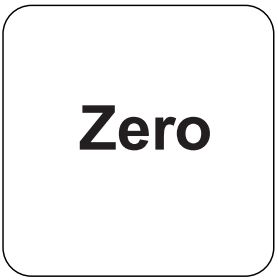
24-mm-Küvette mit **10 mL Probe** füllen.



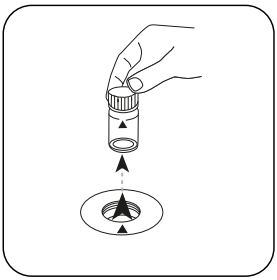
Küvette(n) verschließen.



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



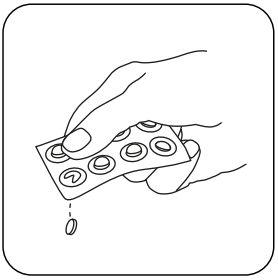
Taste **ZERO** drücken.



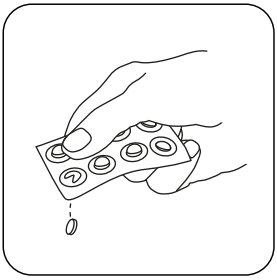
Küvette aus dem Messschacht nehmen.

Die Küvette bis auf einige Tropfen entleeren.

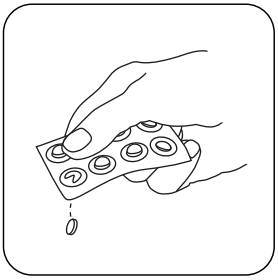
Bei Geräten, die **keine ZERO-Messung** erfordern, **hier beginnen**.



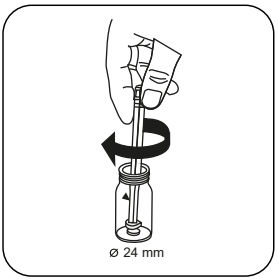
Eine **DPD No. 1 Tablette** zugeben.



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

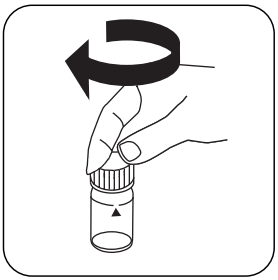


Alternativ zur DPD Nr. 1 und Nr. 3 Tablette kann eine DPD Nr. 4 Tablette zugegeben werden.

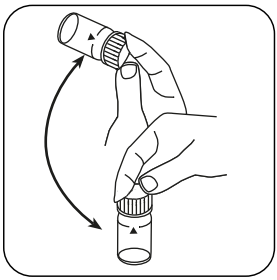


Tablette(n) unter leichter Drehung zerdrücken.

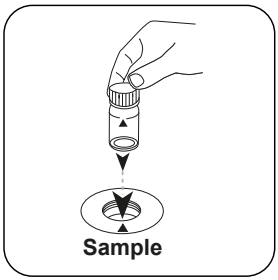
Küvette bis zur **10-mL-Marke** mit der **Probe** auffüllen.



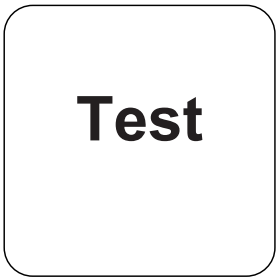
Küvette(n) verschließen.



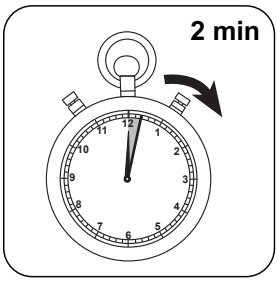
Tablette(n) durch Umschwenken lösen.



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.

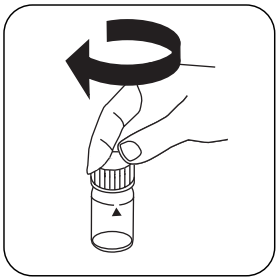
Durchführung der Bestimmung differenziertes Chlor mit Tablette

Die Methode im Gerät auswählen.

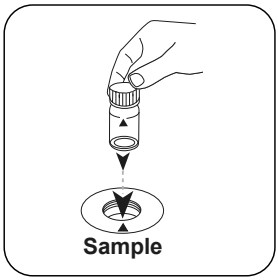
Wählen Sie zudem die Bestimmung: differenziert

Für diese Methode muss bei folgenden Geräten nicht jedes mal eine ZERO-Messung durchgeführt werden: XD 7000, XD 7500

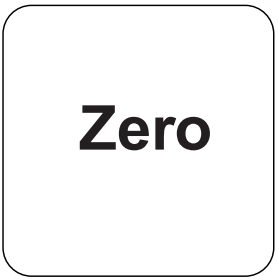
24-mm-Küvette mit **10 mL Probe** füllen.



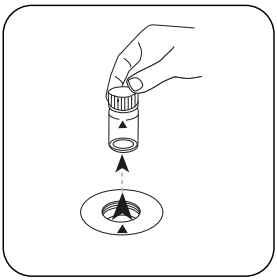
Küvette(n) verschließen.



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



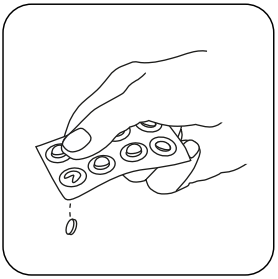
Taste **ZERO** drücken.



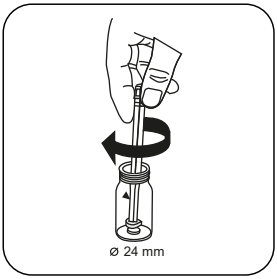
Küvette aus dem Messschacht nehmen.

Die Küvette bis auf einige Tropfen entleeren.

Bei Geräten, die **keine ZERO-Messung** erfordern, **hier beginnen**.



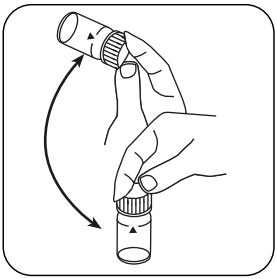
Eine **DPD No. 1 Tablette** zugeben.



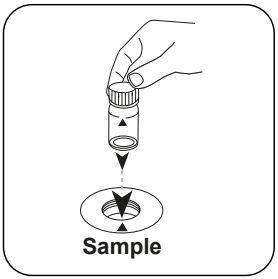
Tablette(n) unter leichter Drehung zerdrücken.

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

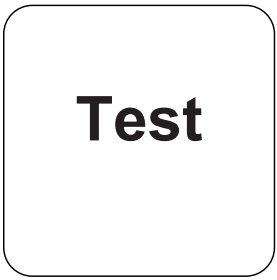
Küvette(n) verschließen.



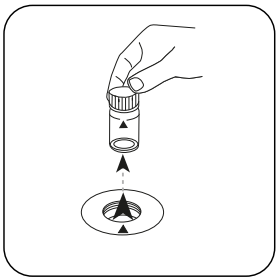
Tablette(n) durch Umschwenken lösen.



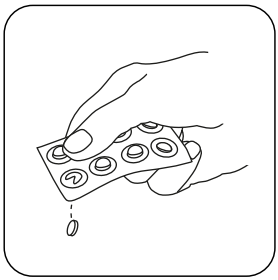
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



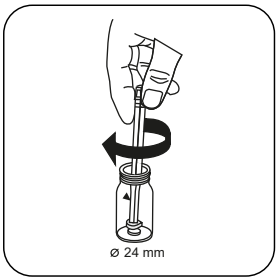
Taste **TEST** (XD: **START**) drücken.



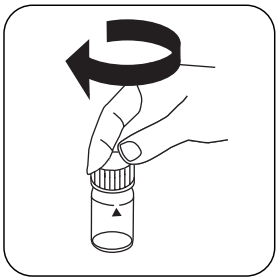
Küvette aus dem Messschacht nehmen.



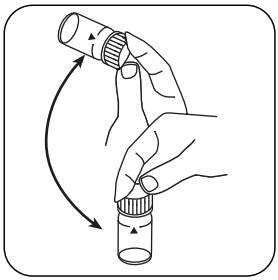
Eine **DPD No. 3 Tablette** zugeben.



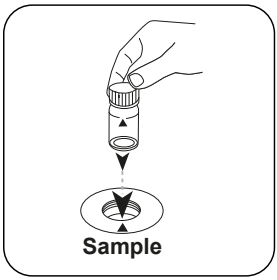
Tablette(n) unter leichter Drehung zerdrücken.



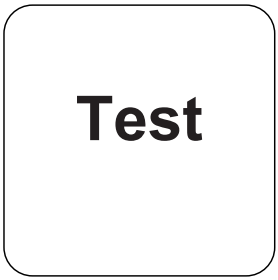
Küvette(n) verschließen.



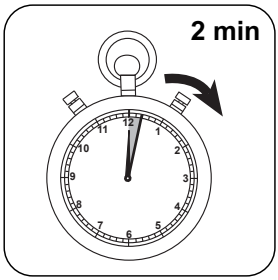
Tablette(n) durch Umschwenken lösen.



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



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



2 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

In der Anzeige erscheint das Ergebnis in mg/L freies Chlor, mg/l gebundenes Chlor, mg/l Gesamtchlor.

Permanente Störungen

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

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

DE

[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

Kupfer T **M150**

0,05 - 5 mg/L Cu[a)] **Cu**

Biquinolin

DE

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
Copper No. 1	Tablette / 100	513550BT
Copper No. 1	Tablette / 250	513551BT
Copper No. 2	Tablette / 100	513560BT
Copper No. 2	Tablette / 250	513561BT
Set Copper No. 1/No. 2#	je 100	517691BT
Set Copper No. 1/No. 2#	je 250	517692BT

Vorbereitung

1. Stark alkalische oder saure Wässer sollten vor der Analyse auf einen pH-Wert von 4 bis 6 eingestellt werden.

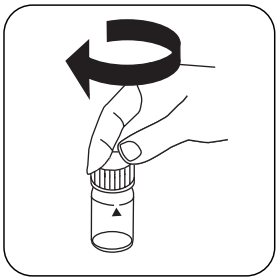
Durchführung der Bestimmung Kupfer, frei mit Tablette

Die Methode im Gerät auswählen.

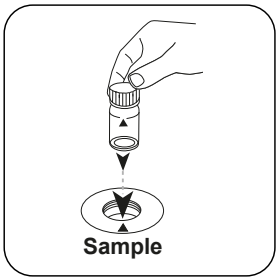
Wählen Sie zudem die Bestimmung: frei

Für diese Methode muss bei folgenden Geräten nicht jedes mal eine ZERO-Messung durchgeführt werden: XD 7000, XD 7500

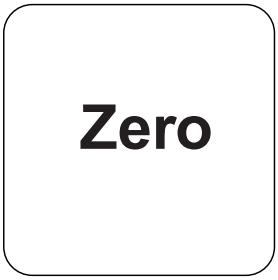
24-mm-Küvette mit **10 mL Probe** füllen.



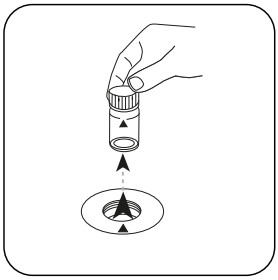
Küvette(n) verschließen.



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

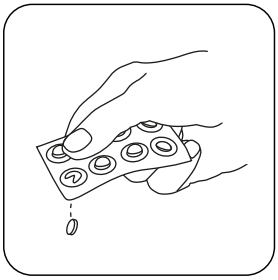


Taste **ZERO** drücken.

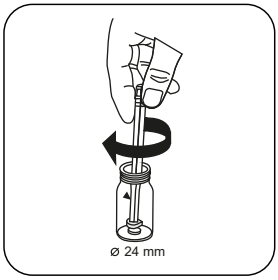


Küvette aus dem Messschacht nehmen.

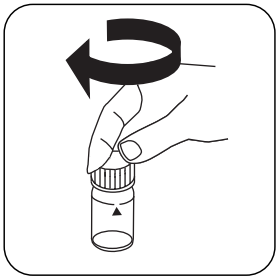
Bei Geräten, die **keine ZERO-Messung** erfordern, **hier beginnen**.



Eine **COPPER No. 1 Tablette** zugeben.

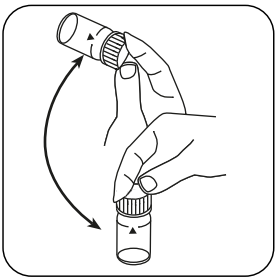


Tablette(n) unter leichter Drehung zerdrücken.

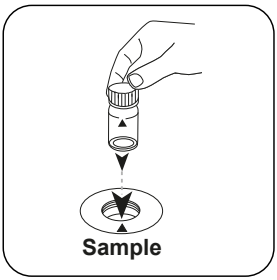


Küvette(n) verschließen.

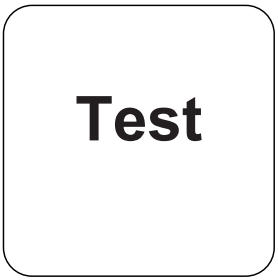
DE



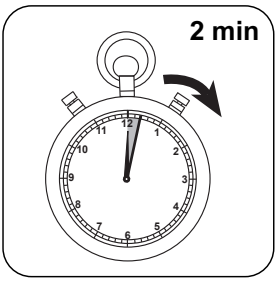
Tablette(n) durch Umschwenken lösen.



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



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



2 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

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

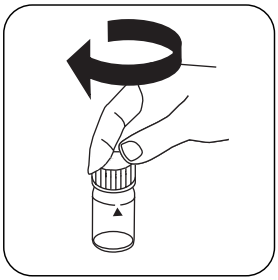
Durchführung der Bestimmung Kupfer, gesamt mit Tablette

Die Methode im Gerät auswählen.

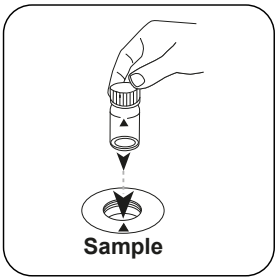
Wählen Sie zudem die Bestimmung: gesamt

Für diese Methode muss bei folgenden Geräten nicht jedes mal eine ZERO-Messung durchgeführt werden: XD 7000, XD 7500

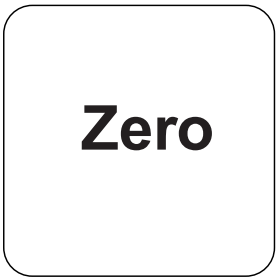
24-mm-Küvette mit **10 mL Probe** füllen.



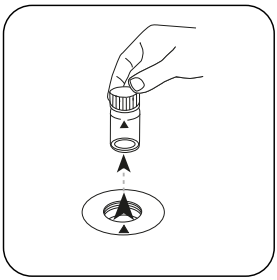
Küvette(n) verschließen.



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

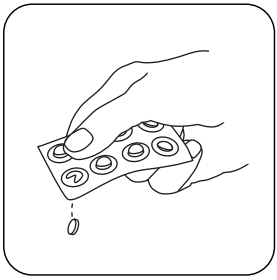


Taste **ZERO** drücken.

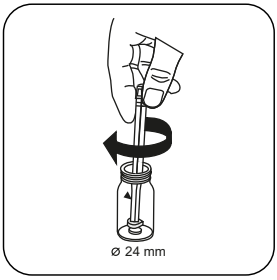


Küvette aus dem Messschacht nehmen.

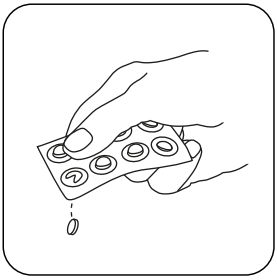
Bei Geräten, die **keine ZERO-Messung** erfordern, **hier beginnen**.



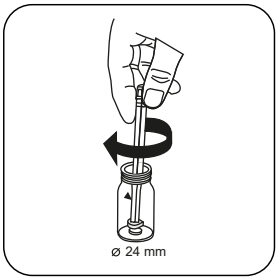
Eine **COPPER No. 1 Tablette** zugeben.



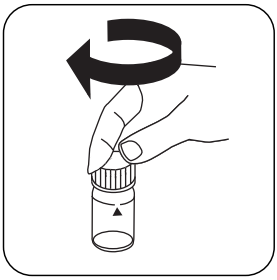
Die Tablette(n) unter leichter Drehung zerdrücken und lösen.



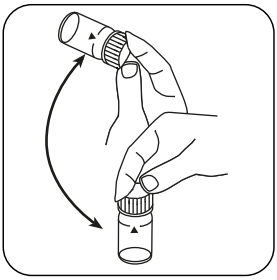
Eine **COPPER No. 2 Tablette** zugeben.



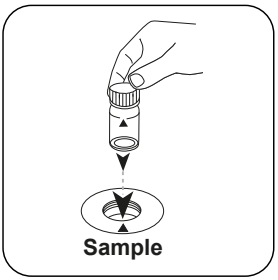
Tablette(n) unter leichter Drehung zerdrücken.



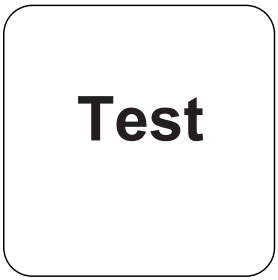
Küvette(n) verschließen.



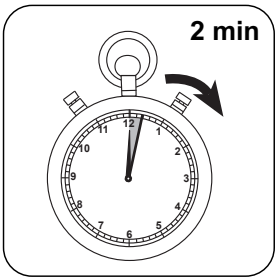
Tablette(n) durch Umschwenken lösen.



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



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



2 Minute(n) Reaktionszeit abwarten.

DE

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

In der Anzeige erscheint das Ergebnis in mg/L gesamtes Kupfer.

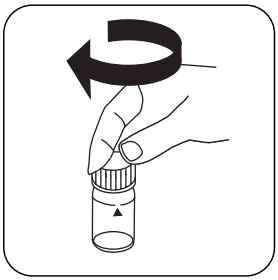
Durchführung der Bestimmung Kupfer , differenzierte Bestimmung mit Tablette

Die Methode im Gerät auswählen.

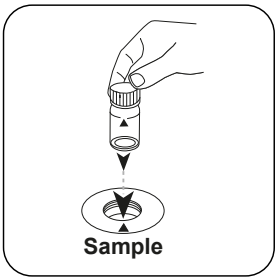
Wählen Sie zudem die Bestimmung: differenziert

Für diese Methode muss bei folgenden Geräten nicht jedes mal eine ZERO-Messung durchgeführt werden: XD 7000, XD 7500

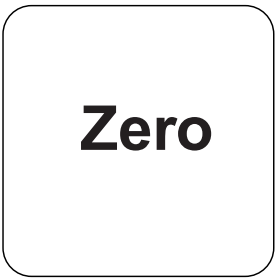
24-mm-Küvette mit **10 mL Probe** füllen.



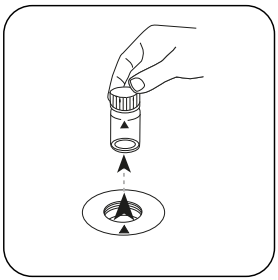
Küvette(n) verschließen.



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

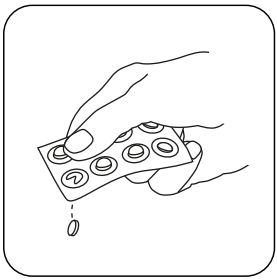


Taste **ZERO** drücken.

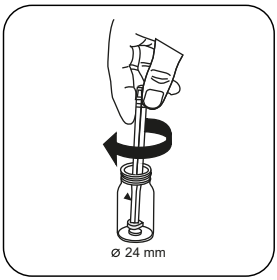


Küvette aus dem Messschacht nehmen.

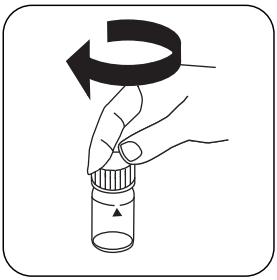
Bei Geräten, die **keine ZERO-Messung** erfordern, **hier beginnen**.



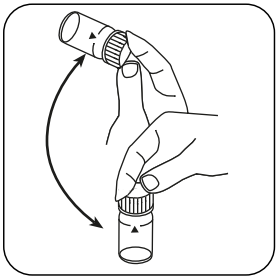
Eine **COPPER No. 1 Tablette** zugeben.



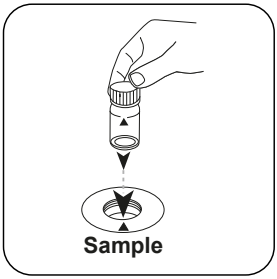
Tablette(n) unter leichter Drehung zerdrücken.



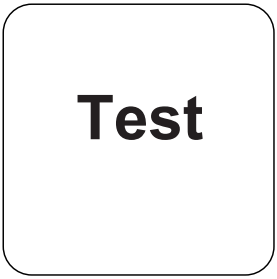
Küvette(n) verschließen.



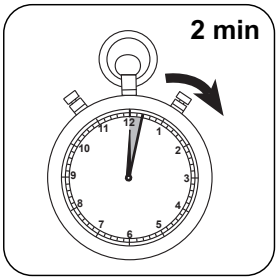
Tablette(n) durch Umschwenken lösen.



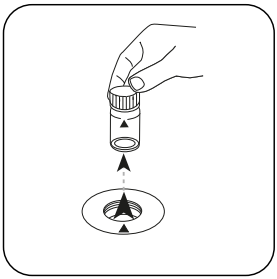
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



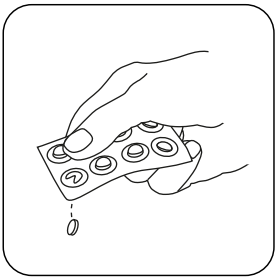
Taste **TEST** (XD: **START**) drücken.



2 Minute(n) Reaktionszeit abwarten.

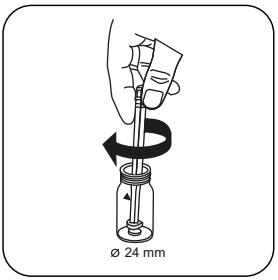


Küvette aus dem Messschacht nehmen.

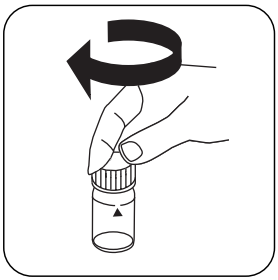


Eine **COPPER No. 2 Tablette** zugeben.

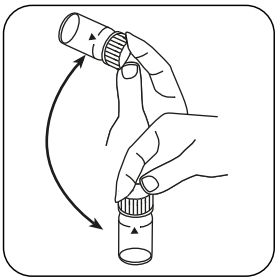
DE



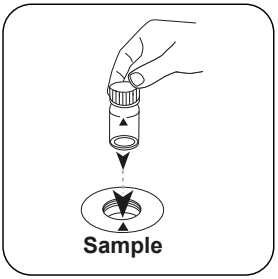
Tablette(n) unter leichter Drehung zerdrücken.



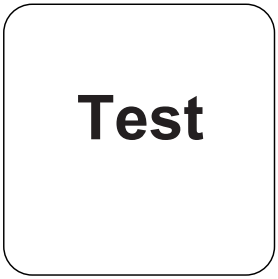
Küvette(n) verschließen.



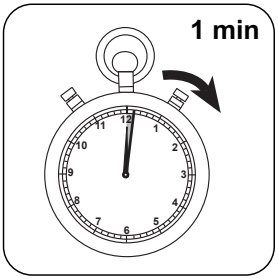
Tablette(n) durch Umschwenken lösen.



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



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



1 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

In der Anzeige erscheint das Ergebnis in mg/L freies Kupfer; mg/l gebundenes Kupfer; mg/l Gesamtkupfer.

Permanente Störungen

1. Cyanide CN^- und Silber Ag^+ stören die Bestimmung.

[a] Bestimmung von frei, gebunden, gesamt möglich | # inklusive Rührstab

Eisen LR L (A) M225

0,03 - 2 mg/L Fe FE

Ferrozine / Thioglycolat

DE

Material

Benötigtes Material (zum Teil optional):

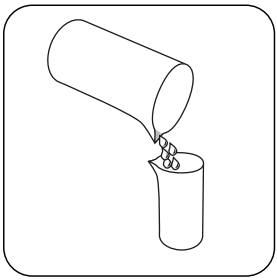
Reagenzien	Form/Menge	Bestell-Nr.
Säure / Alkalität P Indikator PA1	65 mL	56L013565
Calciumhärte Puffer CH2	65 mL	56L014465
KP962-Ammonium Persulphate Pulver	Pulver / 40 g	56P096240
KS63-FE6-Thioglycolat/Molybdat HR RGT	30 mL	56L006330
Eisen Reagenz FE6	65 mL	56L006365
Eisen Reagenz FE5	65 mL	56L006165
Iron LR Reagent Set	1 St.	56R018990

Vorbereitung

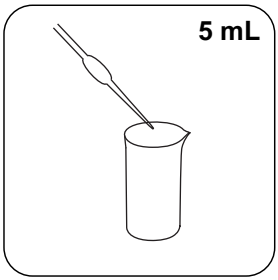
1. Wenn starke Komplexbildner in der Probe vorliegen, muss die Reaktionszeit verlängert werden, bis keine weitere Farbentwicklung mehr sichtbar ist. Sehr starke Eisen-Komplexe werden bei der Messung jedoch nicht erfasst. In diesem Fall müssen die Komplexbildner durch Oxidation mit Säure/Persulfat zerstört und die Probe im Anschluss durch Neutralisation auf pH 6 – 9 gebracht werden.
2. Für die Bestimmung des gesamten gelösten und suspendierten Eisens muss die Probe mit Säure/Persulfat gekocht werden. Neutralisieren Sie im Anschluss auf pH 6 – 9 und füllen mit VE-Wasser wieder auf das ursprüngliche Volumen auf.

Aufschluss

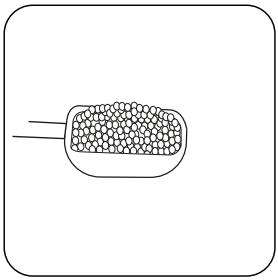
Gesamteisen setzt sich zusammen aus löslichem, komplexiertem und suspendiertem Eisen. Die Probe darf vor der Messung nicht filtriert weden. Um eine Homogenisierung der Probe zu gewährleisten, müssen abgesetzte Partikel unmittelbar vor der Probenahme durch kräftiges Schütteln gleichmäßig verteilt werden. Für die Bestimmung des gesamten löslichen Eisens (einschließlich der komplexen Eisenverbindungen) ist eine Filtration der Probe notwendig. Die zur Bestimmung des Gesamteisens erforderlichen Geräte und Reagenzien sind nicht im Standard-Lieferumfang enthalten.



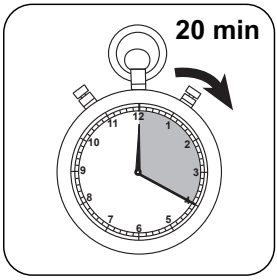
Ein geeignetes Aufschlussgefäß mit **50 mL homogenisierter Probe** füllen.



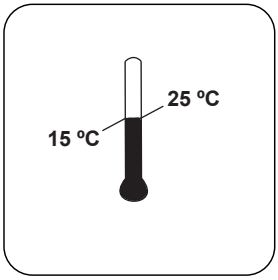
5 mL 1:1 Salzsäure zugeben.



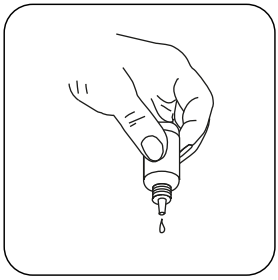
Einen Messlöffel KP 962 (Ammonium Persulfat Powder) zugeben.



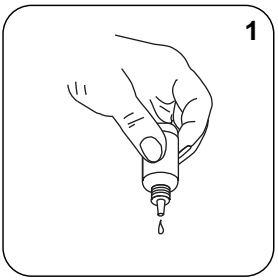
Die Probe für **20 Minuten kochen**. Ein Probevolumen von 25 mL sollte beibehalten werden, gegebenenfalls mit VE-Wasser aufüllen.



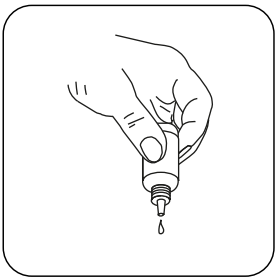
Die Probe auf **Raumtemperatur** abkühlen lassen.



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



1 Tropfen Säure / Alkalität P Indikator PA1 zugeben.



Calciumhärte Puffer CH2 tropfenweise derselben Probe zugeben bis eine schwach rosa bis rote Färbung auftritt. **(Achtung: nach Zugabe jedes Tropfens die Probe schwenken!)**

Die Probe mit **VE-Wasser auf 50 mL** auffüllen.

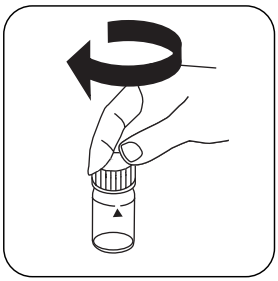
Durchführung der Bestimmung Eisen, gesamt LR (A) mit Flüssigreagenz

Die Methode im Gerät auswählen.

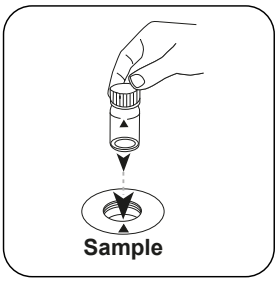
Für die Bestimmung von **Eisen, gesamt LR** den beschriebenen **Aufschluss** durchführen.

Für diese Methode muss bei folgenden Geräten nicht jedes mal eine ZERO-Messung durchgeführt werden: XD 7000, XD 7500

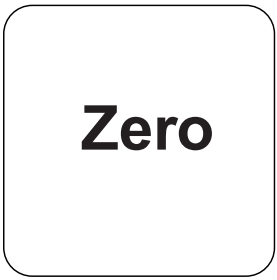
24 mm-Küvette mit **10 mL VE-Wasser** füllen.



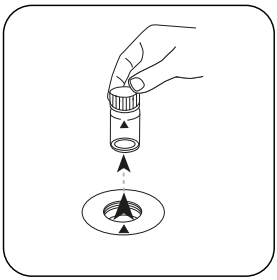
Küvette(n) verschließen.



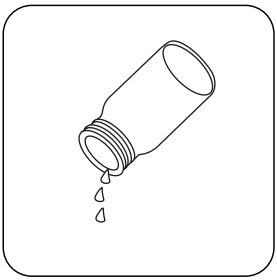
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



Taste **ZERO** drücken.



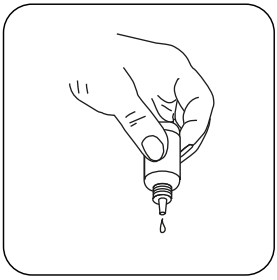
Küvette aus dem Messschacht nehmen.



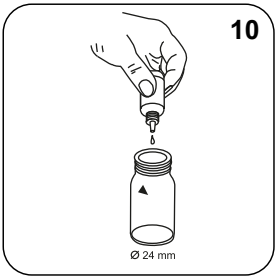
Küvette entleeren.

Bei Geräten, die **keine ZERO-Messung** erfordern, **hier beginnen**.

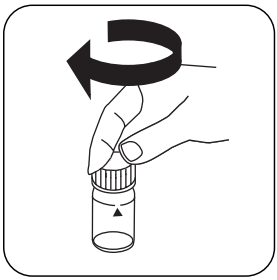
24-mm-Küvette mit **10 mL vorbereiteter Probe** füllen.



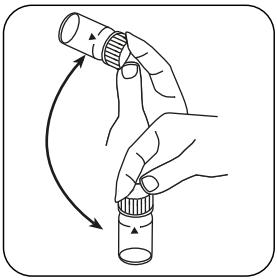
Die Tropfflaschen senkrecht halten und durch langsames Drücken gleich große Tropfen zugeben.



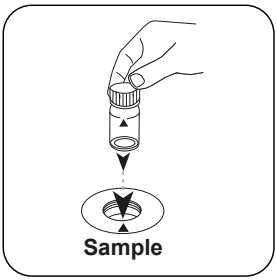
10 Tropfen Eisen Reagenz FE5 zugeben.



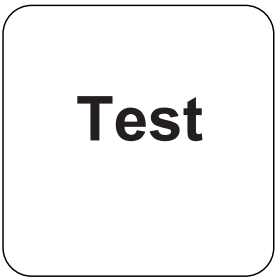
Küvette(n) verschließen.

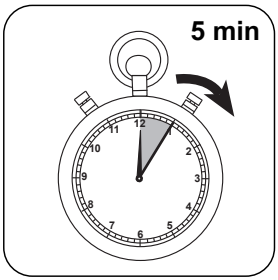


Inhalt durch Umschwenken mischen.



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





DE

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

5 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

In der Anzeige erscheint das Ergebnis in mg/L Gesamteisen oder, bei Verwendung einer filtrierten Probe, in mg/l gesamtes lösliches Eisen.

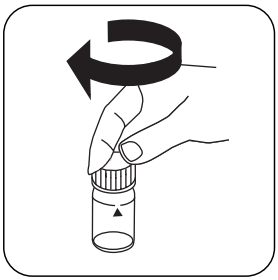
Durchführung der Bestimmung Eisen LR (A) mit Flüssigreagenz

Die Methode im Gerät auswählen.

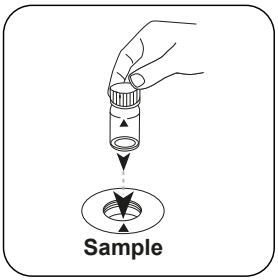
Für diese Methode muss bei folgenden Geräten nicht jedes mal eine ZERO-Messung durchgeführt werden: XD 7000, XD 7500

Für eine Bestimmung des gesamt gelösten Eisens muss die Probe vor der Bestimmung filtriert werden (Porenweite 0,45 µm). Andernfalls werden Eisenpartikel und suspendiertes Eisen mitbestimmt.

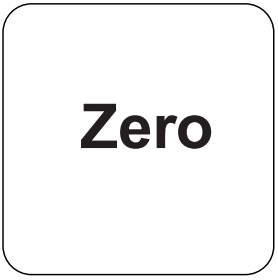
24-mm-Küvette mit **10 mL vorbereiteter Probe** füllen.



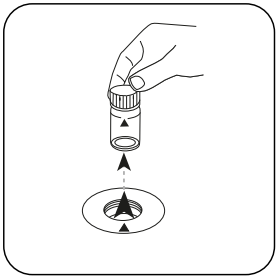
Küvette(n) verschließen.



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

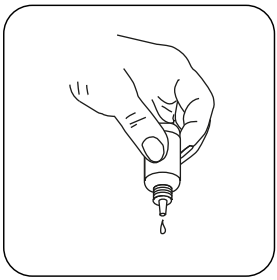


Taste **ZERO** drücken.

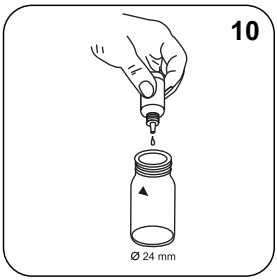


Küvette aus dem Messschacht nehmen.

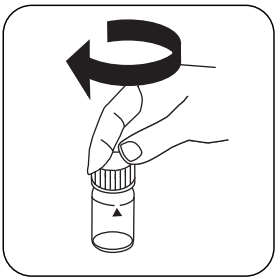
Bei Geräten, die **keine ZERO-Messung** erfordern, **hier beginnen**.



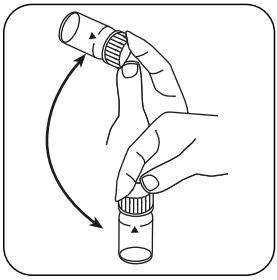
Die Tropfflaschen senkrecht halten und durch langsames Drücken gleich große Tropfen zugeben.



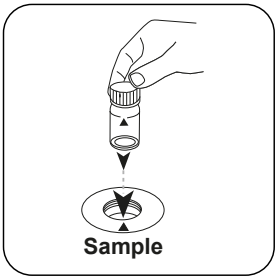
10 Tropfen Eisen Reagenz FE5 zugeben.



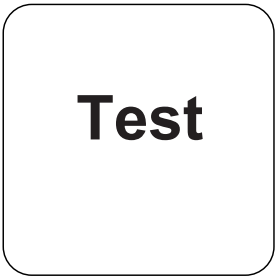
Küvette(n) verschließen.



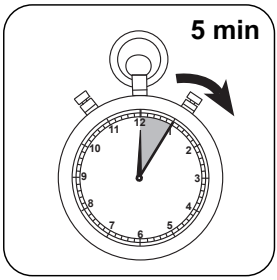
Inhalt durch Umschwenken mischen.



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



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



5 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

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

Störung	Stört ab / [mg/L]
Co	8
Cu	2
Oxalat	500
CN^-	10

NO_2^-

Eisen HR L M227

0,1 - 10 mg/L Fe

Thioglycolat

DE

Material

Benötigtes Material (zum Teil optional):

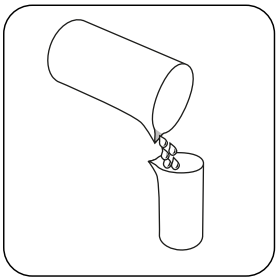
Reagenzien	Form/Menge	Bestell-Nr.
KP962-Ammonium Persulphate Pulver	Pulver / 40 g	56P096240
Säure / Alkalität P Indikator PA1	30 mL	56L013530
Säure / Alkalität P Indikator PA1	65 mL	56L013565
Calciumhärte Puffer CH2	65 mL	56L014465
Calciumhärte Puffer CH2	5 x 65 mL	56L014472
Iron HR Reagent Set	1 St.	56R023590

Vorbereitung

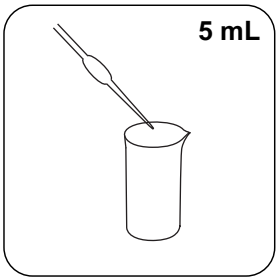
1. Wenn starke Komplexbildner in der Probe vorliegen, muss die Reaktionszeit verlängert werden, bis keine weitere Farbentwicklung mehr sichtbar ist. Sehr starke Eisen-Komplexe werden bei der Messung jedoch nicht erfasst. In diesem Fall müssen die Komplexbildner durch Oxidation mit Säure/Persulfat zerstört und die Probe im Anschluss durch Neutralisation auf pH 6 – 9 gebracht werden.
2. Für die Bestimmung des gesamten gelösten und suspendierten Eisens muss die Probe mit Säure/Persulfat gekocht werden. Neutralisieren Sie im Anschluss auf pH 6 – 9 und füllen mit VE-Wasser wieder auf das ursprüngliche Volumen auf.

Aufschluss

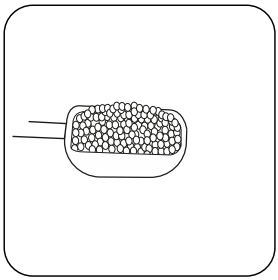
Gesamteisen setzt sich zusammen aus löslichem, komplexiertem und suspendiertem Eisen. Die Probe darf vor der Messung nicht filtriert weden. Um eine Homogenisierung der Probe zu gewährleisten, müssen abgesetzte Partikel unmittelbar vor der Probenahme durch kräftiges Schütteln gleichmäßig verteilt werden. Für die Bestimmung des gesamten löslichen Eisens (einschließlich der komplexen Eisenverbindungen) ist eine Filtration der Probe notwendig. Die zur Bestimmung des Gesamteisens erforderlichen Geräte und Reagenzien sind nicht im Standard-Lieferumfang enthalten.



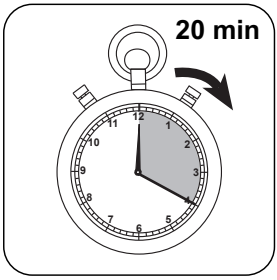
Ein geeignetes Aufschlussgefäß mit **50 mL homogenisierter Probe** füllen.



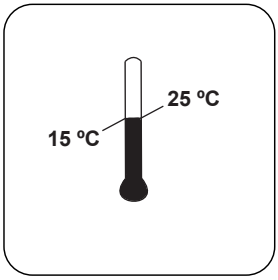
5 mL 1:1 Salzsäure zugeben.



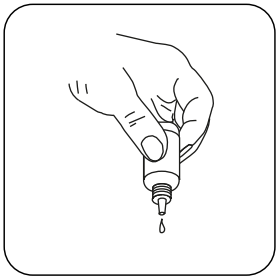
Einen Messlöffel KP 962 (Ammonium Persulphat Powder) zugeben.



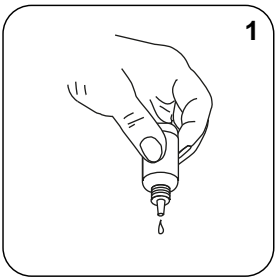
Die Probe für **20 Minuten kochen**. Ein Probevolumen von 25 mL sollte beibehalten werden, gegebenenfalls mit VE-Wasser aufüllen.



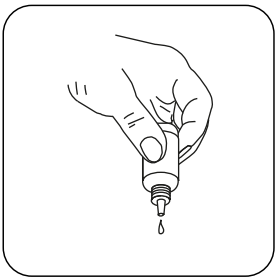
Die Probe auf **Raumtemperatur** abkühlen lassen.



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



1 Tropfen Säure / Alkalität P Indikator PA1 zugeben.



Calciumhärte Puffer CH2 tropfenweise derselben Probe zugeben bis eine schwach rosa bis rote Färbung auftritt. **(Achtung: nach Zugabe jedes Tropfens die Probe schwenken!)**

Die Probe mit **VE-Wasser auf 50 mL** auffüllen.

Durchführung der Bestimmung Eisen, gesamt HR mit Flüssigreagenz

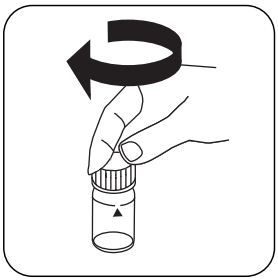
Die Methode im Gerät auswählen.

Für die Bestimmung von **Eisen, gesamt HR mit Flüssigreagenz** den beschriebenen **Aufschluss** durchführen.

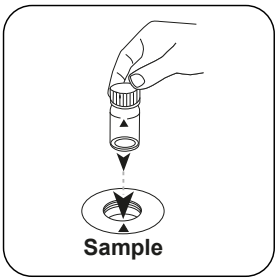
Für diese Methode muss bei folgenden Geräten nicht jedes mal eine ZERO-Messung durchgeführt werden: XD 7000, XD 7500

Gesamteisen setzt sich zusammen aus löslichem, komplexiertem und suspendiertem Eisen. Die Probe darf vor der Messung nicht filtriert weden. Um eine Homogenisierung der Probe zu gewährleisten, müssen abgesetzte Partikel unmittelbar vor der Probenahme durch kräftiges Schütteln gleichmäßig verteilt werden. Für die Bestimmung des gesamten löslichen Eisens (einschließlich der komplexen Eisenverbindungen) ist eine Filtration der Probe notwendig. Die zur Bestimmung des Gesamteisens erforderlichen Geräte und Reagenzien sind nicht im Standard-Lieferumfang enthalten.

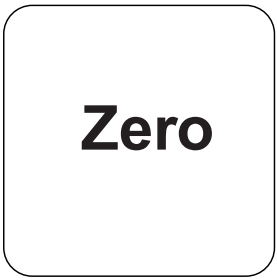
24 mm-Küvette mit **10 mL VE-Wasser** füllen.



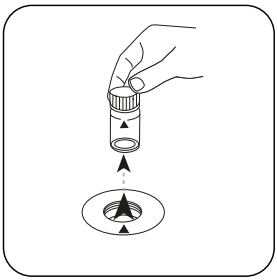
Küvette(n) verschließen.



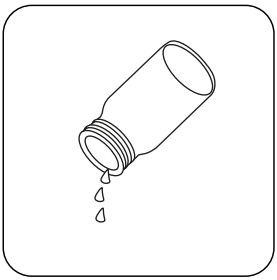
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



Taste **ZERO** drücken.



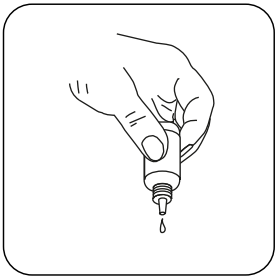
Küvette aus dem Messschacht nehmen.



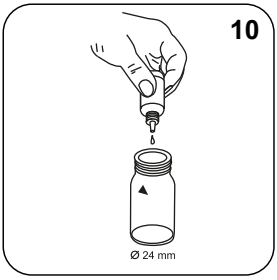
Küvette entleeren.

Bei Geräten, die **keine ZERO-Messung** erfordern, **hier beginnen**.

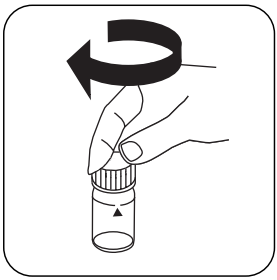
24-mm-Küvette mit **10 mL vorbereiteter Probe** füllen.



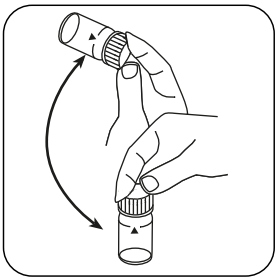
Die Tropfflaschen senkrecht halten und durch langsames Drücken gleich große Tropfen zugeben.



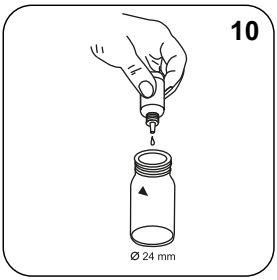
10 Tropfen Eisen Reagenz FE6 zugeben.



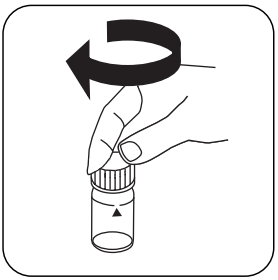
Küvette(n) verschließen.



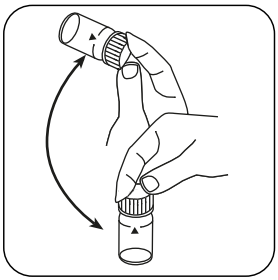
Inhalt durch Umschwenken mischen.



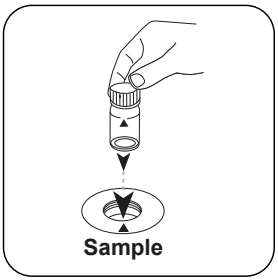
10 Tropfen Gesamthärte Puffer TH2 zugeben.



Küvette(n) verschließen.

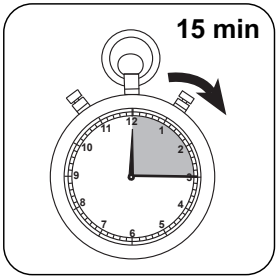


Inhalt durch Umschwenken mischen.



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

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



15 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

In der Anzeige erscheint das Ergebnis in mg/L Gesamteisen oder, bei Verwendung einer filtrierten Probe, in mg/l gesamtes lösliches Eisen.

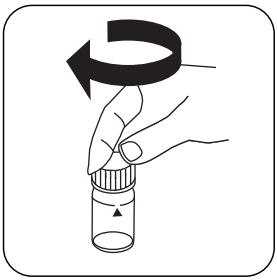
Durchführung der Bestimmung Eisen HR mit Flüssigreagenz

Die Methode im Gerät auswählen.

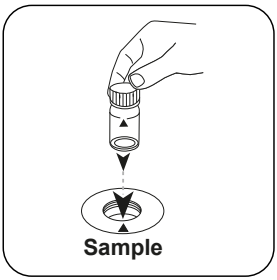
Für diese Methode muss bei folgenden Geräten nicht jedes mal eine ZERO-Messung durchgeführt werden: XD 7000, XD 7500

Für eine Bestimmung des gelösten Eisens, muss die Probe vor der Bestimmung filtriert werden (Porenweite 0,45 µm). Andernfalls werden Eisenpartikel und suspendiertes Eisen mitbestimmt.

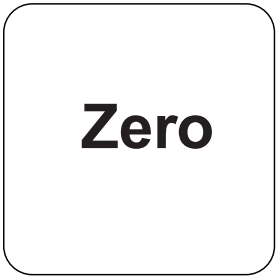
24-mm-Küvette mit **10 mL Probe** füllen.



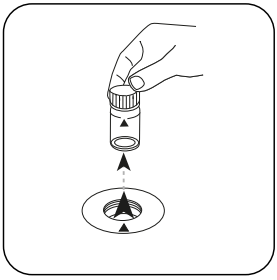
Küvette(n) verschließen.



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

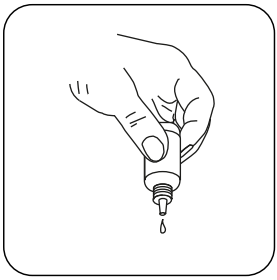


Taste **ZERO** drücken.

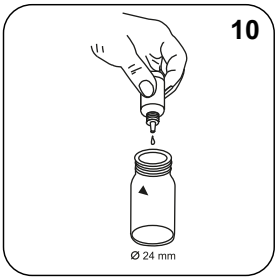


Küvette aus dem Messschacht nehmen.

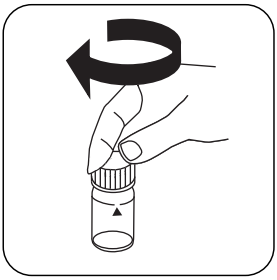
Bei Geräten, die **keine ZERO-Messung** erfordern, **hier beginnen**.



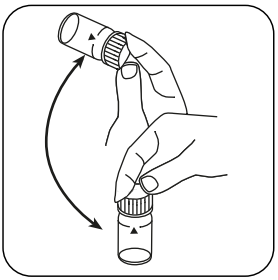
Die Tropfflaschen senkrecht halten und durch langsames Drücken gleich große Tropfen zugeben.



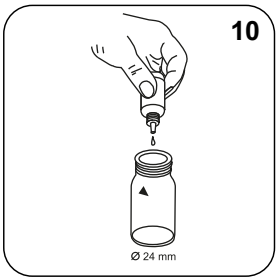
10 Tropfen Eisen Reagenz FE6 zugeben.



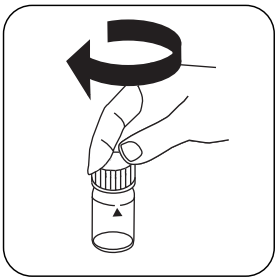
Küvette(n) verschließen.



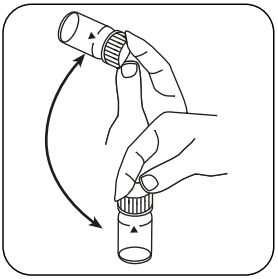
Inhalt durch Umschwenken mischen.



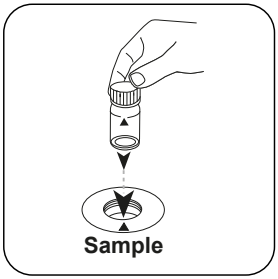
10 Tropfen Gesamthärte Puffer TH2 zugeben.



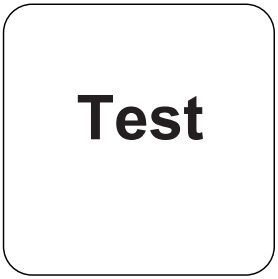
Küvette(n) verschließen.



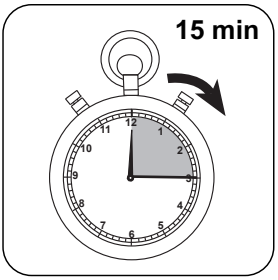
Inhalt durch Umschwenken mischen.



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



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



15 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

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

Molybdat T **M250**

1 - 50 mg/L MoO_4 **Mo3**

Thioglycolat

DE

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
Molybdate HR No. 1	Tablette / 100	513060BT
Molybdate HR No. 1	Tablette / 250	513061BT
Molybdate HR No. 2	Tablette / 100	513070BT
Molybdate HR No. 2	Tablette / 250	513071BT
Set Molybdate No. 1/No. 2#	je 100	517631BT
Set Molybdate No. 1/No. 2#	je 250	517632BT

Anmerkungen

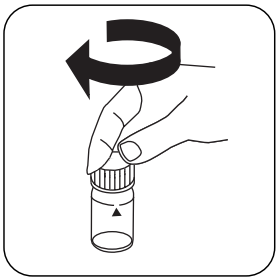
1. Die Reihenfolge der Tablettenzugabe ist unbedingt einzuhalten.

Durchführung der Bestimmung Molybdat HR mit Tablette

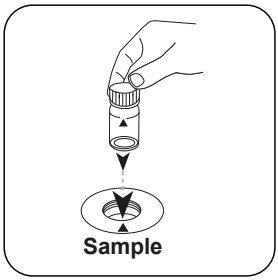
Die Methode im Gerät auswählen.

Für diese Methode muss bei folgenden Geräten nicht jedes mal eine ZERO-Messung durchgeführt werden: XD 7000, XD 7500

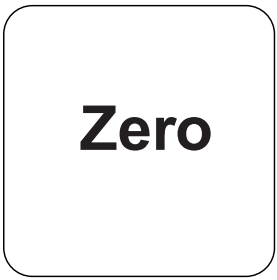
24-mm-Küvette mit **10 mL Probe** füllen.



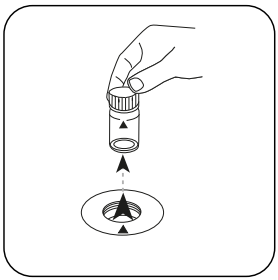
Küvette(n) verschließen.



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



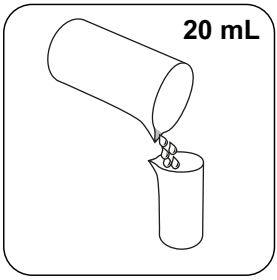
Taste **ZERO** drücken.



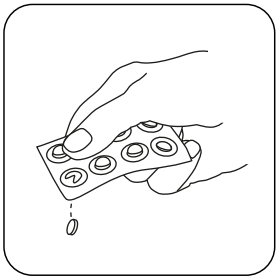
Küvette aus dem Messschacht nehmen.

Küvette entleeren.

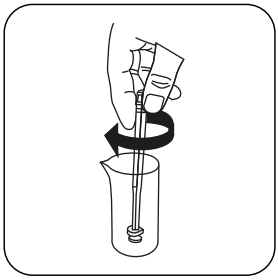
Bei Geräten, die **keine ZERO-Messung** erfordern, **hier beginnen**.



20 mL Probe in einen 100-mL-Messbecher geben.

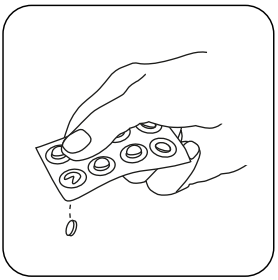


Eine **MOLYBDATE HR No. 1 Tablette** zugeben.

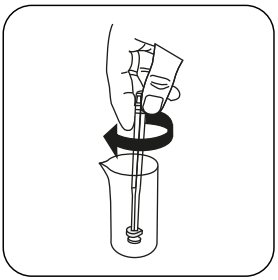


Tablette(n) unter leichter Drehung zerdrücken.

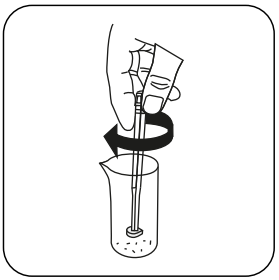
DE



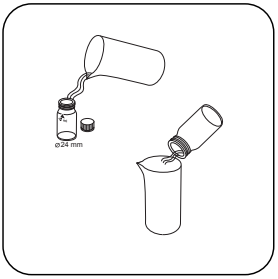
Eine **MOLYBDATE HR No. 2 Tablette** zugeben.



Tablette(n) unter leichter Drehung zerdrücken.



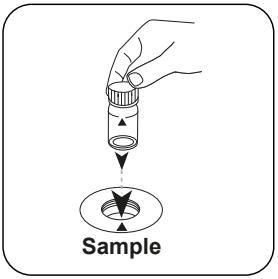
Tablette(n) durch Rühren mit einem sauberen Rührstab lösen.



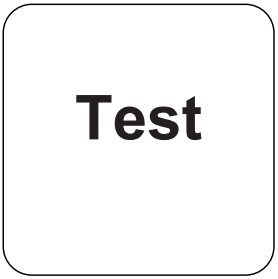
Küvette mit vorbereiteter Probe ausspülen.

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

Küvette(n) verschließen.



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



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

In der Anzeige erscheint das Ergebnis in mg/L Molybdat/ Molybdän.

inklusive Rührstab

Phosphat HR T M321

0,33 - 26 mg/L P

Vanadomolybdat

DE

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
Set Phosphate No. 1 HR/No. 2 HR #	je 100	517661BT
Phosphate HR P1	Tablette / 100	515810BT
Phosphate HR P2	Tablette / 100	515820BT

Vorbereitung

1. Stark gepufferte Proben oder Proben mit extremen pH-Werten sollten vor der Analyse in einen pH-Bereich zwischen 6 und 7 gebracht werden (mit 1 mol/l Salzsäure bzw. 1 mol/l Natronlauge).
2. Die entstehende gelbe Farbe wird durch Reaktion des Reagenzes mit ortho-Phosphat-Ionen erzeugt. Phosphate, die in organischer und in kondensierter, anorganischer (Meta-, Pyro- und Polyphosphate) Form vorliegen, müssen daher vor der Analyse in ortho-Phosphat-Ionen umgewandelt werden. Die Vorbehandlung der Probe mit Säure und Hitze schafft die Bedingungen für die Hydrolyse der kondensierten, anorganischen Formen. Organisch gebundene Phosphate werden durch Erhitzen mit Säure und Persulfat in ortho-Phosphat-Ionen umgewandelt. Die Menge an organisch gebundenem Phosphat kann berechnet werden: mg/L organische Phosphate = mg/L Phosphat, gesamt - mg/L Phosphat, säurehydrolysierbar.

Anmerkungen

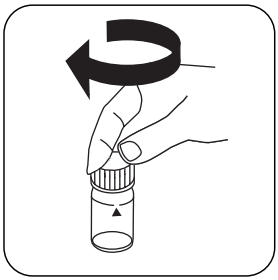
1. Es reagieren nur ortho-Phosphat-Ionen.
2. Bei Proben mit einem Phosphorgehalt unter 5 mg/L PO_4 wird empfohlen, die Analyse mit einer Methode mit niedrigem Messbereich durchzuführen; z.B. Methode 320 "Phosphat, ortho LR mit Tablette".

Durchführung der Bestimmung Phosphat, ortho HR mit Tablette

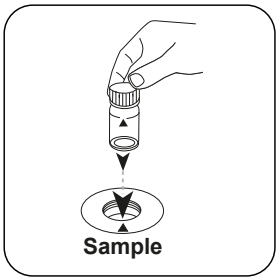
Die Methode im Gerät auswählen.

Für diese Methode muss bei folgenden Geräten nicht jedes mal eine ZERO-Messung durchgeführt werden: XD 7000, XD 7500

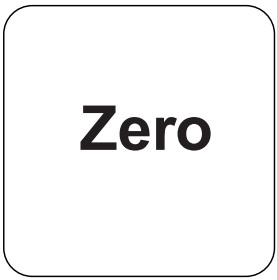
24-mm-Küvette mit **10 mL Probe** füllen.



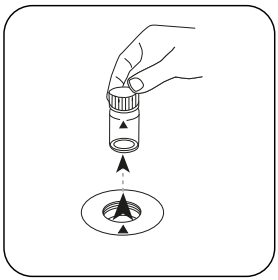
Küvette(n) verschließen.



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

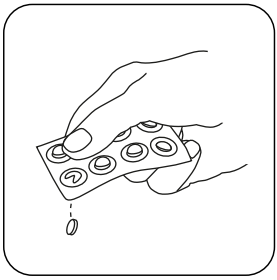


Taste **ZERO** drücken.

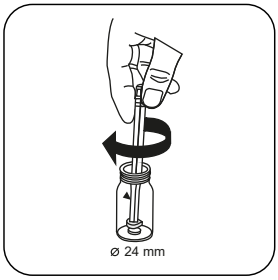


Küvette aus dem Messschacht nehmen.

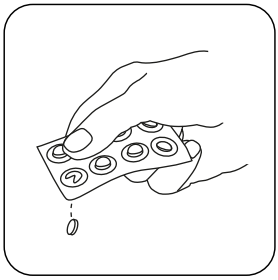
Bei Geräten, die **keine ZERO-Messung** erfordern, **hier beginnen**.



Eine **PHOSPHATE HR P1 Tablette** zugeben.

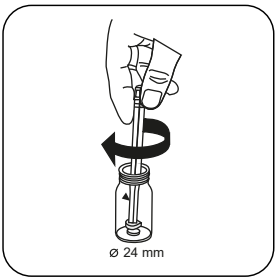


Tablette(n) unter leichter Drehung zerdrücken.

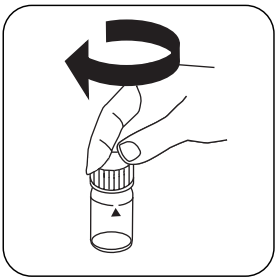


Eine **PHOSPHATE HR P2 Tablette** zugeben.

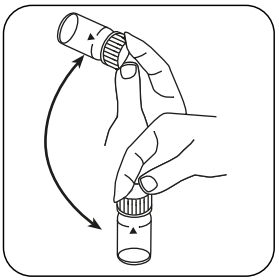
DE



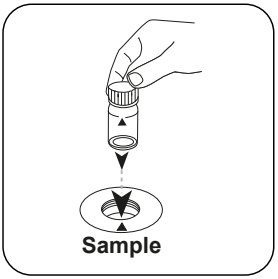
Tablette(n) unter leichter Drehung zerdrücken.



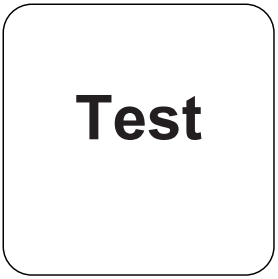
Küvette(n) verschließen.



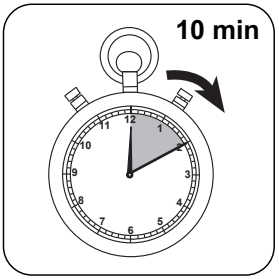
Tablette(n) durch Umschwenken lösen.



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



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



10 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

In der Anzeige erscheint das Ergebnis in mg/L ortho-Phosphat.

Störung	Stört ab / [mg/L]
Al	200
AsO_4^{3-}	in allen Mengen
Cr	100
Cu	10
Fe	100
Ni	300
H_2S	in allen Mengen
SiO_2	50
$Si(OH)_4$	10
S^{2-}	in allen Mengen
Zn	80

inklusive Rührstab

PTSA 2P M501

10 - 400 ppb

Fluoreszenz

DE

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
PTSA Standard Aufstockungslösung, 1000 ppb	1 St.	461210

Vorbereitung

1. Vor dem Gebrauch die Küvetten und das Zubehör reinigen.
2. Die Außenseite der Küvette muss vor Beginn der Analyse sauber unf trocken sein. Die Außenseite der Küvetten mit einem Tuch säubern. Fignerabdrücke oder andere Verunreinigungen müssen entfernt werden.
3. Das Photometer ist bereits werkseitig kalibriert oder es wurde eine benutzerdefinierte Kalibrierung durchgeführt. Es wird empfohlen, die Genauigkeit der Kalibrierung durch einen Standard zu überprüfen:

- falls der angezeigte Messwert zweifelhaft erscheint oder Zweifel and der Genauigkeit der letzten Kalibrierung
- besteht aber mindestens einmal monatlich.
  Die Überpüfungsmessung sollte wie eine Probenmessung durchgeführt werden.

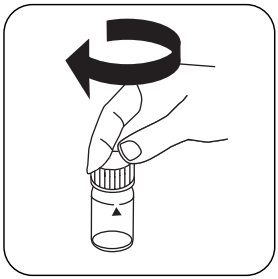
Anmerkungen

1. Benutzen Sie nur Küvetten mit schwarzem Deckel für PTSA Messugnen.
2. Größere Temperaturunterschiede zwischen Messgeräten und Umgebung können zu Fehlmessungen führen. Idealerweise sollten die Messungen mit einer Probentemperatur zwischen 20 °C und 25 °C durchgeführt werden.
3. Küvetten und Küvettendeckel sollten **nachjeder Analyse** gründlich gereinigt werden, um Interferenzen zu vermeiden.
4. Verwenden Sie immer Reagenz-Systeme des Geräteherstellers, um die maximale Genauigkeit des Gerätes zu gewährleisten.
5. Niemals bereits entnommenen Standard in die Vorratsflasche zurückgießen.
6. Durchführung eines Spiking Verfahrens möglich (siehe Photometeranleitung).

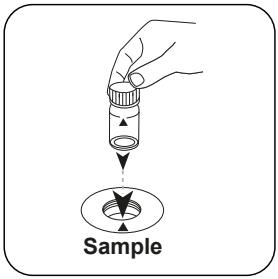
Durchführung der Bestimmung PTSA 2P

Die Methode im Gerät auswählen.

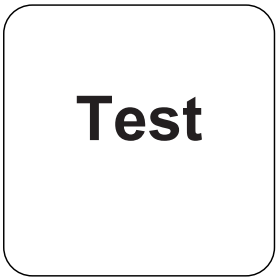
24-mm-Küvette mit **10 mL Probe** füllen.



Küvette(n) verschließen.



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



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

In der Anzeige erscheint das Ergebnis in ppb PTSA.

Tintometer GmbH
Lovibond® Water Testing
Schleefstraße 8-12
44287 Dortmund
Tel.: +49 (0)231/94510-0
sales@lovibond.com
www.lovibond.com
Germany

The Tintometer Limited
Lovibond House
Sun Rise Way
Amesbury, SP4 7GR
Tel.: +44 (0)1980 664800
Fax: +44 (0)1980 625412
sales@lovibond.uk
www.lovibond.com
UK

Tintometer China
9F, SOHO II C.
No.9 Guanghualu,
Chaoyang District,
Beijing, 100020
Customer Care China Tel.: 4009021628
Tel.: +86 10 85251111 Ext. 330
Fax: +86 10 85251001
chinaoffice@tintometer.com
www.lovibond.com
China

Tintometer South East Asia
Unit B-3-12, BBT One Boulevard,
Lebuh Nilam 2, Bandar Bukit Tinggi,
Klang, 41200, Selangor D.E
Tel.: +60 (0)3 3325 2285/6
Fax: +60 (0)3 3325 2287
lovibond.asia@tintometer.com
www.lovibond.com
Malaysia

Tintometer Brazil
Caixa Postal: 271
CEP: 13201-970
Jundiaí – SP
Tel.: +55 (11) 3230-6410
sales@lovibond.us
www.lovibond.com.br
Brazil

Tintometer Inc.
6456 Parkland Drive
Sarasota, FL 34243
Tel: 941.756.6410
Fax: 941.727.9654
sales@lovibond.us
www.lovibond.us
USA

Tintometer India Pvt. Ltd.
Door No: 7-2-C-14, 2nd, 3rd & 4th Floor
Sanathnagar Industrial Estate,
Hyderabad, 500018
Telangana
Tel: +91 (0) 40 23883300
Toll Free: 1 800 599 3891/ 3892
indiaoffice@lovibond.in
www.lovibondwater.in
India

Tintometer Spain
Postbox: 24047
08080 Barcelona
Tel.: +34 661 606 770
sales@tintometer.es
www.lovibond.com
Spain

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