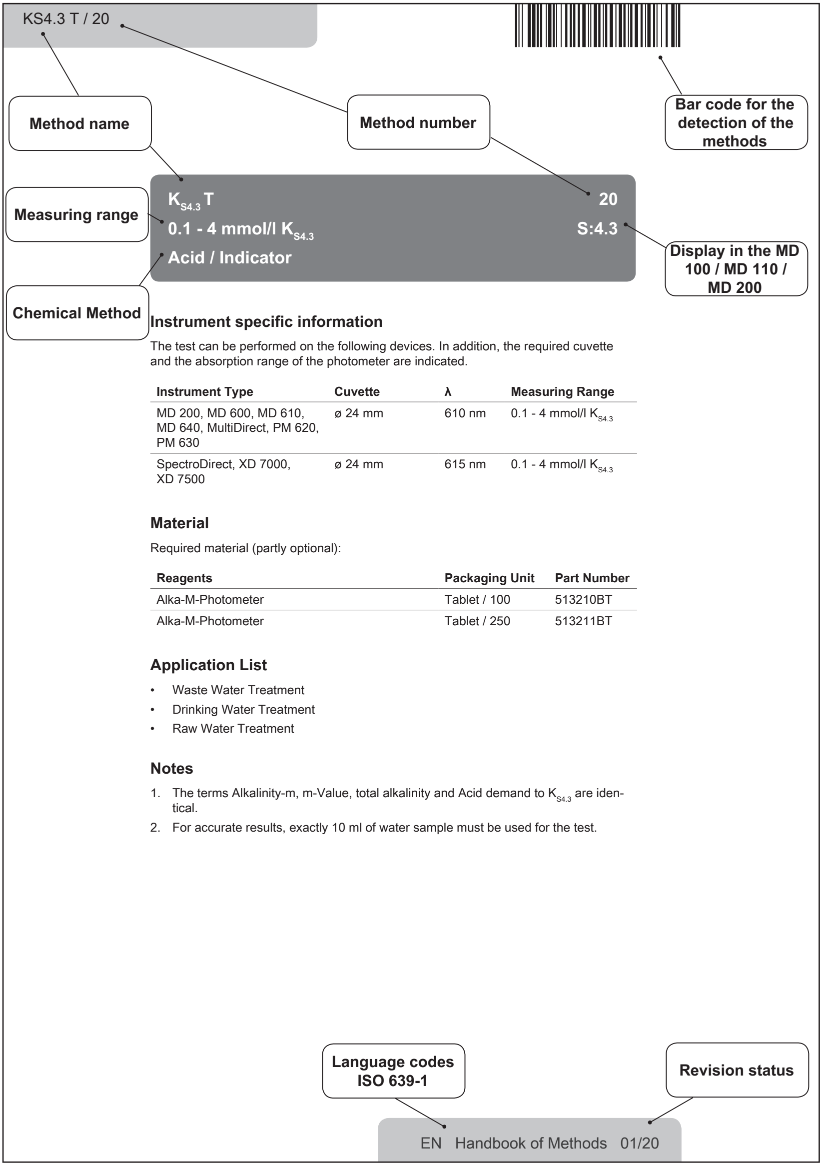
Lovibond® Water Testing

Tintometer® Group

Manual of Methods

MD 100 • MD 110 • MD 200

Aluminium | Bromine | Chlorine | Chlorine Dioxide | Copper |
Iron | Molybdate | Ozone | Polyacrylate | Sulphate | Triazole | Zinc



KS4.3 T / 20

$K_{S4.3}$ T **20**

0.1 - 4 mmol/l $K_{S4.3}$ **S:4.3**

Acid / Indicator

Instrument specific information

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

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

Material

Required material (partly optional):

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

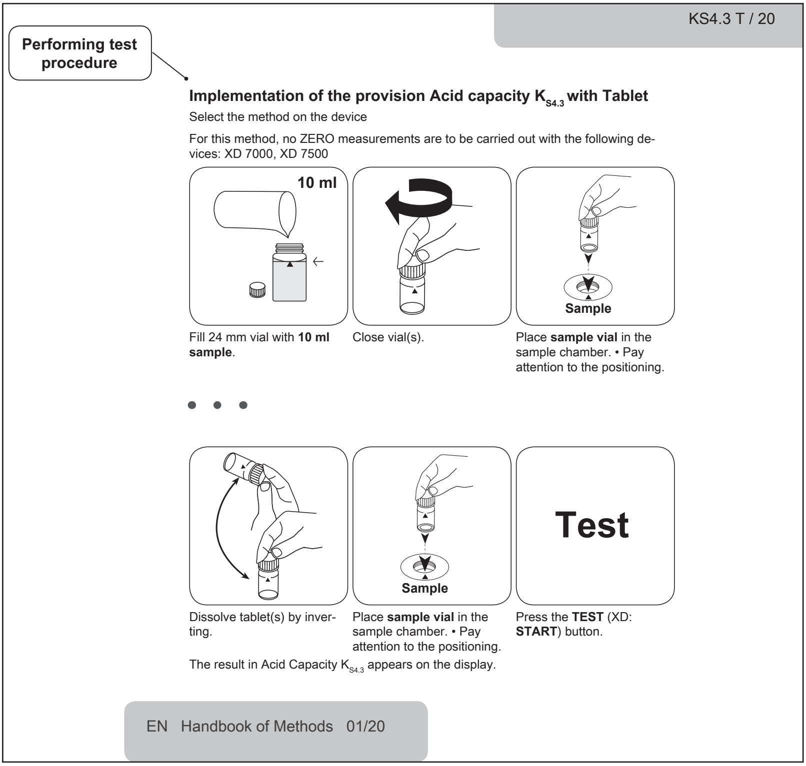
Application List

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

Notes

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

EN Handbook of Methods 01/20



KS4.3 T / 20

Performing test procedure

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

Select the method on the device

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

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

Close vial(s).

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

• • •

Dissolve tablet(s) by inverting.

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

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

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

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Aluminium PP M50

0.01 - 0.25 mg/L Al AL

Eriochrom Cyanine R

Material

Required material (partly optional):

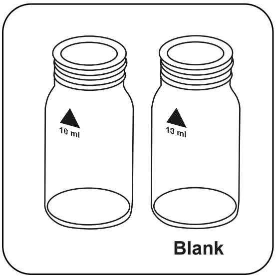
Reagents	Packaging Unit	Part Number
VARIO Aluminium Reagent, Set F20	1 pc.	535000

Preparation

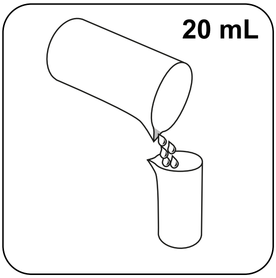
1. To get accurate results the sample temperature must be between 20 °C and 25 °C.
2. To avoid errors caused by contamination, rinse the vial and the accessories with Hydrochloric acid (approx. 20%) before the analysis. Then rinse them with deionised water.

Determination of Aluminium with Vario Powder Pack

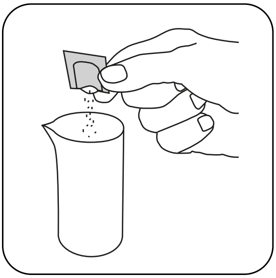
Select the method on the device.



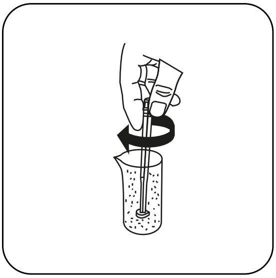
Prepare two clean 24 mm vials. Mark one as a blank.



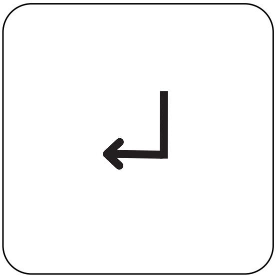
Put **20 mL sample** in 100 mL measuring beaker



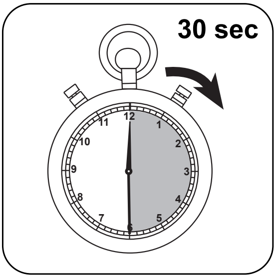
Add **Vario ALUMINIUM ECR F20 powder pack**.



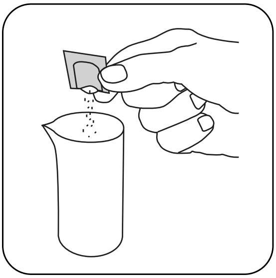
Dissolve the powder by mixing.



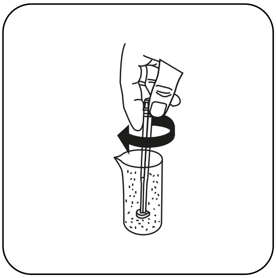
Press the **ENTER** button.



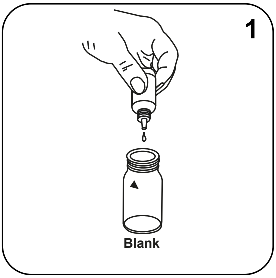
Wait for **30 second(s) reaction time**.



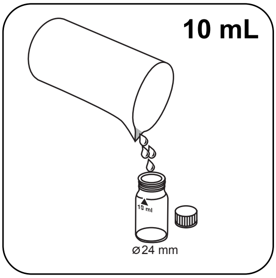
Add **Vario HEXAMINE F20 powder pack**.



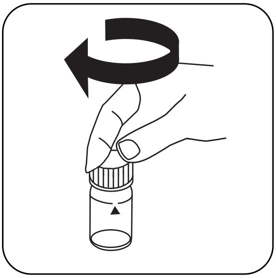
Dissolve the powder by mixing.



Place **1 drops Vario ALUMINIUM ECR Masking Reagent** in the blank.



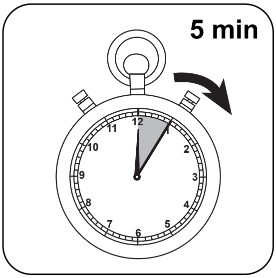
Place **10 mL pre-treated sample** in each vial.



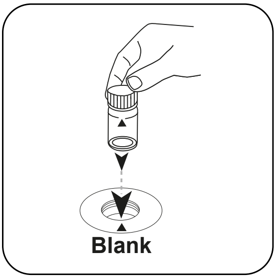
Close vial(s).

↵

Press the **ENTER** button.



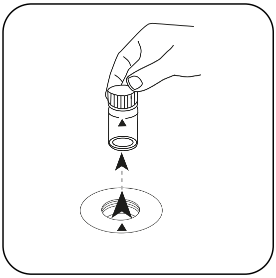
Wait for **5 minute(s) reaction time**.



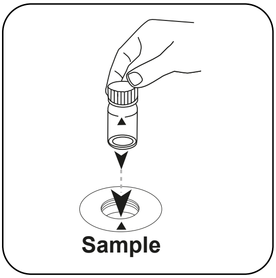
Place **blank** in the sample chamber. Pay attention to the positioning.

Zero

Press the **ZERO** button.



Remove the vial from the sample chamber.



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

Test

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

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

Analyses

The following table identifies the output values can be converted into other citation forms.

Unit	Cite form	Scale Factor
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Chemical Method

Eriochrom Cyanine R

Appendix

Interferences

Removeable Interferences

- A low test result may be given in the presence of Fluorides and Polyphosphates. The effect of this is generally insignificant unless the water has fluoride added artificially. In this case, the following table should be used to determine the actual concentration of aluminium.

Fluoride	**Displayed value: Aluminium [mg/L]**					
[mg/L F]	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**
0.2	0.05	0.11	0.16	0.21	0.27	0.32
0.4	0.06	0.11	0.17	0.23	0.28	0.34
0.6	0.06	0.12	0.18	0.24	0.30	0.37
0.8	0.06	0.13	0.20	0.26	0.32	0.40
1.0	0.07	0.13	0.21	0.28	0.36	0.45
1.5	0.09	0.20	0.29	0.37	0.48	---

Bibliography

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

According to

APHA Method 3500-Al B

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

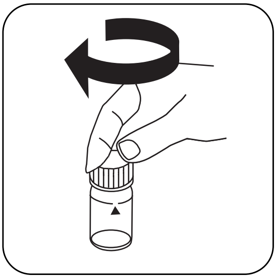
Preparation

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).

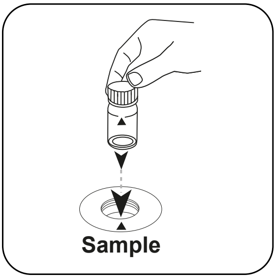
Determination of Bromine with Tablet

Select the method on the device.

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



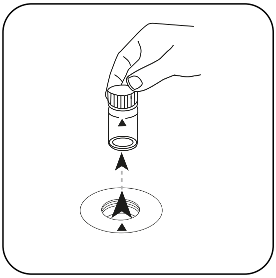
Close vial(s).



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

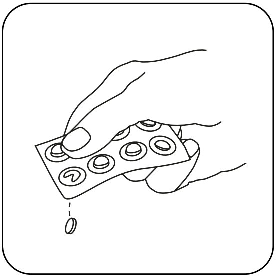
Zero

Press the **ZERO** button.

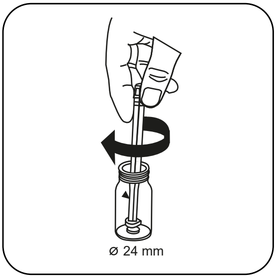


Remove the vial from the sample chamber.

Empty vial except for a few drops.

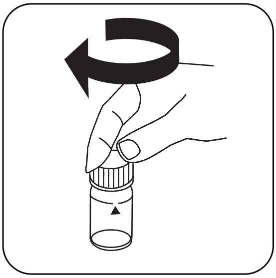


Add **DPD No. 1 tablet** .

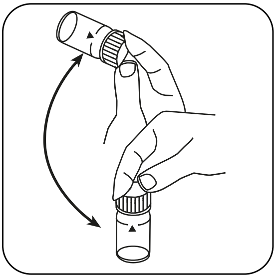


Crush tablet(s) by rotating slightly.

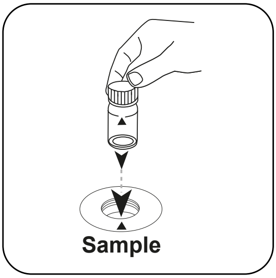
Fill up vial with **sample** to the **10 mL mark**.



Close vial(s).



Dissolve tablet(s) by inverting.



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

Test

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

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

Chemical Method

DPD

Appendix

Interferences

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).

Derived from

US EPA 330.5 (1983)
APHA Method 4500 Cl-G

[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

Material

Required material (partly optional):

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

Available Standards

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

Sampling

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

Preparation

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

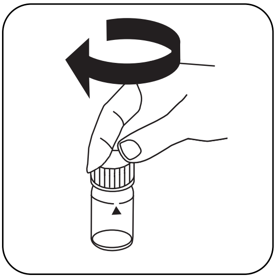
Notes

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

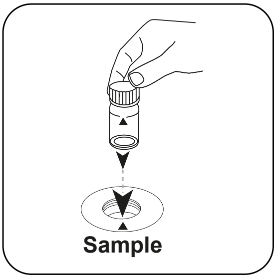
Determination of free chlorine with tablet

Select the method on the device.

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



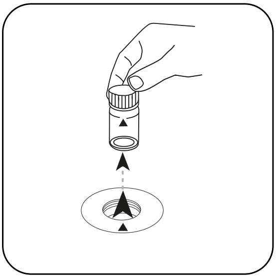
Close vial(s).



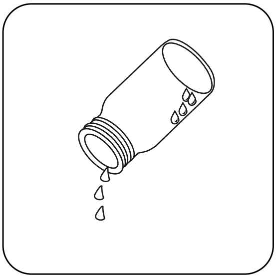
Place **sample vial** in the sample chamber. Pay attention to the positioning.

Zero

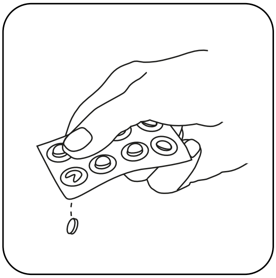
Press the **ZERO** button.



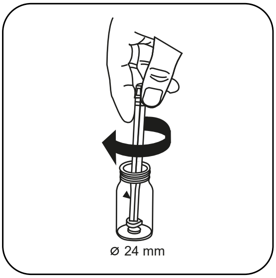
Remove the vial from the sample chamber.



Empty vial except for a few drops.

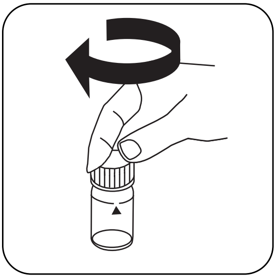


Add **DPD No. 1 tablet** .

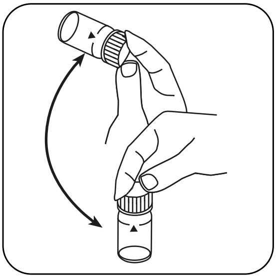


Crush tablet(s) by rotating slightly.

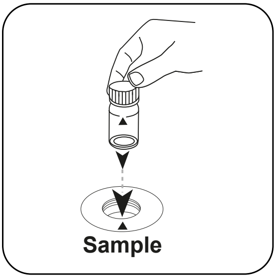
Fill up vial with **sample** to the **10 mL mark**.



Close vial(s).



Dissolve tablet(s) by inverting.



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

Test

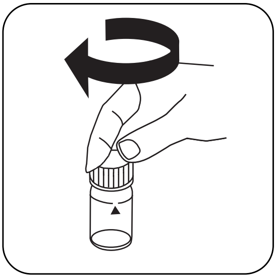
Press the **TEST** (XD: **START**)button.

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

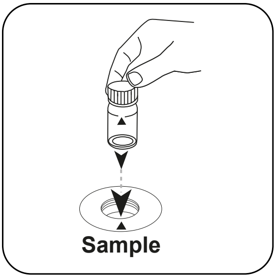
Determination of total Chlorine with tablet

Select the method on the device.

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



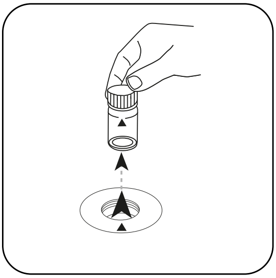
Close vial(s).



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

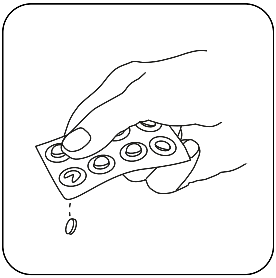
Zero

Press the **ZERO** button.

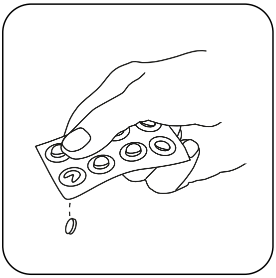


Remove the vial from the sample chamber.

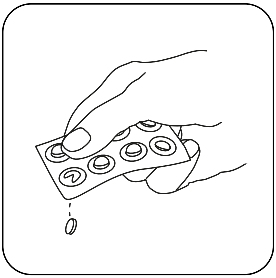
Empty vial except for a few drops.



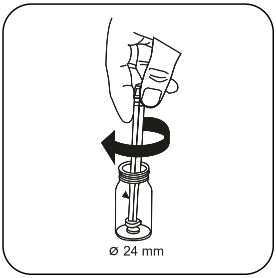
Add **DPD No. 1 tablet** .



Add **DPD No. 3 tablet** .

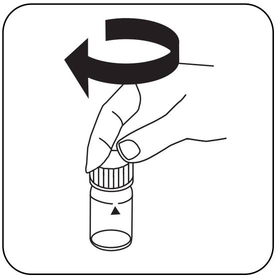


As an alternative to DPD No. 1 and No. 3 tablets, a DPD No. 4 tablet can be added.

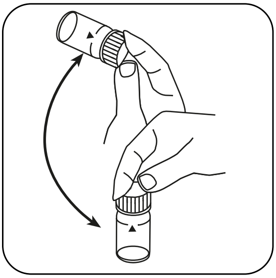


Crush tablet(s) by rotating slightly.

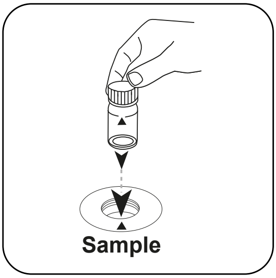
Fill up vial with **sample** to the **10 mL mark**.



Close vial(s).



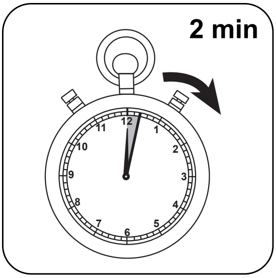
Dissolve tablet(s) by inverting.



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

Test

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



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

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

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

Chemical Method

DPD

Appendix

Interferences

Persistant Interferences

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

Removeable Interferences

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

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

Method Validation

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

Conformity

EN ISO 7393-2

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

Chlorine L M101

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

DPD

Material

Required material (partly optional):

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

Available Standards

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

Sampling

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

Preparation

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

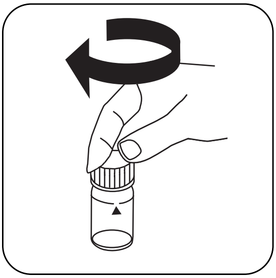
Notes

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

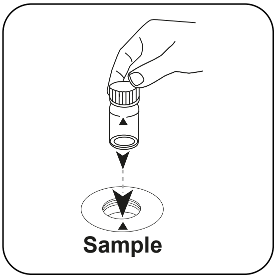
Determination of free chlorine with liquid reagent

Select the method on the device.

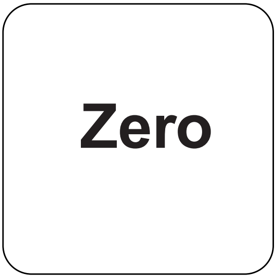
Fill 24 mm vial with **10 mL sample**.



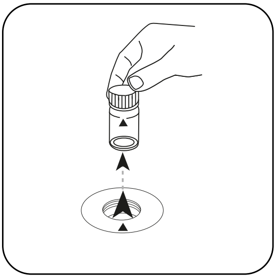
Close vial(s).



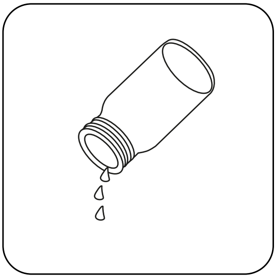
Place **sample vial** in the sample chamber. Pay attention to the positioning.



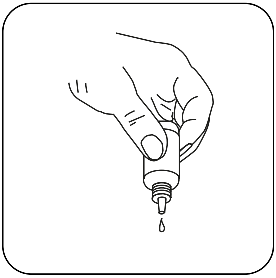
Press the **ZERO** button.



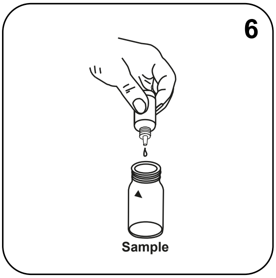
Remove the vial from the sample chamber.



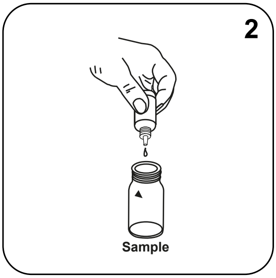
Empty vial.



Hold cuvettes vertically and add equal drops by pressing slowly.

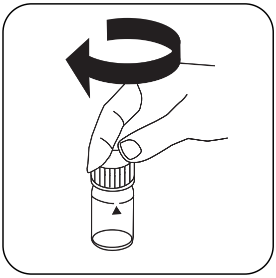


Add **6 drops DPD 1 Buffer Solution** to the **sample vial**.

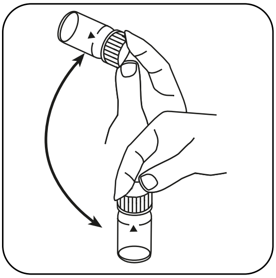


Add **2 drops DPD 1 Reagent Solution** to the **sample vial**.

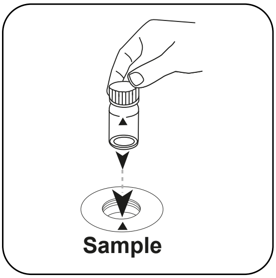
Fill up vial with **sample** to the **10 mL mark**.



Close vial(s).



Invert several times to mix the contents.



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

Test

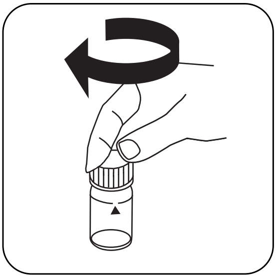
Press the **TEST** (XD: **START**)button.

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

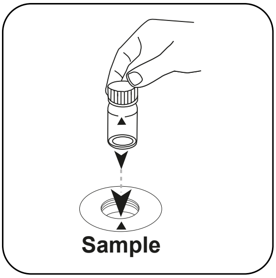
Determination of totale Chlorine with liquid reagent

Select the method on the device.

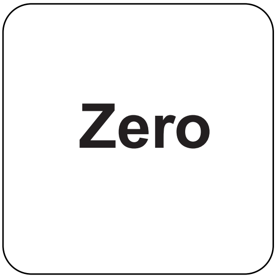
Fill 24 mm vial with **10 mL sample**.



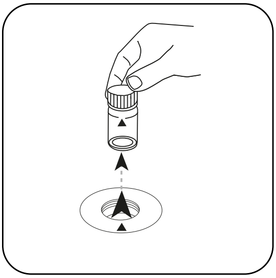
Close vial(s).



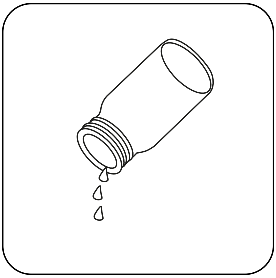
Place **sample vial** in the sample chamber. Pay attention to the positioning.



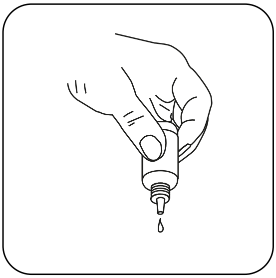
Press the **ZERO** button.



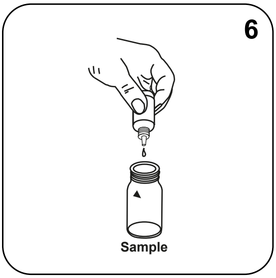
Remove the vial from the sample chamber.



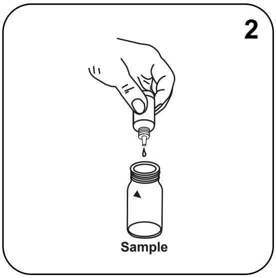
Empty vial.



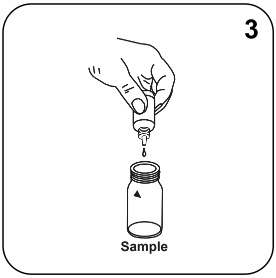
Hold cuvettes vertically and add equal drops by pressing slowly.



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

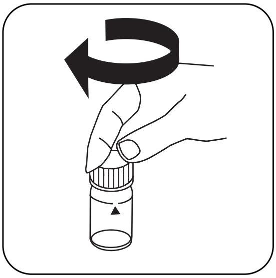


Add **2 drops DPD 1 Reagent Solution** to the **sample vial**.

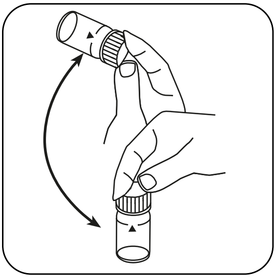


Add **3 drops DPD 3 Solution** to the **sample vial**.

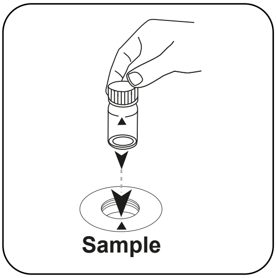
Fill up vial with **sample** to the **10 mL mark**.



Close vial(s).



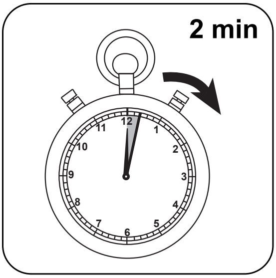
Invert several times to mix the contents.



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

Test

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



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

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

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

Chemical Method

DPD

Appendix

Interferences

Persistant Interferences

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

Removeable Interferences

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

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

Conformity

EN ISO 7393-2

[a] determination of free, combined and total

Chlorine HR (KI) T M105

5 - 200 mg/L Cl_2 CLHr

KI / Acid

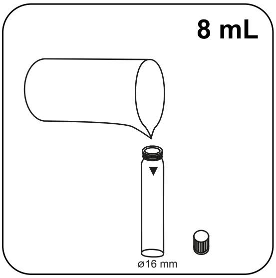
Material

Required material (partly optional):

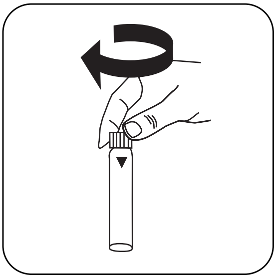
Reagents	Packaging Unit	Part Number
Chlorine HR (KI)	Tablet / 100	513000BT
Chlorine HR (KI)	Tablet / 250	513001BT
Acidifying GP	Tablet / 100	515480BT
Acidifying GP	Tablet / 250	515481BT
Set Chlorine HR (KI)/Acidifying GP 100 Pc. #	100 each	517721BT
Set Chlorine HR (KI)/Acidifying GP 250 Pc. #	250 each	517722BT
Chlorine HR (KI)	Tablet / 100	501210
Chlorine HR (KI)	Tablet / 250	501211

Determination of Chlorine HR (KI) with Tablet

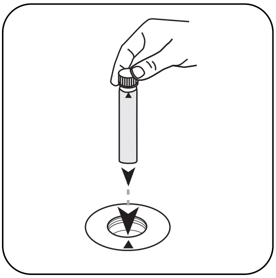
Select the method on the device.



Fill 16 mm vial with **8 mL sample**.



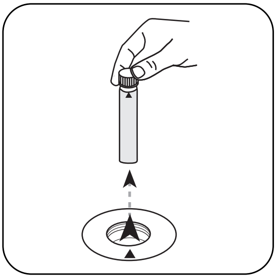
Close vial(s).



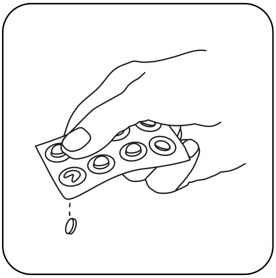
Place **sample vial** in the sample chamber. • Pay attention to the positioning.

Zero

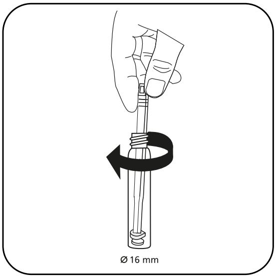
Press the **ZERO** button.



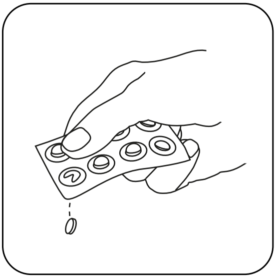
Remove **vial** from the sample chamber.



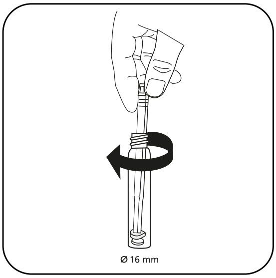
Add **Chlorine HR (KI) tablet**.



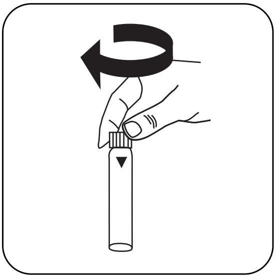
Crush tablet(s) by rotating slightly.



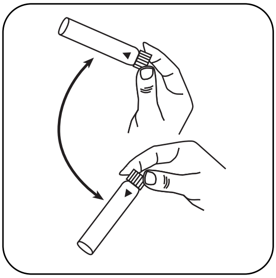
Add **ACIDIFYING GP tablet**.



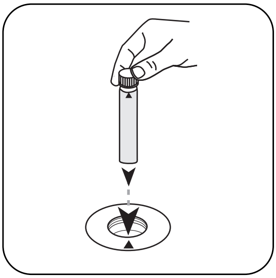
Crush tablet(s) by rotating slightly.



Close vial(s).



Dissolve tablet(s) by inverting.



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

Test

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

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

Chemical Method

KI / Acid

Appendix

Interferences

Persistant Interferences

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

Method Validation

Limit of Detection	1.29 mg/L
Limit of Quantification	3.86 mg/L
End of Measuring Range	200 mg/L
Sensitivity	83.96 mg/L / Abs
Confidence Intervall	1.14 mg/L
Standard Deviation	0.45 mg/L
Variation Coefficient	0.45 %

Derived from

EN ISO 7393-3

[#] including stirring rod, 10 cm

Chlorine dioxide T M120

0.02 - 11 mg/L ClO_2 CLO2

DPD / Glycine

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
Glycine f)	Tablet / 100	512170BT
Glycine f)	Tablet / 250	512171BT
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. 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
Set DPD No. 1/No. 3 100 Pc.#	100 each	517711BT
Set DPD No. 1/No. 3 250 Pc.#	250 each	517712BT
Set DPD No. 1/Glycine 100 Stck. #	100 each	517731BT
Set DPD No. 1/Glycine 250 Stck. #	250 each	517732BT
Set DPD No. 1/No. 3 High Calcium 100 Pc. #	100 each	517781BT
Set DPD No. 1/No. 3 High Calcium 250 Pc. #	250 each	517782BT
DPD No. 3 Evo	Tablet / 100	511420BT
DPD No. 3 Evo	Tablet / 250	511421BT
DPD No. 3 Evo	Tablet / 500	511422BT

Sampling

1. When preparing the sample, 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 dioxide. 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. 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).

Notes

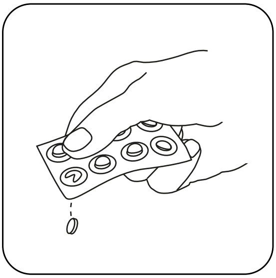
1. EVO tablets can be used as an alternative to the corresponding standard tablet (e.g. DPD No. 3 EVO instead of DPD No. 3).

Determination of Chlorine Dioxide, in presence of chlorine with tablet

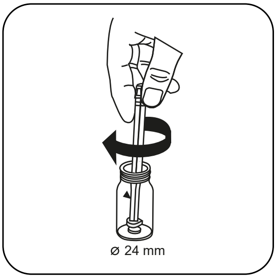
Select the method on the device.

In addition, choose the test: in presence of Chlorine

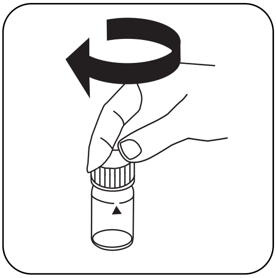
Fill 24 mm vial with **10 mL sample**.



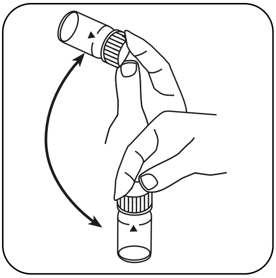
Add **GLYCINE tablet**.



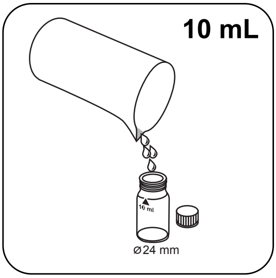
Crush tablet(s) by rotating slightly.



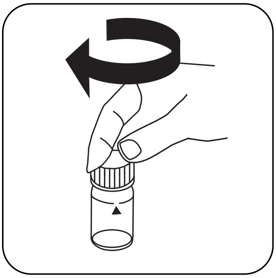
Close vial(s).



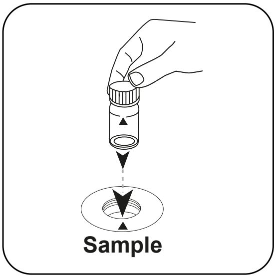
Dissolve tablet(s) by inverting.



Fill a **second vial** with **10 mL sample** .



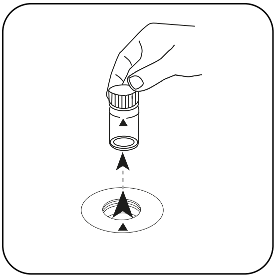
Close vial(s).



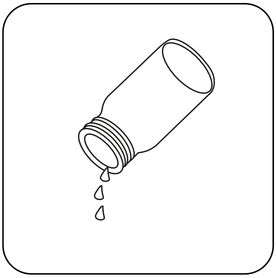
Place **sample vial** in the sample chamber. Pay attention to the positioning.

Zero

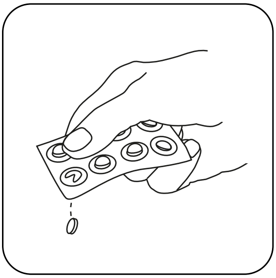
Press the **ZERO** button.



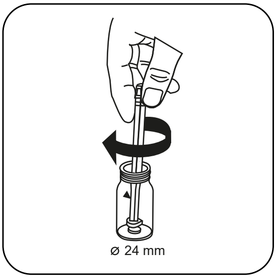
Remove the vial from the sample chamber.



Empty vial.

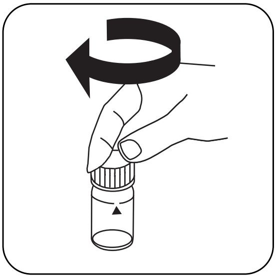


Add **DPD No. 1 tablet** .

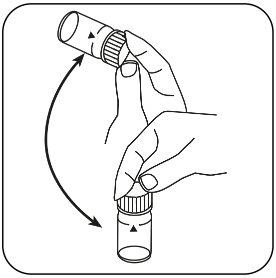


Crush tablet(s) by rotating slightly.

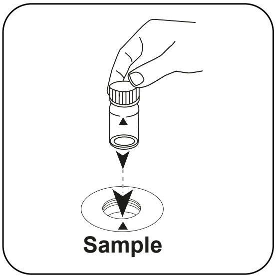
Fill prepared vial with prepared **glycine solution**.



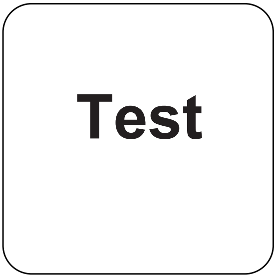
Close vial(s).



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 Chlorine Dioxide appears on the display.

Analyses

The following table identifies the output values can be converted into other citation forms.

Unit	Cite form	Scale Factor
mg/l	ClO_2	1
mg/l	Cl_2 frei	0.525
mg/l	Cl_2 geb.	0.525
mg/l	ges. Cl_2	0.525

Chemical Method

DPD / Glycine

Appendix

Interferences

Persistant Interferences

1. All oxidising agents in the samples lead to higher results.

Removeable Interferences

1. Concentrations above 19 mg/L chlorine dioxide can lead to results within the measuring range of up to 0 mg/L. In this case, the water sample must be diluted with water that is free from chlorine dioxide. 10 ml of the diluted sample should be mixed with the reagent and the measurement taken again.

Derived from

DIN 38408, Section 5

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[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 | [f] additionally required for determination of bromine, chlorine dioxide and ozone in the presence of chlorine | [#] including stirring rod, 10 cm

Copper T M150

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

Biquinoline

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
ValidCheck Copper 2 mg/l	1 pc.	48141525

Preparation

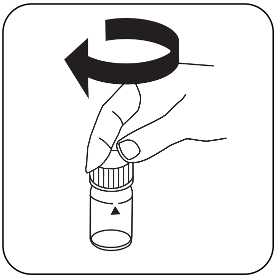
1. Strong alkaline or acidic water samples must be adjusted to pH 4 to 6 before analysis.

Determination of Copper, free with tablet

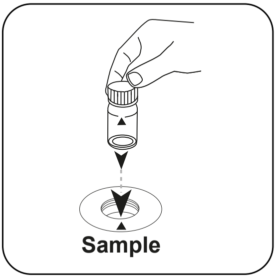
Select the method on the device.

In addition, choose the test: free

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



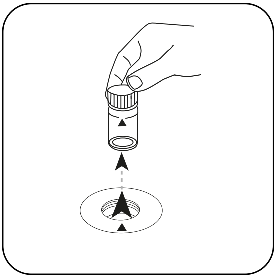
Close vial(s).



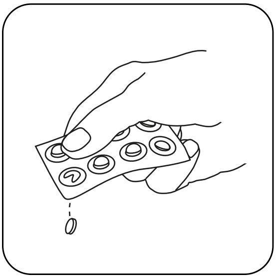
Place **sample vial** in the sample chamber. Pay attention to the positioning.

Zero

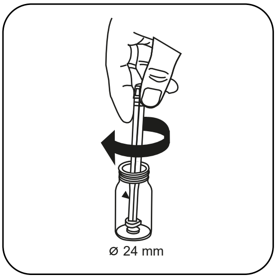
Press the **ZERO** button.



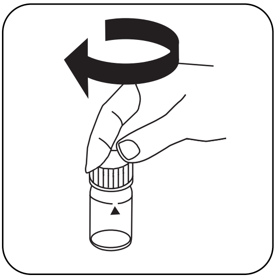
Remove the vial from the sample chamber.



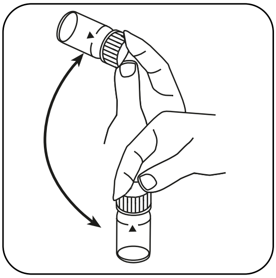
Add **COPPER No. 1 tablet** .



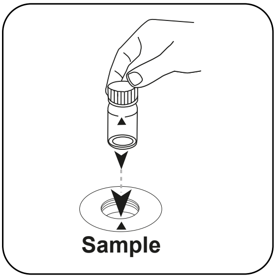
Crush tablet(s) by rotating slightly.



Close vial(s).



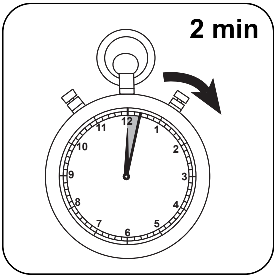
Dissolve tablet(s) by inverting.



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

Test

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



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

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

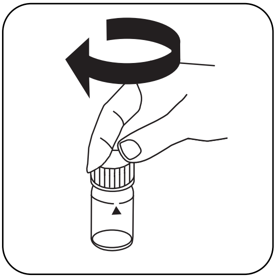
The result in mg/L free Copper appears on the display.

Determination of Copper, total with tablet

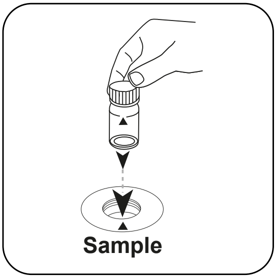
Select the method on the device.

In addition, choose the test: total

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



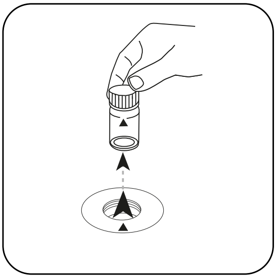
Close vial(s).



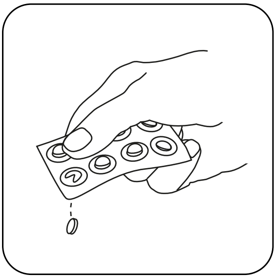
Place **sample vial** in the sample chamber. Pay attention to the positioning.

Zero

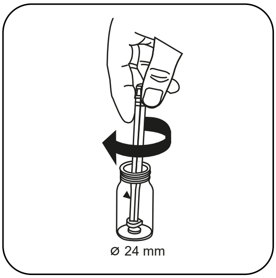
Press the **ZERO** button.



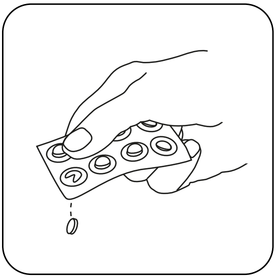
Remove the vial from the sample chamber.



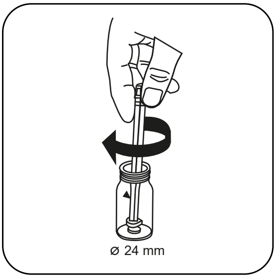
Add **COPPER No. 1 tablet** .



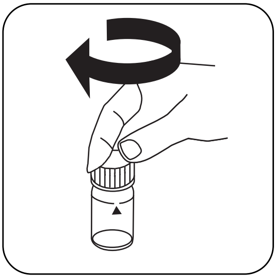
Crush tablet(s) by rotating slightly and dissolve.



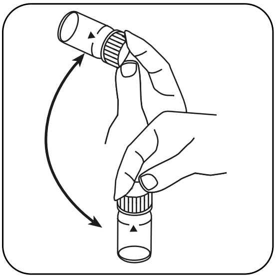
Add **COPPER No. 2 tablet** .



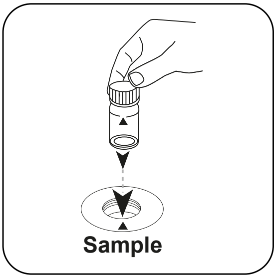
Crush tablet(s) by rotating slightly.



Close vial(s).



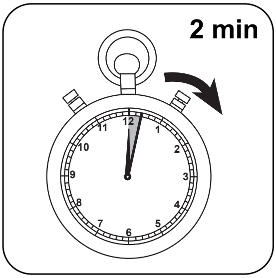
Dissolve tablet(s) by inverting.



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

Test

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 Copper appears on the display.

Chemical Method

Biquinoline

Appendix

Interferences

Persistant Interferences

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

Method Validation

Limit of Detection	0.05 mg/L
Limit of Quantification	0.15 mg/L
End of Measuring Range	5 mg/L
Sensitivity	3.8 mg/L / Abs
Confidence Intervall	0.026 mg/L
Standard Deviation	0.011 mg/L
Variation Coefficient	0.42 %

Bibliography

Photometrische Analyse, Lange/Vedjelek, Verlag Chemie 1980

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

Iron in Mo PP (224) M224

0.01 - 1.8 mg/L Fe FEM

TPTZ

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
VARIO Fe in MO Reagent Set	1 Set	536010

Sampling

1. Samples are to be collected in clean glass or plastic bottles. These should have been cleaned with 6 N (1:1) Hydrochloric acid and then rinsed with deionised water.
2. To preserve samples for later analysis, the pH value of the sample must be adjusted to less than 2. Approximately 2 ml per litre of concentrated Hydrochloric acid can be added to the sample. the sample is tested immediately, this addition is not necessary.
3. If determination of dissolved Iron is required, the sample must be filtered through a 0.45-micron filter or equivalent medium immediately after it has been collected and before acidification.
4. Preserved samples should be stored no longer than 6 months at room temperature.
5. The pH is to be adjusted to 3–5 by adding 5 N Sodium hydroxide solution before the analysis. A pH value of 5 must not be exceeded, since this can lead to precipitation of iron.
6. The test result needs to be corrected on the basis of the volume additions.

Preparation

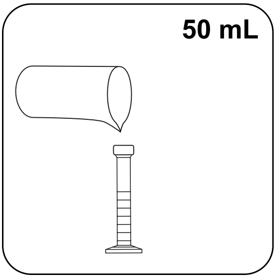
1. All glassware is to be cleaned with cleaning detergents and then rinsed with tap water. Afterwards, it should be reclaimed with Hydrochloric acid (1:1) and deionised water. These steps will remove any deposits that may cause slightly higher results.
2. If the sample contains 100 mg/L or more Molybdate (MoO_4^{2-}) then the sample reading must be taken immediately after zeroing the device.
3. For more accurate results, a reagent blank value can be determined for each new batch of reagent. Follow the procedure set out, using deionised water instead of the sample. The measured value that is obtained should be /subtracted from the readings of these results.

Notes

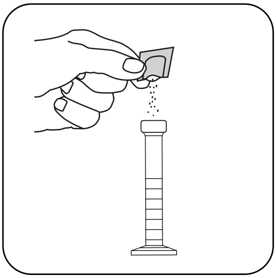
1. A blue colour develops in the presence of iron. A small amount of undissolved powder has no influence on the result.

Determination of Iron, total (Fe, Mo) in the presence of molybdate with Vario Powder Packs

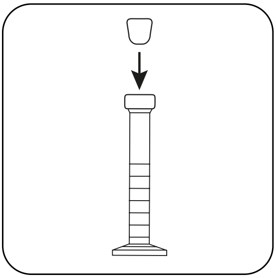
Select the method on the device.



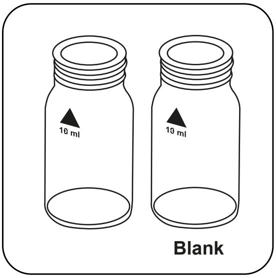
Put **50 mL sample** in 50 mL measuring cylinder.



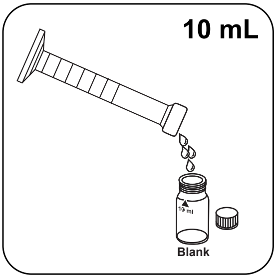
Add **Vario (Fe in Mo) Rgt 1 powder pack**.



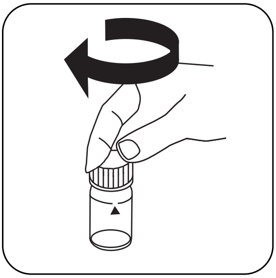
Stopper the mixing cylinder. Swirl around to dissolve the powder.



Prepare two clean 24 mm vials. Mark one as a blank.

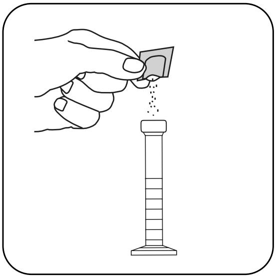


Fill blank with **10 mL prepared sample**.

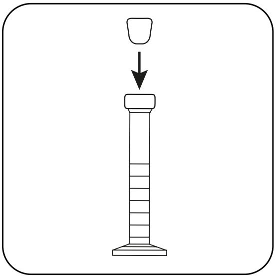


Close vial(s).

Put **25 mL prepared sample** in 25 mL measuring cylinder.



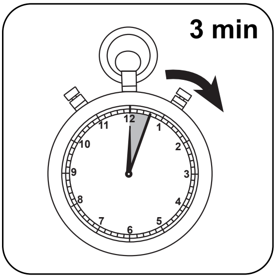
Add **Vario (Fe in Mo) Rgt 2 powder pack**.



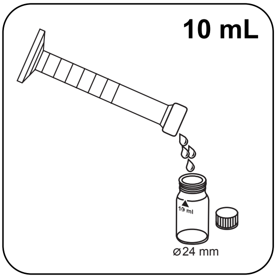
Stopper the mixing cylinder. Swirl around to dissolve the powder.

↵

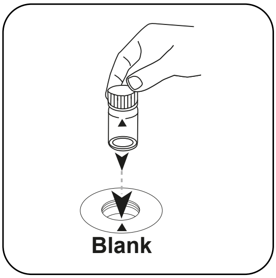
Press the **ENTER** button.



Wait for **3 minute(s) reaction time**.



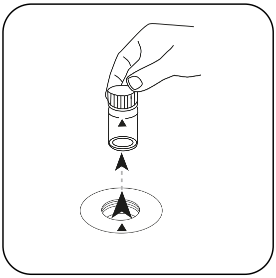
Put **10 mL sample** in the sample vial.



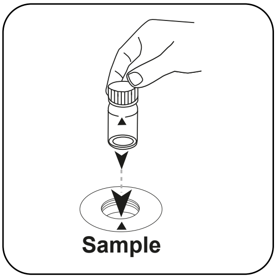
Place **blank** in the sample chamber. Pay attention to the positioning.

Zero

Press the **ZERO** button.



Remove the vial from the sample chamber.



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

Test

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

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

Chemical Method

TPTZ

Appendix

Interferences

Removeable Interferences

1. PH interference: A sample pH after the addition of reagent, which is less than 3 or greater than 4, may inhibit colour formation since the developed colour fades too quickly, or can result in turbidity. This means that the pH value must be adjusted to between 3 and 5 in the measuring glass before the addition of the reagent:
   A suitable amount of iron-free acid or base, such as 1 N Sulphuric acid or 1 N Sodium hydroxide, can be added on a drop by drop basis.
   A volume correction must be carried out if significant volumes of acid or base are added.

Bibliography

G. Frederic Smith Chemical Co., The Iron Reagents, 3rd ed. (1980)

Iron LR L (A) M225

0.03 - 2 mg/L Fe FE

Ferrozine / Thioglycolate

Material

Required material (partly optional):

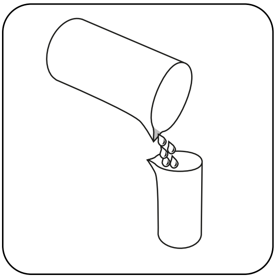
Reagents	Packaging Unit	Part Number
Acidity / Alkalinity P Indicator PA1	65 mL	56L013565
Hardness Calcium Buffer CH2	65 mL	56L014465
KP962-Ammonium Persulphate Powder	Powder / 40 g	56P096240
KS63-FE6-Thioglycolate/Molybdate HR RGT	30 mL	56L006330
Iron Reagent FE6	65 mL	56L006365
Iron Reagent FE5	65 mL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

Preparation

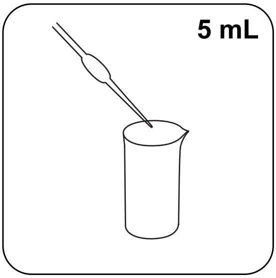
1. If there are strong complexing agents in the sample, the response time must be extended until no further colour development is seen. However, very strong iron complexes are not included in the measurement. In this event, the complexing agent must be destroyed by means of oxidation with acid/persulphate 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

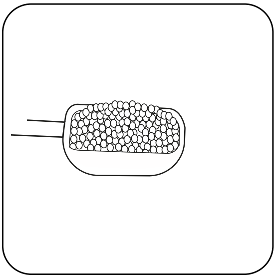
Total iron consists of suspended, soluble and complexed iron. The sample must be not filtered before measuring. To ensure homogenisation of the sample, deposed particles must be evenly distributed immediately prior to sampling by forcible shaking. A filtration of the sample is necessary for the determination 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.



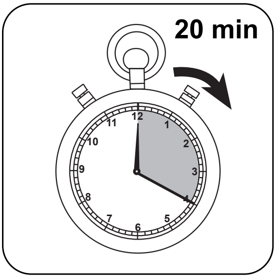
Fill a suitable digestion vessel with **50 mL homogenised sample**.



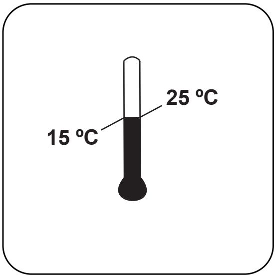
Add **5 mL 1:1 Hydrochloric acid**.



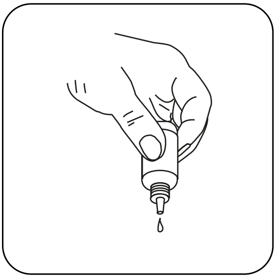
Add **a measuring scoop KP 962 (Ammonium Persulfat Powder)** .



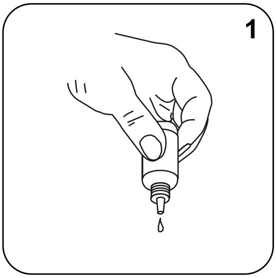
Boil the sample for **20 minutes** . A sample volume of about 25 mL should be retained;
If necessary, fill with deionised water.



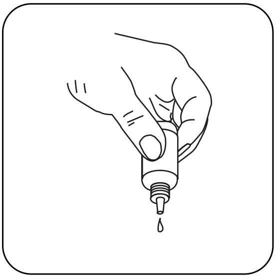
Allow the sample to cool to room temperature.



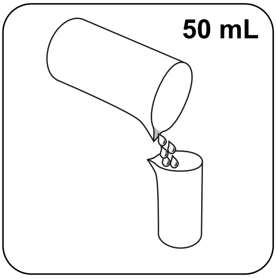
Hold cuvettes vertically and add equal drops by pressing slowly.



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!)**



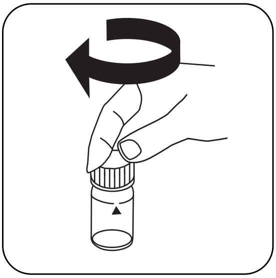
Fill the sample with **deionised water to 50 mL** .

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

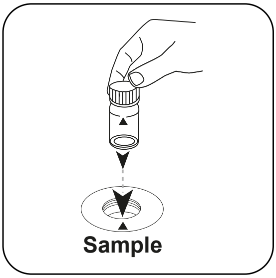
Select the method on the device.

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

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



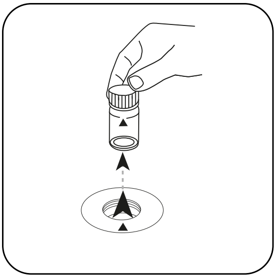
Close vial(s).



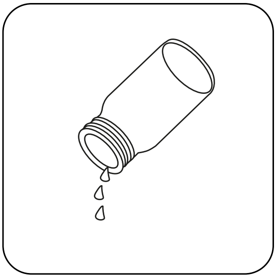
Place **sample vial** in the sample chamber. Pay attention to the positioning.

Zero

Press the **ZERO** button.

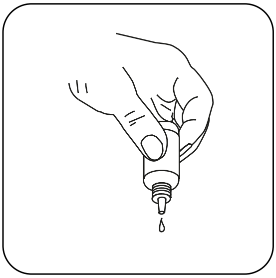


Remove the vial from the sample chamber.

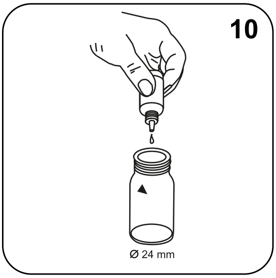


Empty vial.

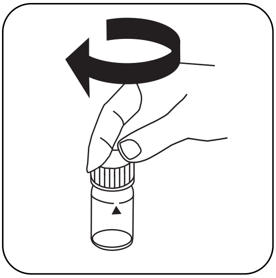
Fill 24 mm vial with **10 mL prepared sample** .



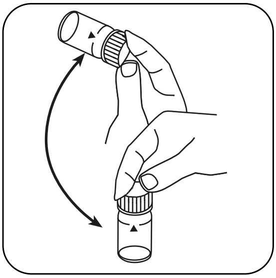
Hold cuvettes vertically and add equal drops by pressing slowly.



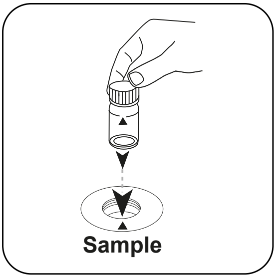
Add **10 drops Iron Reagent FE5**.



Close vial(s).



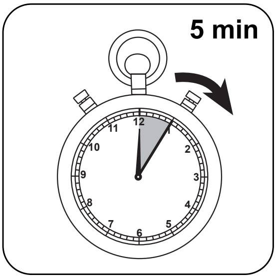
Invert several times to mix the contents.



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

Test

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



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

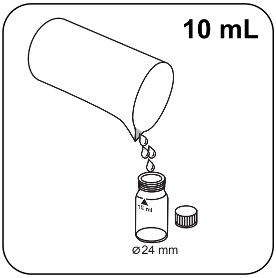
Once the reaction period is finished, the measurement takes place automatically.

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

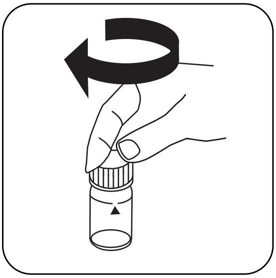
Determination of Iron LR (A) with liquid reagent

Select the method on the device.

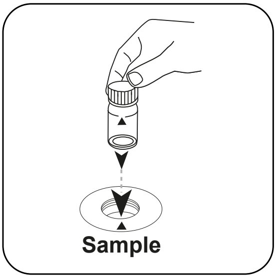
For determination of total dissolved iron the sample must be filtered prior to the test (pore size 0,45 µm). Otherwise, iron particles and suspended iron are measured.



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



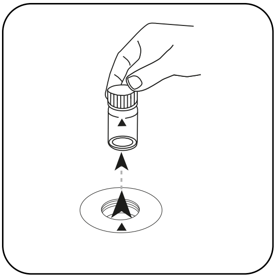
Close vial(s).



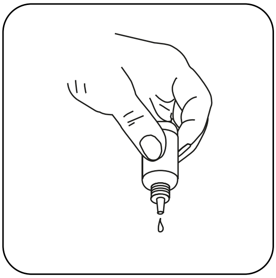
Place **sample vial** in the sample chamber. Pay attention to the positioning.

Zero

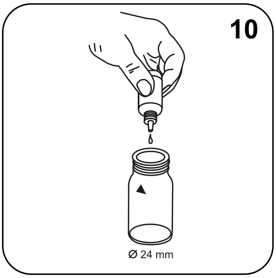
Press the **ZERO** button.



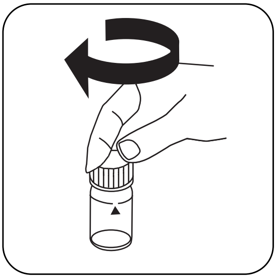
Remove the vial from the sample chamber.



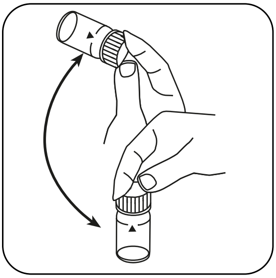
Hold cuvettes vertically and add equal drops by pressing slowly.



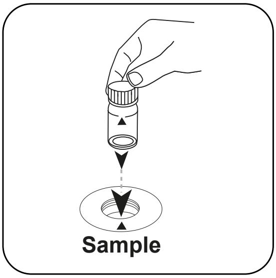
Add **10 drops Iron Reagent FE5**.



Close vial(s).



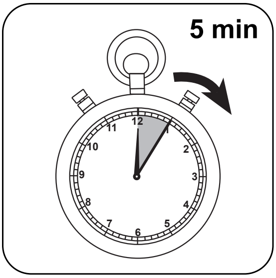
Invert several times to mix the contents.



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

Test

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.

Chemical Method

Ferrozine / Thioglycolate

Appendix

Interferences

Removeable Interferences

1. If using KS61 (Ferrozine/Thioglycolate), a high concentration of molybdate will result in an intense yellow colour. In this instance, a chemical blank value is required:

- Use two clean **24 mm vials**.
- Mark one as blank for zeroing.
- Fill a clean vial (24 mm) with **10 ml of the sample** (blank).
- Add **10 drops of KS63 (Thioglycolate)** to the vial.
- Close the vial with the cap and swirl the contents to mix them.
- Place the blank in the sample chamber.
- Pay attention to the positioning.
- Press the **ZERO** button.
- Remove the vial from the sample chamber.
- Fill a second clean vial (24 mm) with **10 ml of the sample** (this is the sample vial).
- Add **10 drops of KS63 (Ferrozine/Thioglycolate)** and as before, follow the procedure as described.

Interference	from / [mg/L]
Co	8
Cu	2
Oxalat	500
CN^-	10
NO_2^-	

Bibliography

D. F. Boltz and J. A. Howell, eds., Colorimetric Determination of Nonmetals, 2nd ed., Vol. 8, p. 304 (1978). Carpenter, J.F. "A New Field Method for Determining the Levels of Iron Contamination in Oilfield Completion Brine", SPE International Symposium (2004)

Molybdate LR PP M251

0.03 - 3 mg/L Mo Mo1

Ternary Complex

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
VARIO Molybdenum LR, Set F10	1 pc.	535450

The following accessories are required.

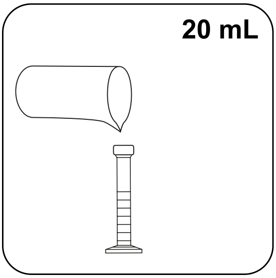
Accessories	Packaging Unit	Part Number
Mixing cylinder, 25 ml	1 pc.	19802650

Preparation

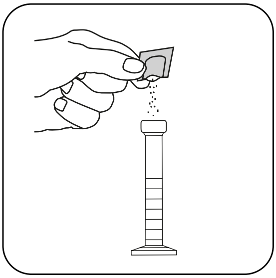
1. Strong alkaline or acidic water samples must be adjusted between pH 3 and pH 5 before the analysis (use 0.5 mol/l Sulphuric acid or 1 mol/l Sodium hydroxide).
2. To avoid errors caused by deposits, rinse the glassware with Hydrochloric acid (approx. 20%) before the analysis and then rinse with deionised water.

Determination of Molybdate LR with Vario Powder Packs

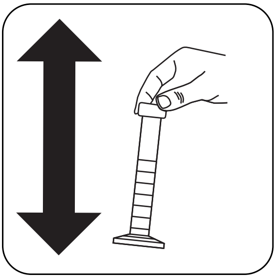
Select the method on the device.



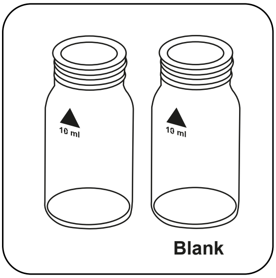
Put **20 mL sample** in 25 mL measuring cylinder.



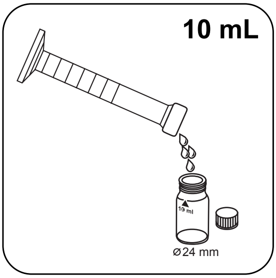
Add **Vario Molybdenum 1 LR F20 powder pack**.



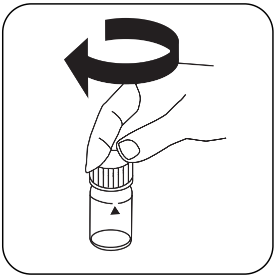
Stopper the mixing cylinder. Shake to dissolve the powder.



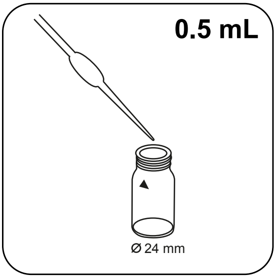
Prepare two clean 24 mm vials. Mark one as a blank.



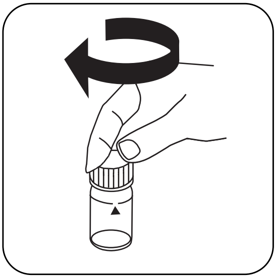
Place **10 mL sample** in each vial.



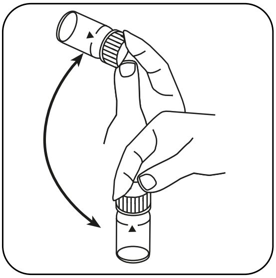
Firmly close the **blank** .



Place **0.5 mL Molybdenum 2 LR solution** in the sample cuvette.



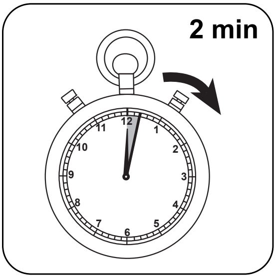
Close vial(s).



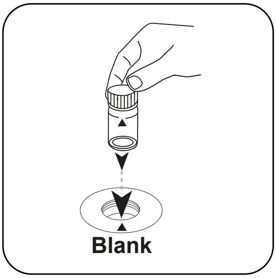
Invert several times to mix the contents.

↵

Press the **ENTER** button.



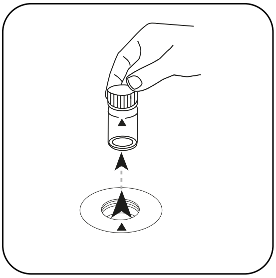
Wait for **2 minute(s) reaction time**.



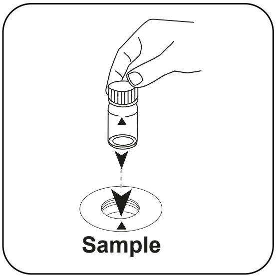
Place **blank** in the sample chamber. Pay attention to the positioning.

Zero

Press the **ZERO** button.



Remove the vial from the sample chamber.



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

Test

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

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

Analyses

The following table identifies the output values can be converted into other citation forms.

Unit	Cite form	Scale Factor
mg/l	MoO_4	1
mg/l	Mo	0.6
mg/l	Na_2MoO_4	1.29

Chemical Method

Ternary Complex

Appendix

Interferences

Interference	from / [mg/L]	Influence
Al	50	
Cr	1000	
Fe	50	
Ni	50	
NO_2^-	in all quantities	
Cu	10	Leads to higher readings with a response time of more than 5 minutes

Bibliography

Analytical Chemistry, 25(9) 1363 (1953)

Molybdate HR L M254

1 - 100 mg/L MoO_4 Mo2

Thioglycolate

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Iron Reagent FE6	65 mL	56L006365

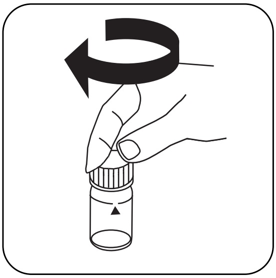
Sampling

1. The test must take place immediately after taking the sample. Molybdate is deposited on the walls of the sample vessels, which leads to lower measurement results.

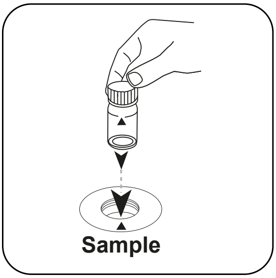
Determination of Molybdate HR with liquid reagent

Select the method on the device.

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



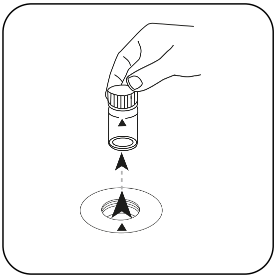
Close vial(s).



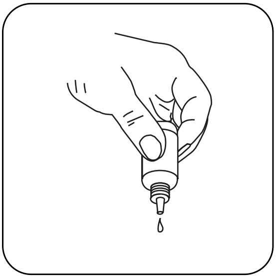
Place **sample vial** in the sample chamber. Pay attention to the positioning.

Zero

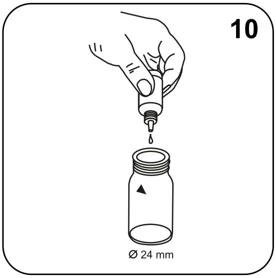
Press the **ZERO** button.



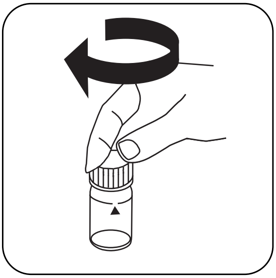
Remove the vial from the sample chamber.



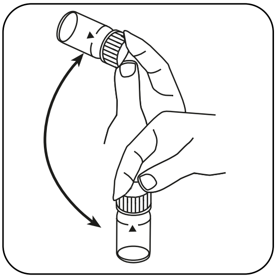
Hold cuvettes vertically and add equal drops by pressing slowly.



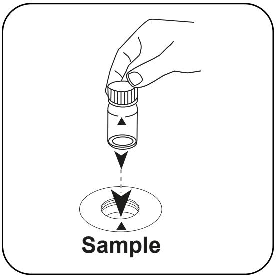
Add **10 drops Iron Reagent FE6**.



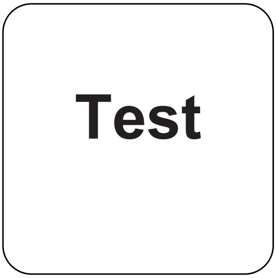
Close vial(s).



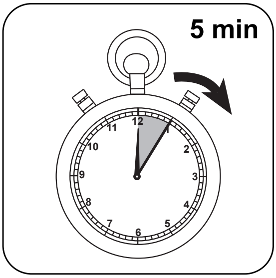
Invert several times to mix the contents.



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 Molybdate/ Molybdenum appears on the display.

Analyses

The following table identifies the output values can be converted into other citation forms.

Unit	Cite form	Scale Factor
mg/l	MoO_4	1
mg/l	Mo	0.6
mg/l	Na_2MoO_4	1.29

Chemical Method

Thioglycolate

Appendix

Interferences

Removeable Interferences

1. Interference from niobium, tantalum, titanium, and zirconium are masked with citric acid.
2. Interference from vanadium(V) is masked with potassium fluoride.

Bibliography

Photometrische Analyse, Lange/ Vjedelek, Verlag Chemie 1980

Ozone T M300

0.02 - 2 mg/L O_3 O3

DPD / Glycine

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
Glycine f)	Tablet / 100	512170BT
Glycine f)	Tablet / 250	512171BT
Set DPD No. 1/No. 3 100 Pc.#	100 each	517711BT
Set DPD No. 1/No. 3 250 Pc.#	250 each	517712BT
Set DPD No. 1/No. 3 High Calcium 100 Pc. #	100 each	517781BT
Set DPD No. 1/No. 3 High Calcium 250 Pc. #	250 each	517782BT
Set DPD No. 1/Glycine 100 Stck. #	100 each	517731BT
Set DPD No. 1/Glycine 250 Stck. #	250 each	517732BT

Preparation

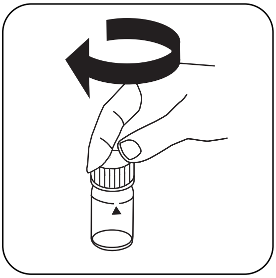
1. Cleaning of vials:
   As many household cleaners (e.g. dishwasher detergent) contain reducing substances, the subsequent determination of oxidising agents (e.g. ozone and chlorine) may show lower results. To avoid measurement errors, the glassware used should be free of chlorine consumption. To achieve 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, Ozone 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 Ozone, in presence of Chlorine with tablet

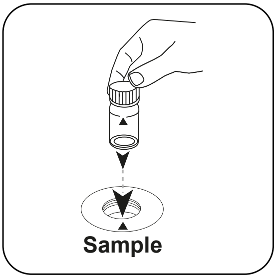
Select the method on the device.

In addition, choose the test: in presence of Chlorine

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



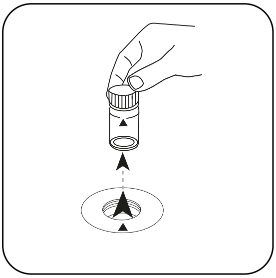
Close vial(s).



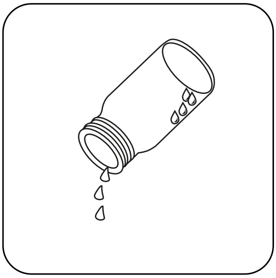
Place **sample vial** in the sample chamber. Pay attention to the positioning.

Zero

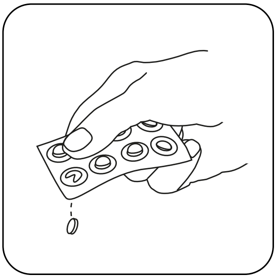
Press the **ZERO** button.



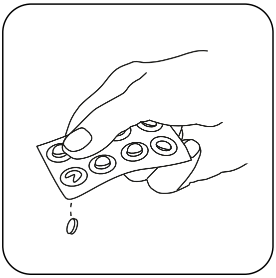
Remove the vial from the sample chamber.



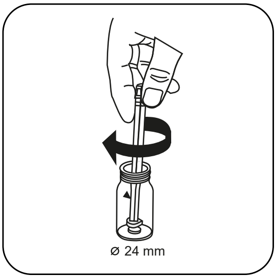
Empty vial except for a few drops.



Add **DPD No. 1 tablet** .

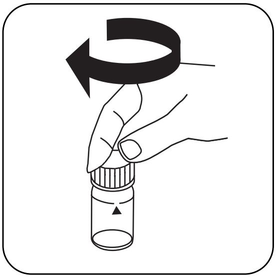


Add **DPD No. 3 tablet** .

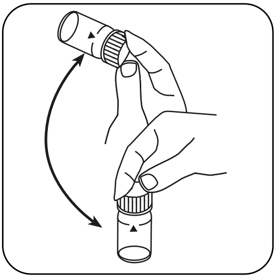


Crush tablet(s) by rotating slightly.

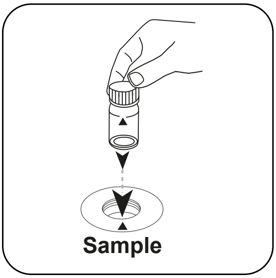
Fill up vial with **sample** to the **10 mL mark**.



Close vial(s).



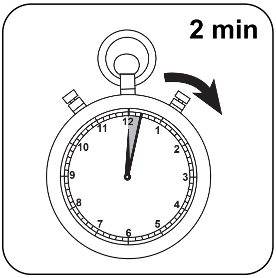
Dissolve tablet(s) by inverting.



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

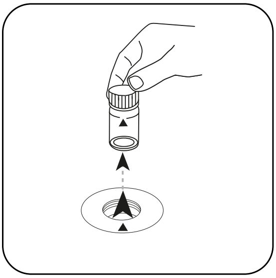
Test

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

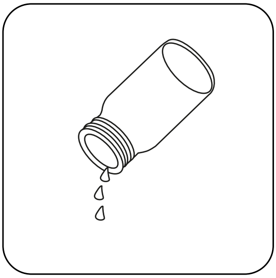


Wait for **2 minute(s) reaction time**.

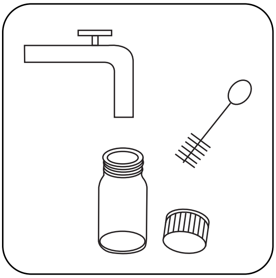
Once the reaction period is finished, the measurement takes place automatically.



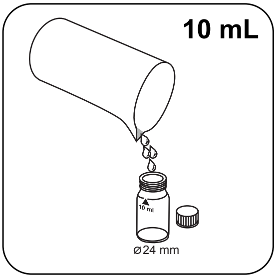
Remove the vial from the sample chamber.



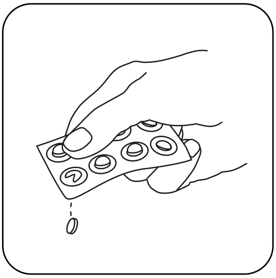
Empty vial.



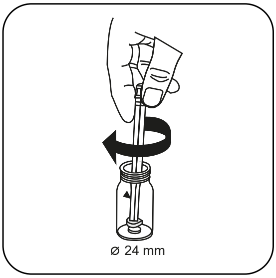
Thoroughly clean the vial and vial cap.



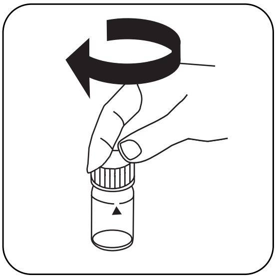
Fill a **second vial** with **10 mL sample** .



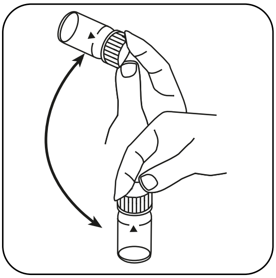
Add **GLYCINE tablet**.



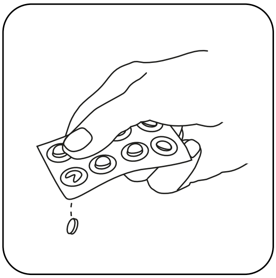
Crush tablet(s) by rotating slightly.



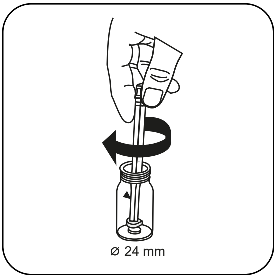
Close vial(s).



Dissolve tablet(s) by inverting.

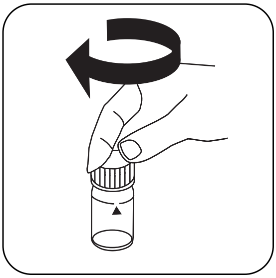


Add **one DPD No. 1 tablet** and **one DPD No. 3 tablet** straight from the foil into the first cleaned cuvette

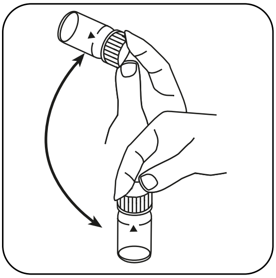


Crush tablet(s) by rotating slightly.

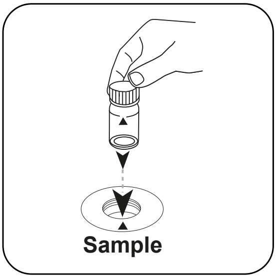
Fill prepared vial with prepared **glycine solution**.



Close vial(s).



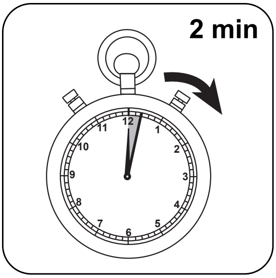
Dissolve tablet(s) by inverting.



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

Test

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



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

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

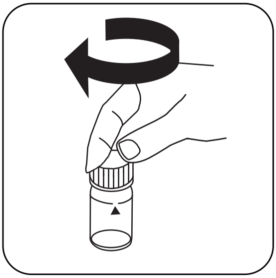
The result in mg/L Ozone; mg/l total chlorine appears on the display.

Determination of Ozone, in absence of chlorine with tablet

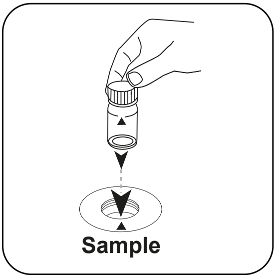
Select the method on the device.

In addition, choose the test: without Chlorine

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



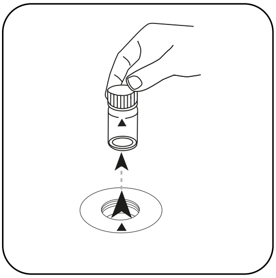
Close vial(s).



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

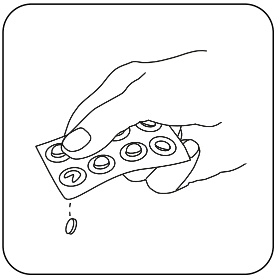
Zero

Press the **ZERO** button.

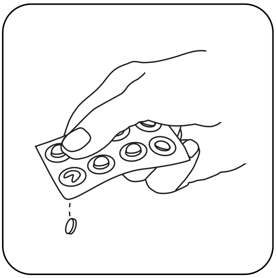


Remove the vial from the sample chamber.

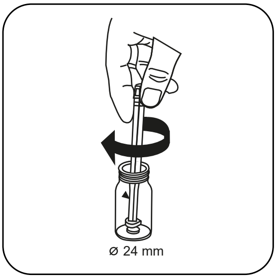
Empty vial except for a few drops.



Add **DPD No. 1 tablet** .

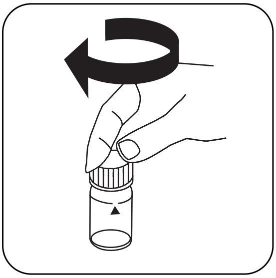


Add **DPD No. 3 tablet** .

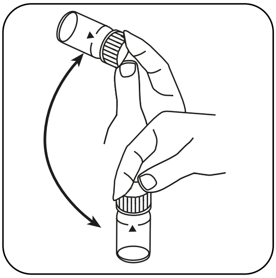


Crush tablet(s) by rotating slightly.

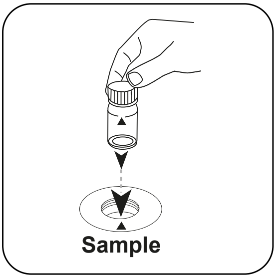
Fill up vial with **sample** to the **10 mL mark**.



Close vial(s).



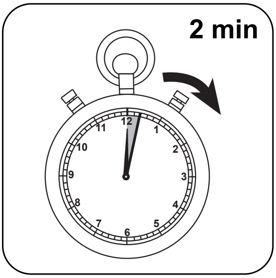
Dissolve tablet(s) by inverting.



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

Test

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 Ozone appears on the display.

Analyses

The following table identifies the output values can be converted into other citation forms.

Unit	Cite form	Scale Factor
mg/l	O_3	1
mg/l	Cl_2	1.4771

Chemical Method

DPD / Glycine

Appendix

Interferences

Persistant Interferences

1. All oxidising agents in the samples react like chlorine, which leads to higher results.
2. Concentrations above 6 mg/L Ozone 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).

Bibliography

Colorimetric Chemical Analytical Methods, 9th Edition, Lovibond

Derived from

DIN 38408-3:2011-04

[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 | [f)] additionally required for determination of bromine, chlorine dioxide and ozone in the presence of chlorine | [#] including stirring rod, 10 cm

Polyacrylate L M338

1 - 30 mg/L Polyacryl POLY

Turbidity

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Cartouche C18	1 pc.	56A020101
KS173-P2-2,4 Dinitrophenol Indicator	65 mL	56L017365
QAC Buffer QA2	65 mL	56L018365
Polyacrylate L Reagent Set	1 pc.	56R019165
KS336-Propan-2-ol, 65 mL	65 mL	56L033665

The following accessories are required.

Accessories	Packaging Unit	Part Number
Pipette, 1000 µl	1 pc.	365045
Pipette tips, 0,1-1 ml (white), 1000 pc.	1 pc.	419073

Preparation

- **Preparing the cartridge:**

1. Remove the plunger from a suitable syringe. Attach the C18 cartridge to the syringe cylinder.
2. Add 5 ml of KS336 (propane-2-ol) to the syringe cylinder.
3. Using the plunger, press the solvent by drop through the cartridge.
4. Remove the solvent that has passed through.
5. Remove the plunger again. Fill the syringe cylinder with 20 ml of deionised water.
6. With the help of the plunger, press the contents through the cartridge drop by drop.
7. Discard the deionised water that has flowed through.
8. The cartridge is now ready for use.

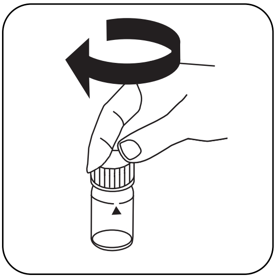
Notes

1. If little or no turbidity is present at correct dose concentrations, the sample will need a pre-concentration step in order to detect this level of polyacrylate/polymer.
2. Anomalous results occur when interferences are present as part of the sample components or from sample contaminants. In this case, the interference will need to be eliminated.
3. This test has been calibrated using polyacrylic acid 2'100 sodium salt in the range 1-30 mg/L. Other polyacrylates/polymers will give differing responses and therefore the test range will vary.

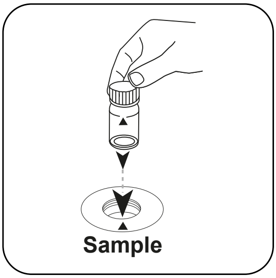
Determination of Polyacrylate with liquid reagent

Select the method on the device.

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



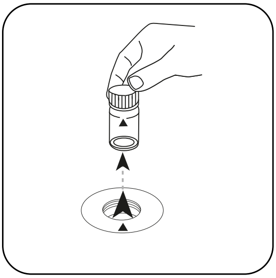
Close vial(s).



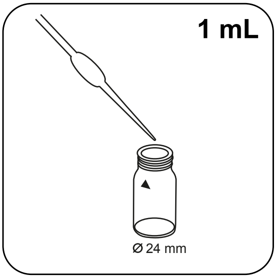
Place **sample vial** in the sample chamber. Pay attention to the positioning.

Zero

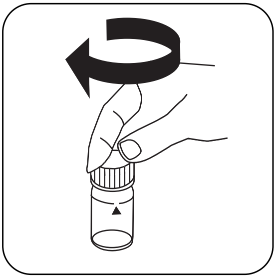
Press the **ZERO** button.



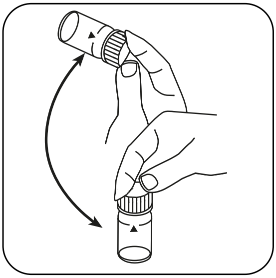
Remove the vial from the sample chamber.



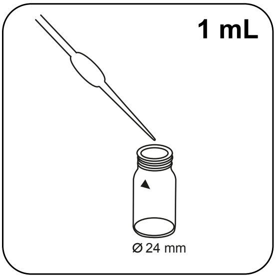
Place **1 mL (25 drops) Polyacrylate Buffer A1 solution** in the sample cuvette.



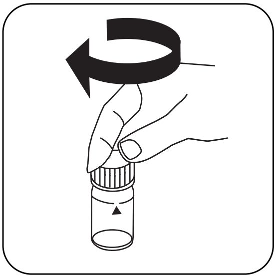
Close vial(s).



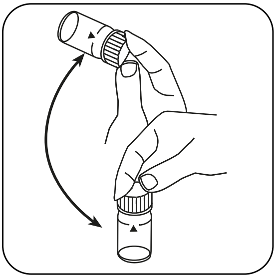
Invert several times to mix the contents.



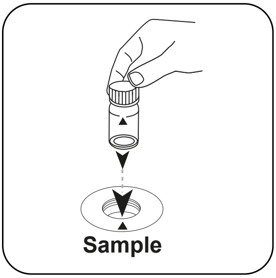
Place **1 mL (25 drops) Polyacrylate Precipitant A2 solution** in the sample cuvette.



Close vial(s).



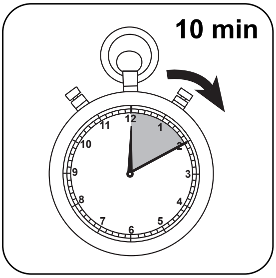
Invert several times to mix the contents.



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

Test

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 Polyacryl acid 2100 sodium salt appears on the display.

Chemical Method

Turbidity

Appendix

Bibliography

W.B. Crummett, R.A. Hummel (1963), The Determination of Polyacrylamides in Water, American Water Works Association, 55 (2), pp. 209-219

Sulphate PP M360

5 - 100 mg/L SO_4^{2-} SO4

Bariumsulphate Turbidity

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
VARIO Sulfa 4 F10	Powder / 100 pc.	532160
ValidCheck Sulfat 75 mg/l	1 pc.	48311325

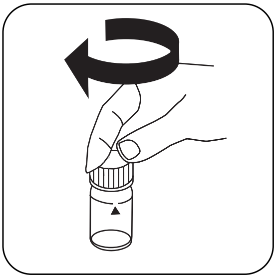
Notes

1. Sulphate causes a finely distributed turbidity.

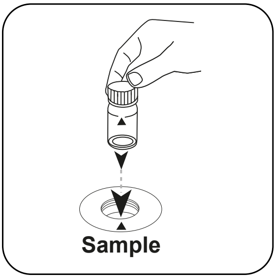
Determination of Sulphate with Vario Powder Pack

Select the method on the device.

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



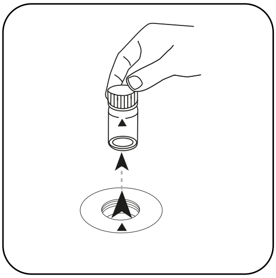
Close vial(s).



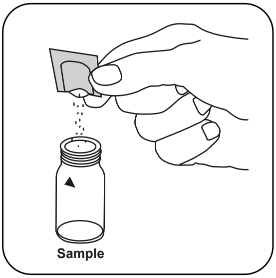
Place **sample vial** in the sample chamber. Pay attention to the positioning.

Zero

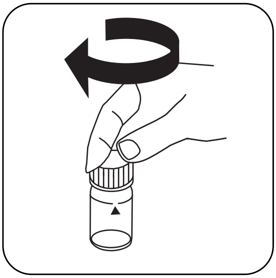
Press the **ZERO** button.



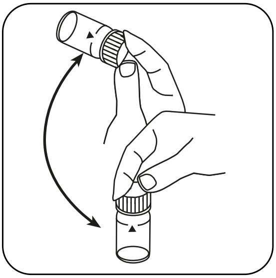
Remove the vial from the sample chamber.



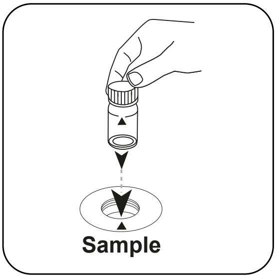
Add **Vario Sulpha 4/ F10 powder pack**.



Close vial(s).



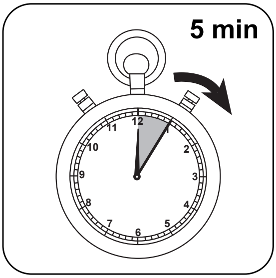
Invert several times to mix the contents.



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

Test

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 Sulphate appears on the display.

Chemical Method

Bariumsulphate Turbidity

Appendix

According to

Standard Method 4500-SO42- E
US EPA 375.4

Derived from

DIN ISO 15923-1 D49

Triazole PP M388

1 - 16 mg/L Benzotriazole or Tolyltriazole tri

Catalyzed UV Digestion

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
VARIO Triazole Rgt Powder Pack F25	Powder / 100 pc.	532200
Vario Rochelle Salt Solution, 30 ml [h)]	30 mL	530640

The following accessories are required.

Accessories	Packaging Unit	Part Number
UV Pen Lamp, 254 nm	1 pc.	400740
UV protection glasses, orange	1 pc.	400755

Hazard Notes

While the UV lamp is in operation, UV safety goggles must be worn.

Sampling

1. Measure the water sample as soon as possible after sampling.

Preparation

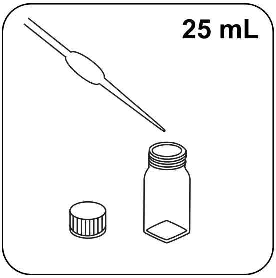
1. To get accurate results the sample temperature must be between 20 °C and 25 °C.
2. Nitrites or borax-containing water must be adjusted between pH 4 and pH 6 before the analysis (with 1N Sulphuric acid).
3. If the sample contains more than 500 mg/L $CaCO_3$ hardness, 10 drops of Rochelle Salt Solution are to be added.

Notes

1. Triazole Reagent Powder Packs and UV maps available on request.
2. For handling of the UV lamp see manufacturer's manual. Do not touch the surface of the UV lamp. Fingerprints will erode the glass. Wipe the UV lamp with a soft and clean cloth between measurements.
3. The test does not distinguish between Tolyltriazole and Benzotriazole.

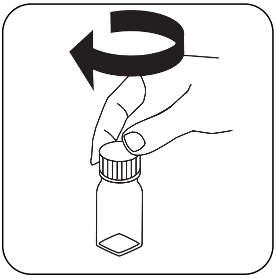
Determination of Benzotriazole / Tolyltriazole with Vario Powder Packs

Select the method on the device.

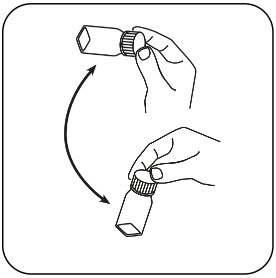


Fill the digestion vial with **25 mL** sample.

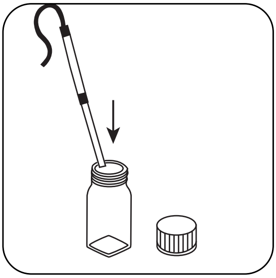
Add **powder pack**.



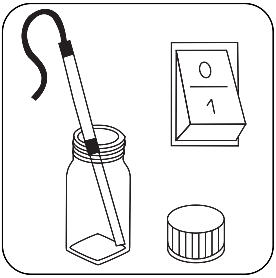
Close digestion vial.



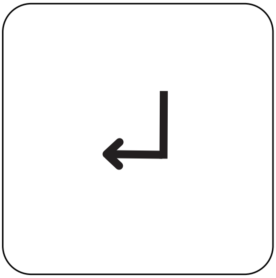
Swirl around to dissolve the powder.



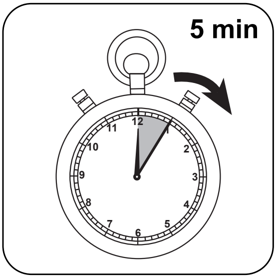
Keep the UV lamp in the sample. **Note: wear UV safety goggles!**



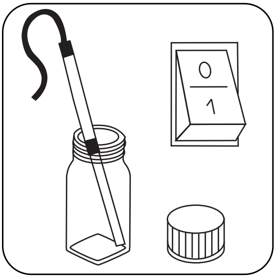
Turn on the UV lamp.



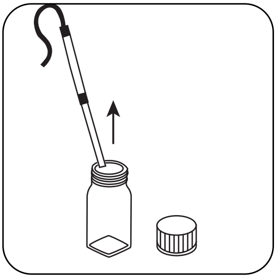
Press the **ENTER** button.



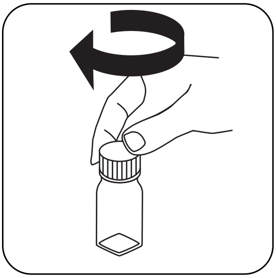
Wait for **5 minute(s) reaction time**.



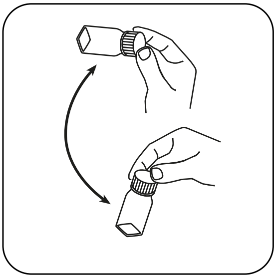
The UV lamp is switched off when the countdown is finished.



Remove the UV lamp from the sample.

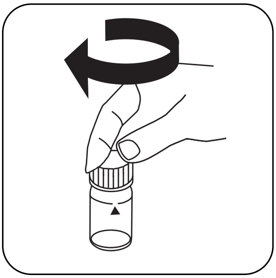


Close digestion vial.

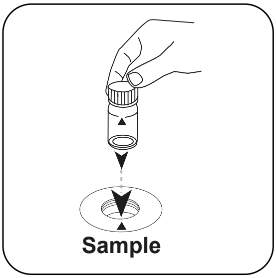


Invert several times to mix the contents.

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



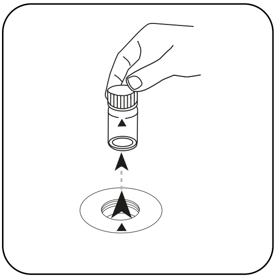
Close vial(s).



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

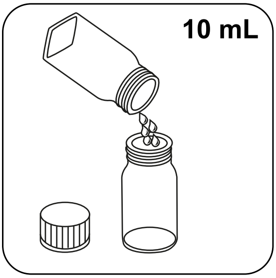
Zero

Press the **ZERO** button.

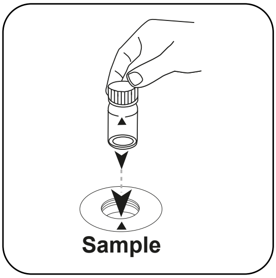


Remove the vial from the sample chamber.

Empty vial.



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



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

Test

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

The result in mg/L Benzotriazole or Tolyltriazole (Switch between citation forms by pressing up-/down arrow.) appears on the display.

Analyses

The following table identifies the output values can be converted into other citation forms.

Unit	Cite form	Scale Factor
mg/l	Benzotriazole	1
mg/l	Tolyltriazole	1.1177

Chemical Method

Catalyzed UV Digestion

Appendix

Interferences

Persistant Interferences

- Should the photolysis be carried out for more or less than 5 minutes, this may lead to showing lower results.

Bibliography

Harp, D., Proceedings 45th International Water Conference, 299 (October 22-24, 1984)

[h] additionally required for samples with hardness values above 300 mg/l $CaCO_3$

Zinc L M405

0.1 - 2.5 mg/L Zn Zn

Zincon / EDTA

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
KS 89 - Cationic Suppressor	65 mL	56L008965
Zinc LR Reagent Set	1 pc.	56R023965
Zinc Buffer Z1B	65 mL	56L024365
Zinc Indicator Z4P	Powder / 20 g	56P024420

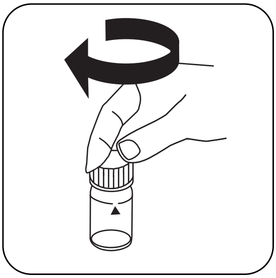
Notes

1. The measuring spoon supplied with the reagents must be used for the correct dosage.
2. This test is suitable for the determination of free soluble zinc. Zinc, which is bound to strong complexifying agents, is not measured.

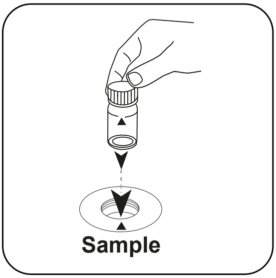
Determination of Zinc with liquid reagent and powder

Select the method on the device.

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



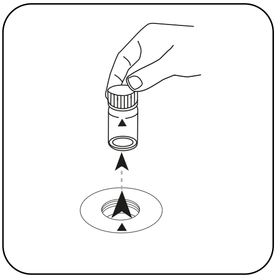
Close vial(s).



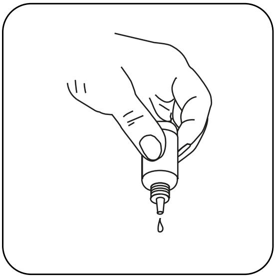
Place **sample vial** in the sample chamber. Pay attention to the positioning.

Zero

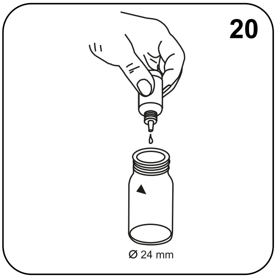
Press the **ZERO** button.



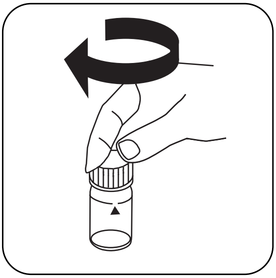
Remove the vial from the sample chamber.



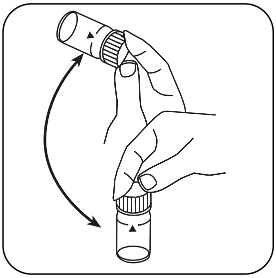
Hold cuvettes vertically and add equal drops by pressing slowly.



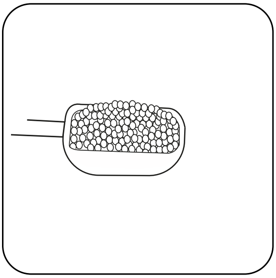
Add **20 drops Zinc Buffer Z1B**.



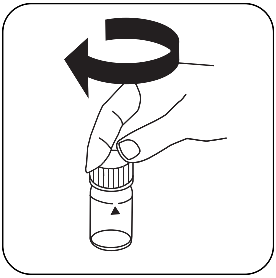
Close vial(s).



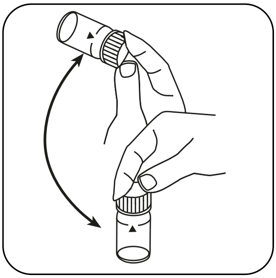
Invert several times to mix the contents.



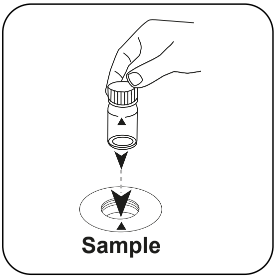
Add **a measuring scoop Zinc Indicator Z4P** .



Close vial(s).



Swirl around to dissolve the powder.



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

Test

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

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

Chemical Method

Zincon / EDTA

Appendix

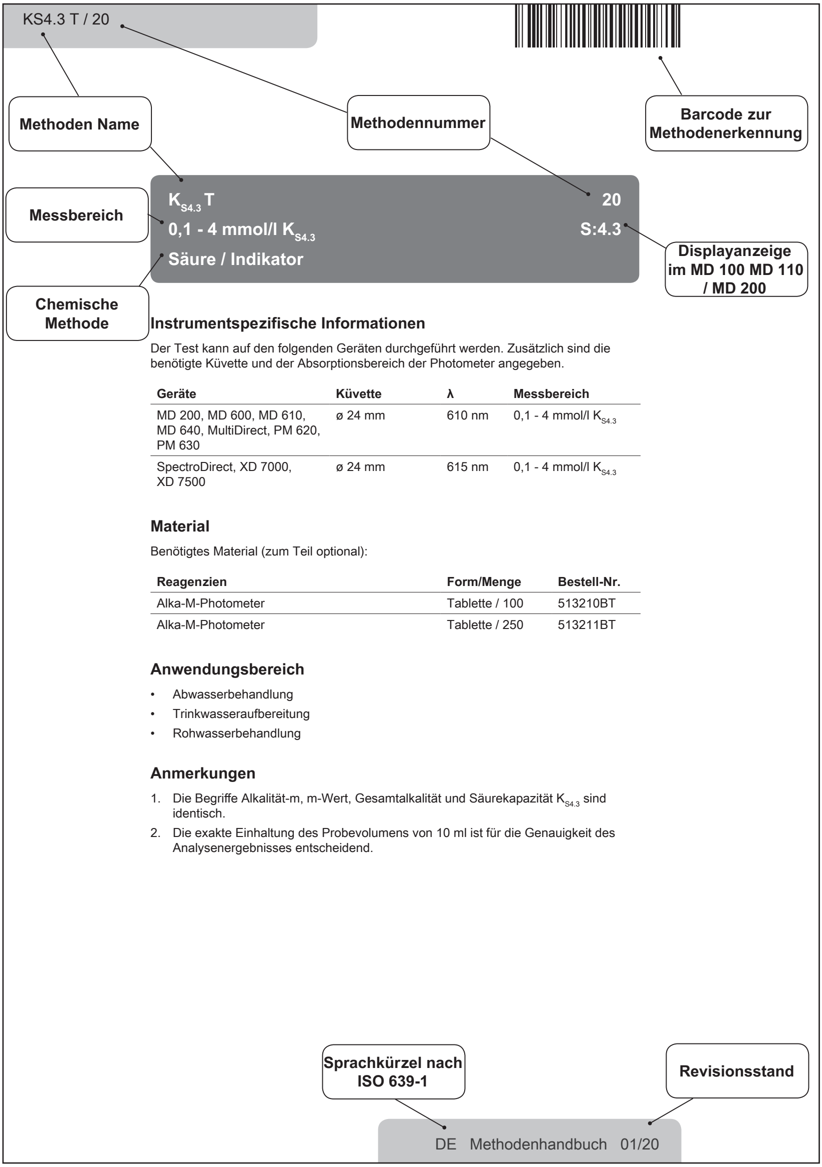
Interferences

Removeable Interferences

- Cationics such as quaternary ammonium compounds will cause the colour to change from rose red to purple, depending upon the level of copper present. In this event add drops of KS89 (cationic suppressor) one at a time, until it turns orange/blue. Note: After adding each drop, swirl the vial.

Bibliography

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989
S.M. Khopkar, Basic Concepts of Analytical Chemistry (2004), New Age International Ltd. Publishers, New Dheli, p. 75



KS4.3 T / 20

$K_{S4.3}$ T **20**

0,1 - 4 mmol/l $K_{S4.3}$ **S:4.3**

Säure / Indikator

Instrumentspezifische Informationen

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

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

Material

Benötigtes Material (zum Teil optional):

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

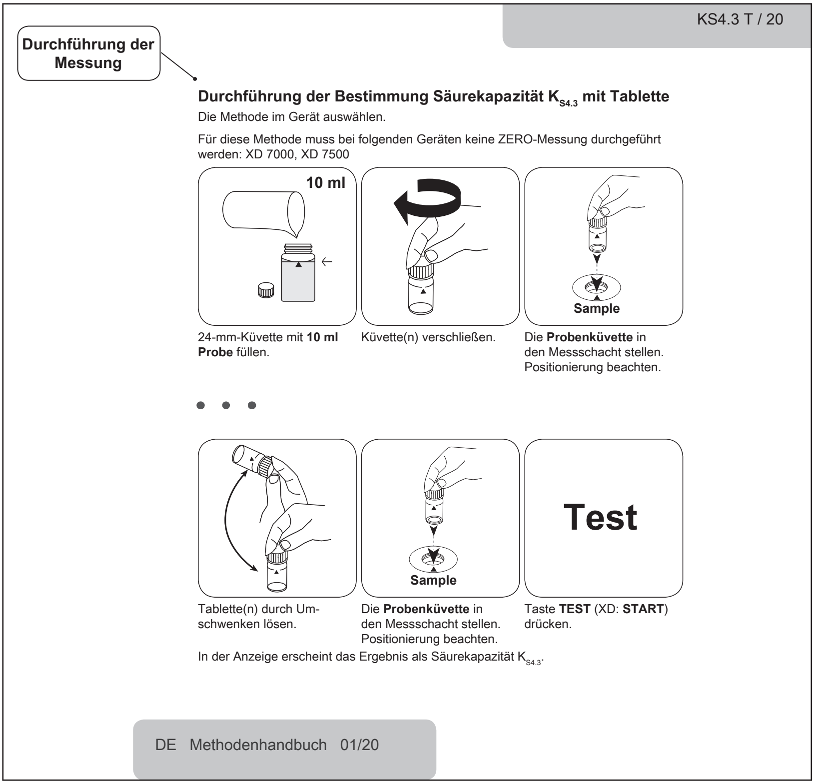
Anwendungsbereich

- Abwasserbehandlung
- Trinkwasseraufbereitung
- Rohwasserbehandlung

Anmerkungen

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

DE Methodenhandbuch 01/20



Durchführung der Messung

KS4.3 T / 20

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

Die Methode im Gerät auswählen.

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

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

Küvette(n) verschließen.

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

• • •

Tablette(n) durch Umschwenken lösen.

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

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

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

DE Methodenhandbuch 01/20

Aluminium PP M50

0,01 - 0,25 mg/L Al AL

Eriochromcyanin R

Material

Benötigtes Material (zum Teil optional):

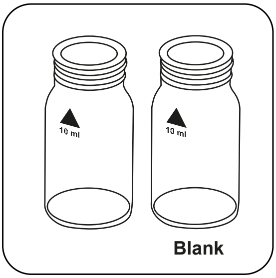
Reagenzien	Form/Menge	Bestell-Nr.
VARIO Aluminium Set 20 ml	1 St.	535000

Vorbereitung

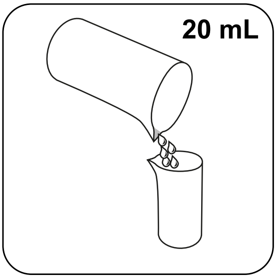
1. Zur Erzielung genauer Analyseergebnisse muss eine Probentemperatur von 20 °C bis 25 °C eingehalten werden.
2. Zur Vermeidung von Fehlern durch Verunreinigungen, die Küvette und das Zubehör vor der Analyse mit Salzsäurelösung (ca. 20%ig) und anschließend mit VE-Wasser spülen.

Durchführung der Bestimmung Aluminium mit Vario Pulverpäckchen

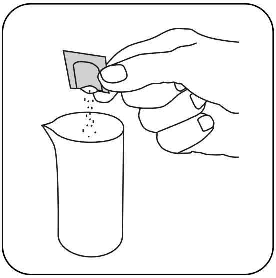
Die Methode im Gerät auswählen.



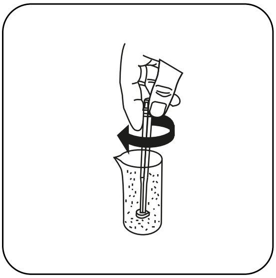
Zwei saubere 24-mm-Küvetten bereitstellen. Eine als Nullküvette kennzeichnen.



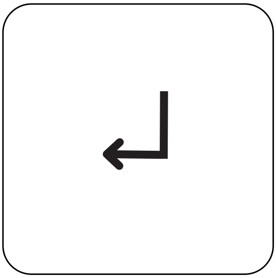
20 mL Probe in einen 100-mL-Messbecher geben.



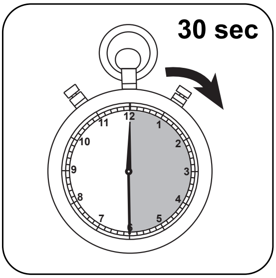
Ein **Vario ALUMINIUM ECR F20 Pulverpäckchen** zugeben.



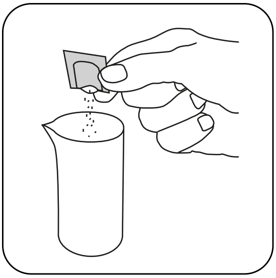
Pulver durch Rühren lösen.



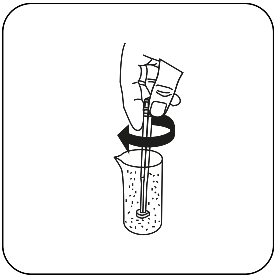
Taste **ENTER** drücken.



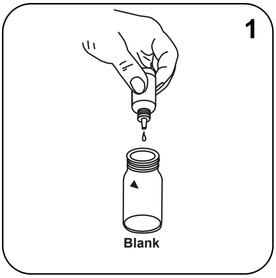
30 Sekunden Reaktionszeit abwarten.



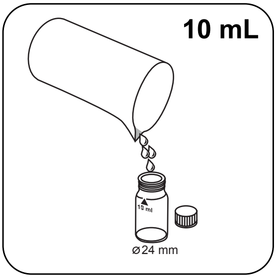
Ein **Vario HEXAMINE F20 Pulverpäckchen** zugeben.



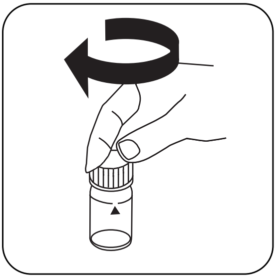
Pulver durch Rühren lösen.



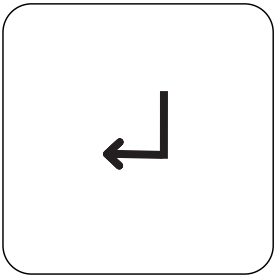
1 Tropfen Vario ALUMINIUM ECR Masking Reagent in die Nullküvette geben.



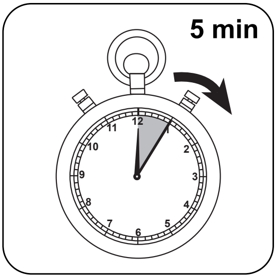
In jede Küvette **10 mL vorbehandelte Probe** geben.



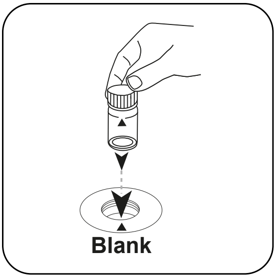
Küvette(n) verschließen.



Taste **ENTER** drücken.



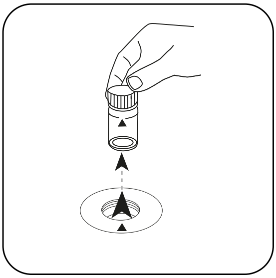
5 Minute(n) Reaktionszeit abwarten.



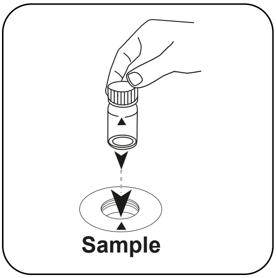
Die **Nullküvette** in den Messschacht stellen. Positionierung beachten.

Zero

Taste **ZERO** drücken.



Küvette aus dem Messschacht nehmen.



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

Test

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

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

Auswertung

Die folgende Tabelle gibt an wie die ausgegebenen Werte in andere Zitierformen umgewandelt werden können.

Einheit	Zitierform	Umrechnungsfaktor
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Chemische Methode

Eriochromcyanin R

Appendix

Störungen

Ausschließbare Störungen

- Durch die Anwesenheit von Fluoriden und Polyphosphaten können die Analyseergebnisse zu niedrig ausfallen. Dieser Einfluss hat im Allgemeinen keine signifikante Bedeutung, es sei denn, das Wasser wird künstlich fluoriert. In diesem Fall kann die unten angegebene Tabelle angewandt werden, um die tatsächliche Aluminiumkonzentration zu bestimmen.

Fluorid	**Wert im Display: Aluminium [mg/L]**					
[mg/L F]	**0,05**	**0,10**	**0,15**	**0,20**	**0,25**	**0,30**
0,2	0,05	0,11	0,16	0,21	0,27	0,32
0,4	0,06	0,11	0,17	0,23	0,28	0,34
0,6	0,06	0,12	0,18	0,24	0,30	0,37
0,8	0,06	0,13	0,20	0,26	0,32	0,40
1,0	0,07	0,13	0,21	0,28	0,36	0,45
1,5	0,09	0,20	0,29	0,37	0,48	---

Literaturverweise

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

Gemäß

APHA Method 3500-Al B

Brom T M80

0,05 - 13 mg/L Br_2 Br

DPD

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

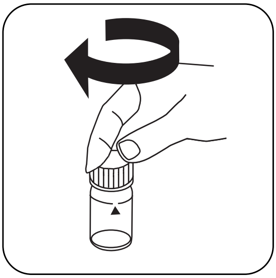
Vorbereitung

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).

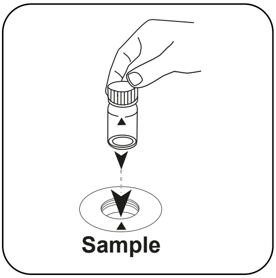
Durchführung der Bestimmung Brom mit Tablette

Die Methode im Gerät auswählen.

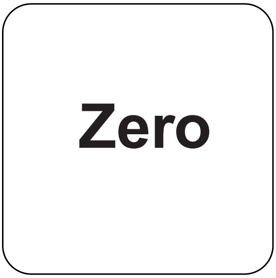
24-mm-Küvette mit **10 mL Probe** füllen.



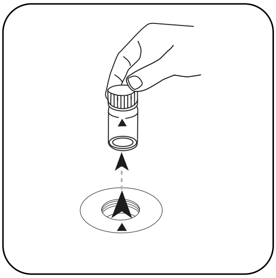
Küvette(n) verschließen.



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

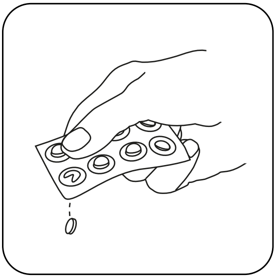


Taste **ZERO** drücken.

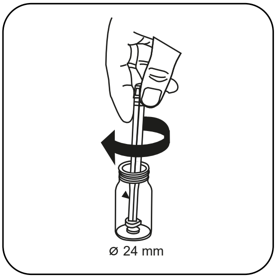


Küvette aus dem Messschacht nehmen.

Die Küvette bis auf einige Tropfen entleeren.

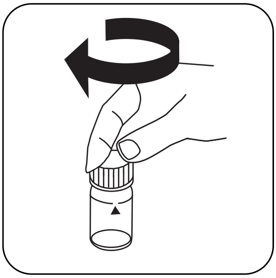


Eine **DPD No. 1 Tablette** zugeben.

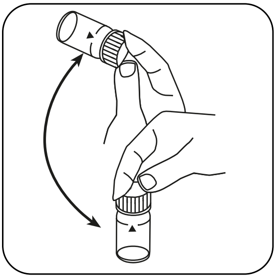


Tablette(n) unter leichter Drehung zerdrücken.

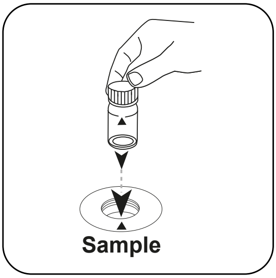
Küvette bis zur **10-mL-Marke** mit der **Probe** auffüllen.



Küvette(n) verschließen.



Tablette(n) durch Umschwenken lösen.



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

Test

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

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

Chemische Methode

DPD

Appendix

Störungen

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).

Abgeleitet von

US EPA 330.5 (1983)
APHA Method 4500 Cl-G

[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

Material

Benötigtes Material (zum Teil optional):

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

Verfügbare Standards

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

Probenahme

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

Vorbereitung

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

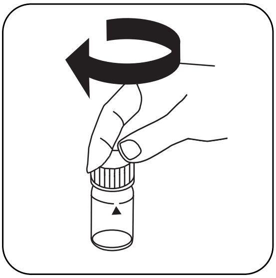
Anmerkungen

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

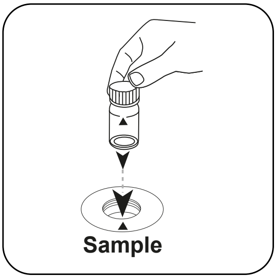
Durchführung der Bestimmung freies Chlor mit Tablette

Die Methode im Gerät auswählen.

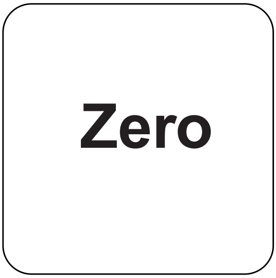
24-mm-Küvette mit **10 mL Probe** füllen.



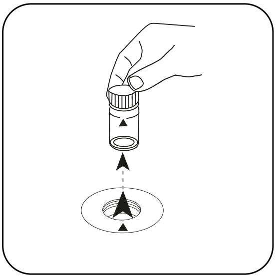
Küvette(n) verschließen.



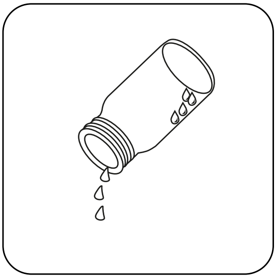
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



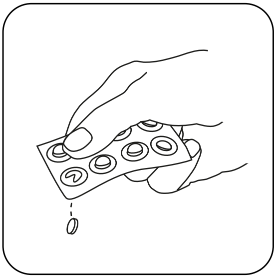
Taste **ZERO** drücken.



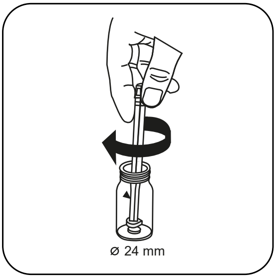
Küvette aus dem Messschacht nehmen.



Die Küvette bis auf einige Tropfen entleeren.

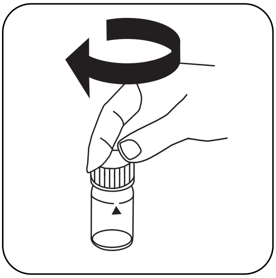


Eine **DPD No. 1 Tablette** zugeben.

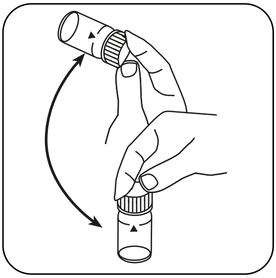


Tablette(n) unter leichter Drehung zerdrücken.

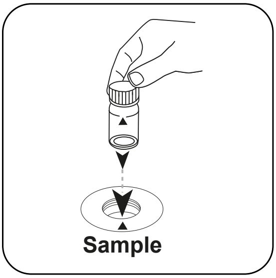
Küvette bis zur **10-mL-Marke** mit der **Probe** auffüllen.



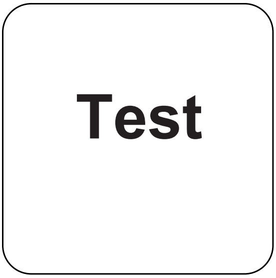
Küvette(n) verschließen.



Tablette(n) durch Umschwenken lösen.



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



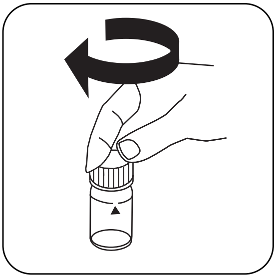
Taste **TEST** (XD: **START**) drücken.

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

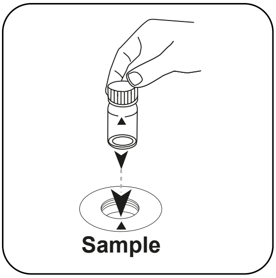
Durchführung der Bestimmung gesamt Chlor mit Tablette

Die Methode im Gerät auswählen.

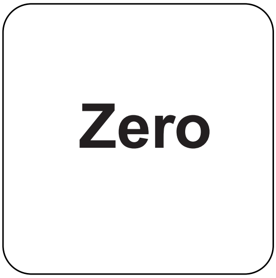
24-mm-Küvette mit **10 mL Probe** füllen.



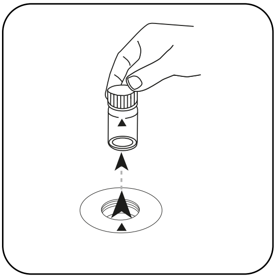
Küvette(n) verschließen.



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

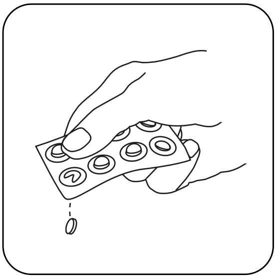


Taste **ZERO** drücken.

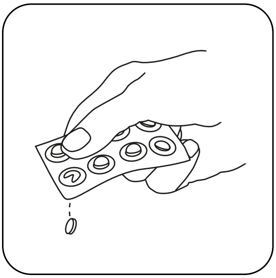


Küvette aus dem Messschacht nehmen.

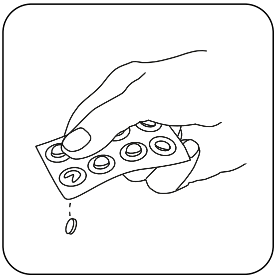
Die Küvette bis auf einige Tropfen entleeren.



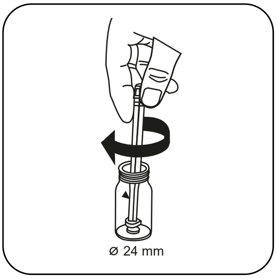
Eine **DPD No. 1 Tablette** zugeben.



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

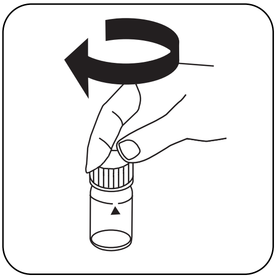


Alternativ zur DPD Nr. 1 und Nr. 3 Tablette kann eine DPD Nr. 4 Tablette zugegeben werden.

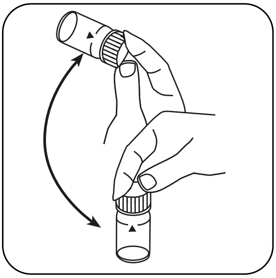


Tablette(n) unter leichter Drehung zerdrücken.

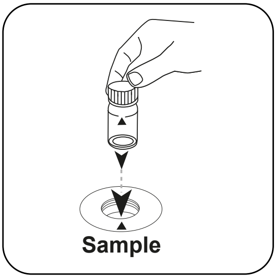
Küvette bis zur **10-mL-Marke** mit der **Probe** auffüllen.



Küvette(n) verschließen.



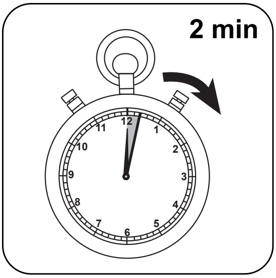
Tablette(n) durch Umschwenken lösen.



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

Test

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



2 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

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

Chemische Methode

DPD

Appendix

Störungen

Permanente Störungen

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

Ausschließbare Störungen

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

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

Methodenvalidierung

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

Konform

EN ISO 7393-2

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

Chlor L M101

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

DPD

Material

Benötigtes Material (zum Teil optional):

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

Verfügbare Standards

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

Probenahme

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

Vorbereitung

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

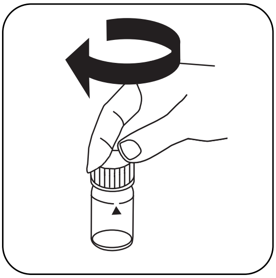
Anmerkungen

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

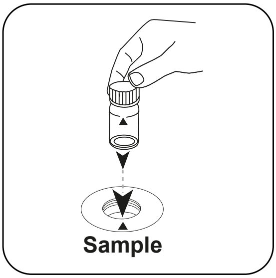
Durchführung der Bestimmung freies Chlor mit Flüssigreagenz

Die Methode im Gerät auswählen.

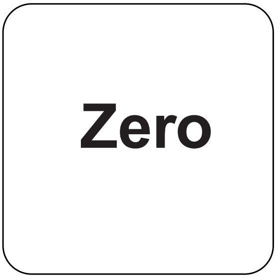
24-mm-Küvette mit **10 mL Probe** füllen.



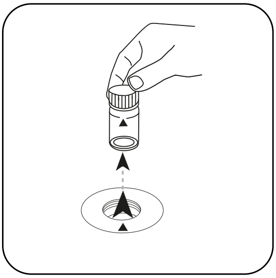
Küvette(n) verschließen.



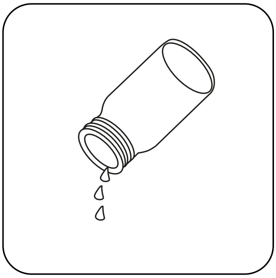
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



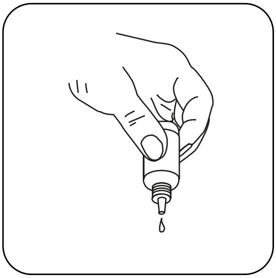
Taste **ZERO** drücken.



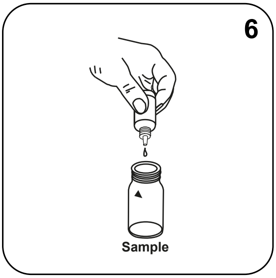
Küvette aus dem Messschacht nehmen.



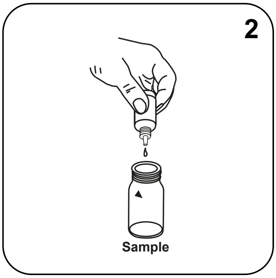
Küvette entleeren.



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

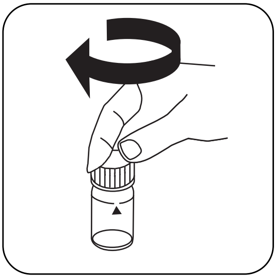


6 Tropfen DPD 1 Puffer-Lösung in die **Probenküvette** geben.

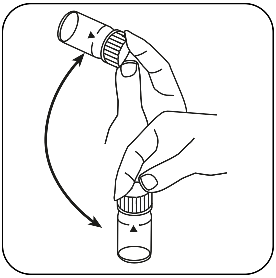


2 Tropfen DPD 1 Reagenz-Lösung in die **Probenküvette** geben.

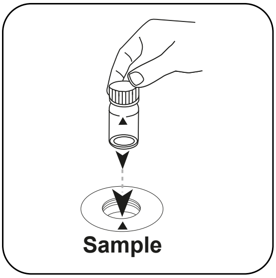
Küvette bis zur **10-mL-Marke** mit der **Probe** auffüllen.



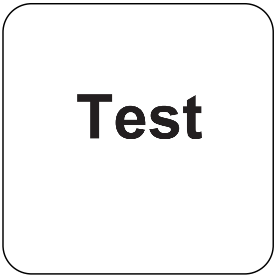
Küvette(n) verschließen.



Inhalt durch Umschwenken mischen.



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



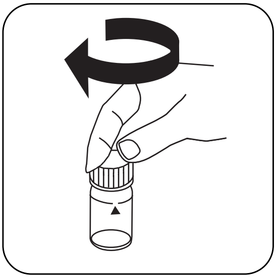
Taste **TEST** (XD: **START**) drücken.

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

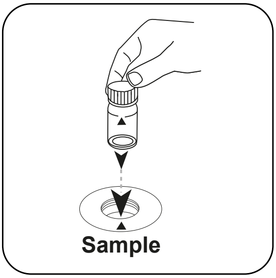
Durchführung der Bestimmung gesamtes Chlor mit Flüssigreagenz

Die Methode im Gerät auswählen.

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



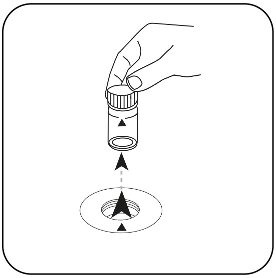
Küvette(n) verschließen.



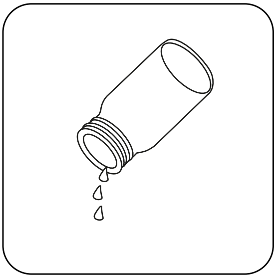
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

Zero

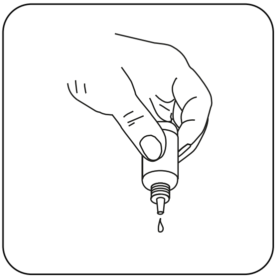
Taste **ZERO** drücken.



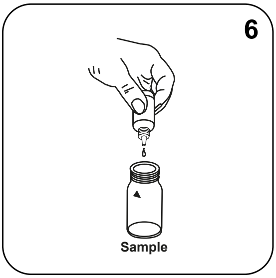
Küvette aus dem Messschacht nehmen.



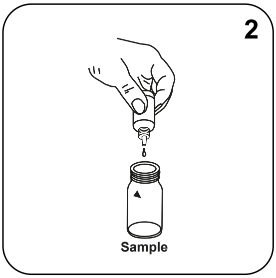
Küvette entleeren.



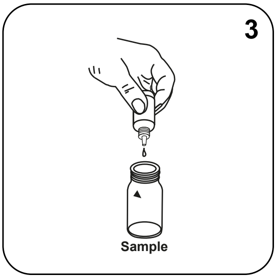
Die Tropfflaschen senkrecht halten und durch langsames Drücken gleich große Tropfen zugeben.



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

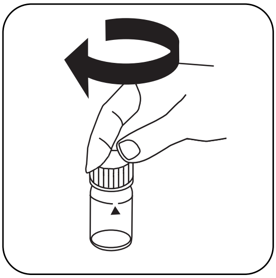


2 Tropfen DPD 1 Reagenz-Lösung in die **Probenküvette** geben.

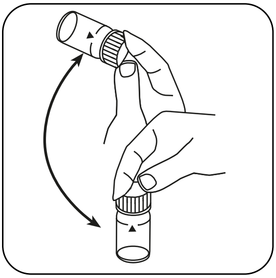


3 Tropfen DPD 3 Lösung in die **Probenküvette** geben.

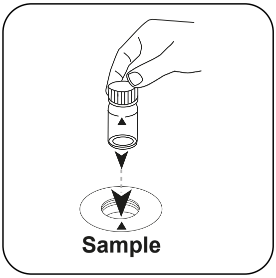
Küvette bis zur **10-mL-Marke** mit der **Probe** auffüllen.



Küvette(n) verschließen.



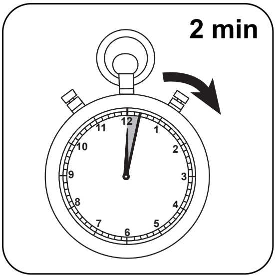
Inhalt durch Umschwenken mischen.



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

Test

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



2 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

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

Chemische Methode

DPD

Appendix

Störungen

Permanente Störungen

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

Ausschließbare Störungen

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

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

Konform

EN ISO 7393-2

[a] Bestimmung von frei, gebunden, gesamt möglich

Chlor HR (KI) T M105

5 - 200 mg/L Cl_2 CLHr

KI / Säure

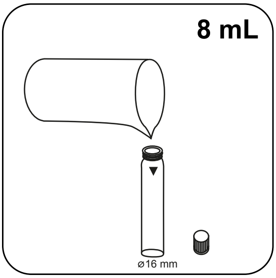
Material

Benötigtes Material (zum Teil optional):

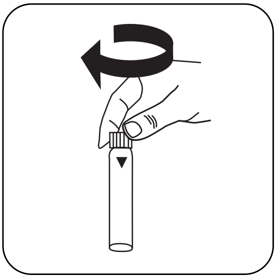
Reagenzien	Form/Menge	Bestell-Nr.
Chlorine HR (KI)	Tablette / 100	513000BT
Chlorine HR (KI)	Tablette / 250	513001BT
Acidifying GP	Tablette / 100	515480BT
Acidifying GP	Tablette / 250	515481BT
Set Chlorine HR (KI)/Acidifying GP#	je 100	517721BT
Set Chlorine HR (KI)/Acidifying GP#	je 250	517722BT
Chlorine HR (KI)	Tablette / 100	501210
Chlorine HR (KI)	Tablette / 250	501211

Durchführung der Bestimmung Chlor HR (KI) mit Tablette

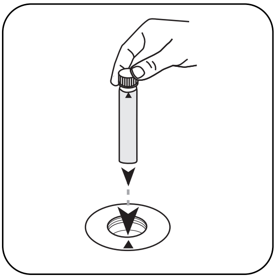
Die Methode im Gerät auswählen.



16-mm-Küvette mit **8 mL Probe** füllen.



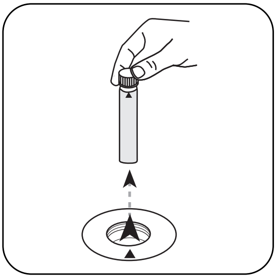
Küvette(n) verschließen.



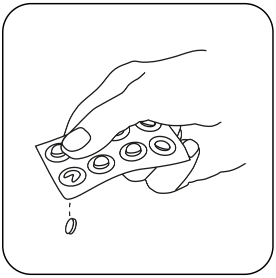
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

Zero

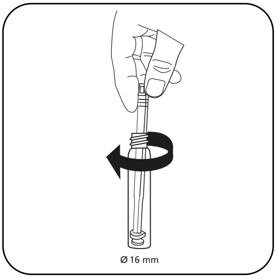
Taste **ZERO** drücken.



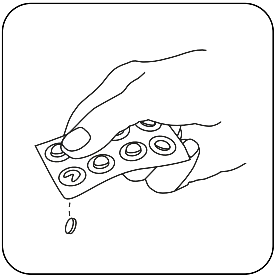
Die **Küvette** aus dem Messschacht nehmen.



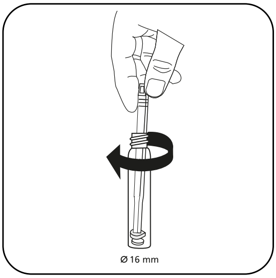
Eine **Chlorine HR (KI) Tablette** zugeben.



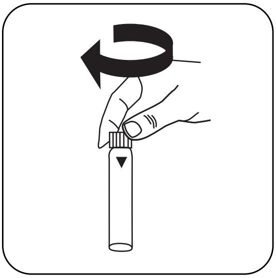
Tablette(n) unter leichter Drehung zerdrücken.



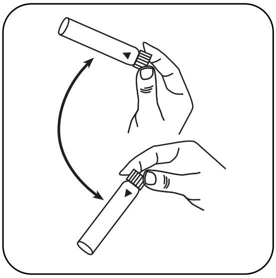
Eine **ACIDIFYING GP Tablette** zugeben.



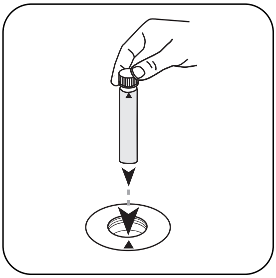
Tablette(n) unter leichter Drehung zerdrücken.



Küvette(n) verschließen.



Tablette(n) durch Umschwenken lösen.



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

Test

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

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

Chemische Methode

KI / Säure

Appendix

Störungen

Permanente Störungen

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

Methodenvalidierung

Nachweisgrenze	1.29 mg/L
Bestimmungsgrenze	3.86 mg/L
Messbereichsende	200 mg/L
Empfindlichkeit	83.96 mg/L / Abs
Vertrauensbereich	1.14 mg/L
Verfahrensstandardabweichung	0.45 mg/L
Verfahrensvariationskoeffizient	0.45 %

Abgeleitet von

EN ISO 7393-3

inklusive Rührstab

Chlordioxid T M120

0,02 - 11 mg/L ClO_2 CLO2

DPD / Glycin

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
Glycine [f)]	Tablette / 100	512170BT
Glycine [f)]	Tablette / 250	512171BT
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. 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
Set DPD No. 1/No. 3[#]	je 100	517711BT
Set DPD No. 1/No. 3[#]	je 250	517712BT
Set DPD No. 1/Glycine [#]	je 100	517731BT
Set DPD No. 1/Glycine [#]	je 250	517732BT
Set DPD No. 1/No. 3 High Calcium[#]	je 100	517781BT
Set DPD No. 1/No. 3 High Calcium[#]	je 250	517782BT
DPD No. 3 Evo	Tablette / 100	511420BT
DPD No. 3 Evo	Tablette / 250	511421BT
DPD No. 3 Evo	Tablette / 500	511422BT

Probenahme

1. Bei der Probenvorbereitung muss das Ausgasen, 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 Chlordioxid 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. 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).

Anmerkungen

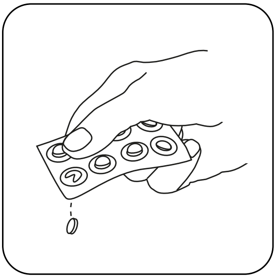
1. EVO-Tabletten können alternativ zu der entsprechenden Standard-Tablette verwendet werden (z.B. DPD Nr. 3 EVO anstatt DPD Nr. 3).

Durchführung der Bestimmung Chlordioxid,neben Chlor, mit Tablette

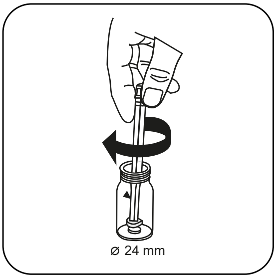
Die Methode im Gerät auswählen.

Wählen Sie zudem die Bestimmung: neben Chlor

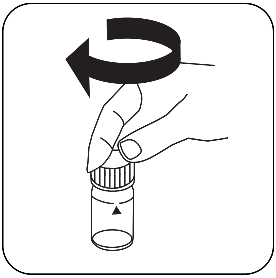
24-mm-Küvette mit **10 mL Probe** füllen.



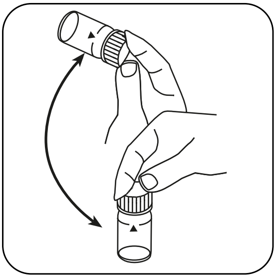
Eine **GLYCINE Tablette** zugeben.



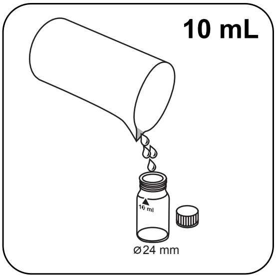
Tablette(n) unter leichter Drehung zerdrücken.



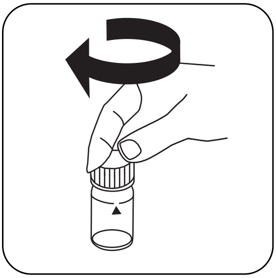
Küvette(n) verschließen.



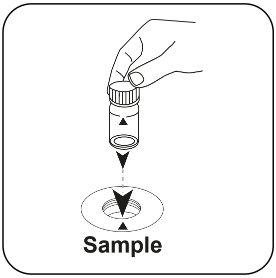
Tablette(n) durch Umschwenken lösen.



Eine **zweite Küvette** mit **10 mL Probe** füllen.



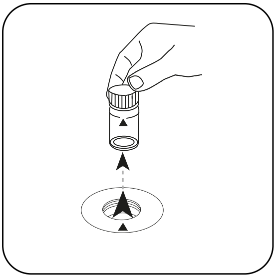
Küvette(n) verschließen.



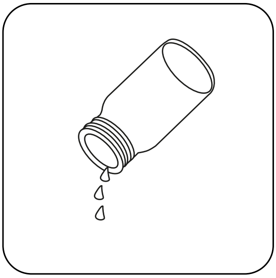
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

Zero

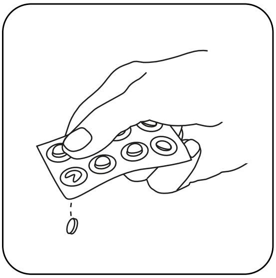
Taste **ZERO** drücken.



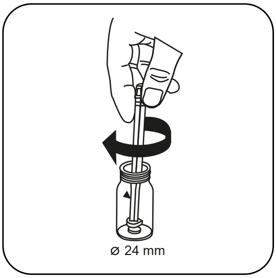
Küvette aus dem Messschacht nehmen.



Küvette entleeren.

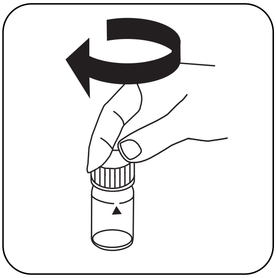


Eine **DPD No. 1 Tablette** zugeben.

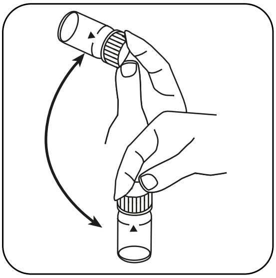


Tablette(n) unter leichter Drehung zerdrücken.

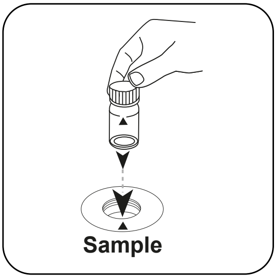
Die vorbereitete **Glycinlösung** in die vorbereitete Küvette füllen.



Küvette(n) verschließen.



Tablette(n) durch Umschwenken lösen.



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

Test

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

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

Auswertung

Die folgende Tabelle gibt an wie die ausgegebenen Werte in andere Zitierformen umgewandelt werden können.

Einheit	Zitierform	Umrechnungsfaktor
mg/l	ClO_2	1
mg/l	Cl_2 frei	0.525
mg/l	Cl_2 geb.	0.525
mg/l	ges. Cl_2	0.525

Chemische Methode

DPD / Glycin

Appendix

Störungen

Permanente Störungen

1. Alle in den Proben vorhandenen Oxidationsmittel führen zu Mehrbefunden.

Ausschließbare Störungen

1. Konzentrationen über 19 mg/L Chlordioxid können zu Ergebnissen innerhalb des Messbereiches bis hin zu 0 mg/L führen. In diesem Fall ist die Wasserprobe mit Chlordioxidfreiem Wasser zu verdünnen. 10 ml der verdünnten Probe werden mit Reagenz versetzt und die Messung wiederholt.

Abgeleitet von

DIN 38408, Teil 5

[e)] Hilfsreagenz, alternativ zur DPD No. 1 / No. 3 bei Eintrübungen der Probe durch hohen Calciumionengehalt und/oder hohe Leitfähigkeit | [f)] Hilfsreagenz, wird zusätzlich für die Bestimmung Brom, Chlordioxid bzw. Ozon benötigt bei Anwesenheit von Chlor | [#] inklusive Rührstab

Kupfer T M150

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

Biquinolin

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
ValidCheck Kupfer 2 mg/L	1 St.	48141525

Vorbereitung

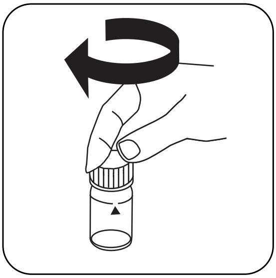
1. Stark alkalische oder saure Wässer sollten vor der Analyse auf einen pH-Wert von 4 bis 6 eingestellt werden.

Durchführung der Bestimmung Kupfer, frei mit Tablette

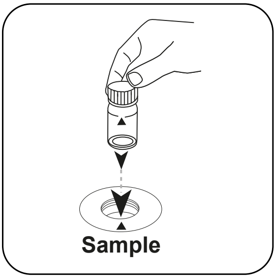
Die Methode im Gerät auswählen.

Wählen Sie zudem die Bestimmung: frei

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



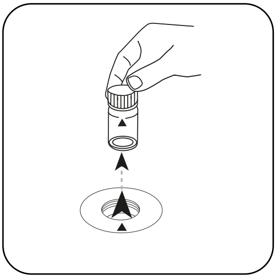
Küvette(n) verschließen.



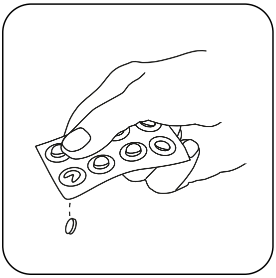
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

Zero

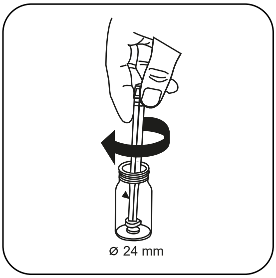
Taste **ZERO** drücken.



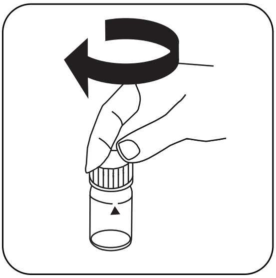
Küvette aus dem Messschacht nehmen.



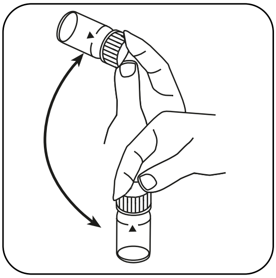
Eine **COPPER No. 1 Tablette** zugeben.



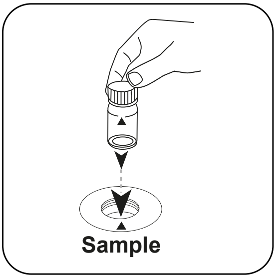
Tablette(n) unter leichter Drehung zerdrücken.



Küvette(n) verschließen.



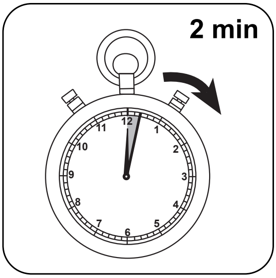
Tablette(n) durch Umschwenken lösen.



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

Test

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



2 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

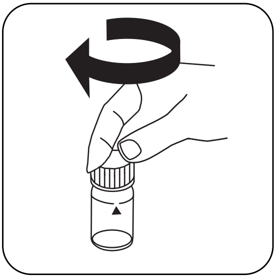
In der Anzeige erscheint das Ergebnis in mg/L freies Kupfer.

Durchführung der Bestimmung Kupfer, gesamt mit Tablette

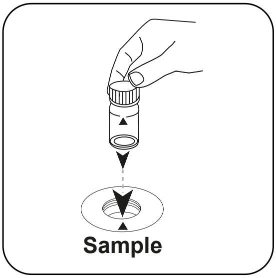
Die Methode im Gerät auswählen.

Wählen Sie zudem die Bestimmung: gesamt

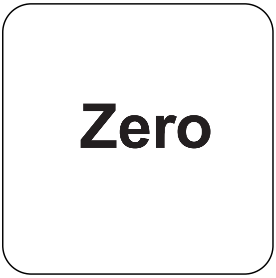
24-mm-Küvette mit **10 mL Probe** füllen.



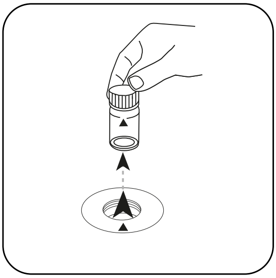
Küvette(n) verschließen.



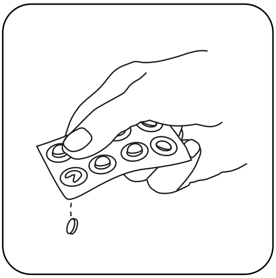
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



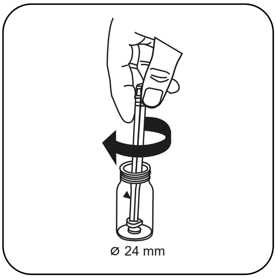
Taste **ZERO** drücken.



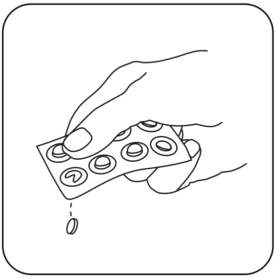
Küvette aus dem Messschacht nehmen.



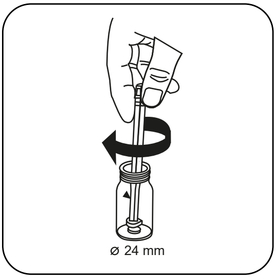
Eine **COPPER No. 1 Tablette** zugeben.



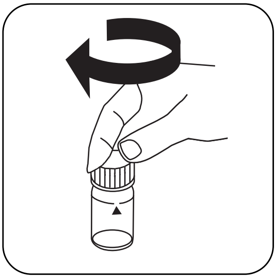
Die Tablette(n) unter leichter Drehung zerdrücken und lösen.



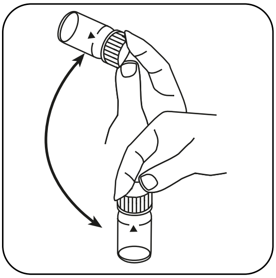
Eine **COPPER No. 2 Tablette** zugeben.



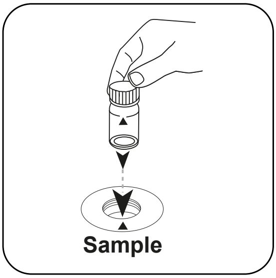
Tablette(n) unter leichter Drehung zerdrücken.



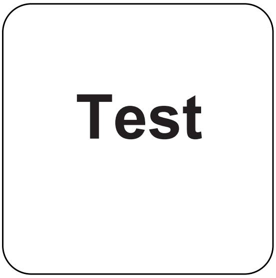
Küvette(n) verschließen.



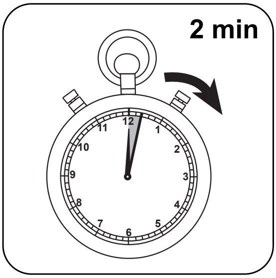
Tablette(n) durch Umschwenken lösen.



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



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



2 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

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

Chemische Methode

Biquinolin

Appendix

Störungen

Permanente Störungen

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

Methodenvalidierung

Nachweisgrenze	0.05 mg/L
Bestimmungsgrenze	0.15 mg/L
Messbereichsende	5 mg/L
Empfindlichkeit	3.8 mg/L / Abs
Vertrauensbereich	0.026 mg/L
Verfahrensstandardabweichung	0.011 mg/L
Verfahrensvariationskoeffizient	0.42 %

Literaturverweise

Photometrische Analyse, Lange/Vedjelek, Verlag Chemie 1980

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

Eisen in Mo PP M224

0,01 - 1,8 mg/L Fe FEM

TPTZ

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
VARIO Fe in MO Reagent Set	1 Satz	536010

Probenahme

1. Die Probenahme in gereinigten Glas- oder Kunststoffflaschen durchführen. Diese sollten mit 6 N (1:1) Salzsäure und anschliesend mit VE-Wasser gereinigt worden sein.
2. Um die Probe für eine spätere Analyse haltbar zu machen, muss der pH-Wert auf unter 2 gesenkt werden. Hierzu ca. 2 ml konzentrierte Salzsuäre pro Liter Probe zugeben. Wird die Probe direkt analysiert, ist diese Zugabe nicht notig.
3. Zur Bestimmung des gelösten Eisens, muss die Probe durch einen 0,45µm Filter oder vergleichbaren direkt nach der Probenahme und vor der Ansäuerung filtriert werden.
4. Die konservierten Proben sollten nicht länger als 6 Monate bei Raumtemperatur gelagert werden.
5. Vor der Analyse muss der pH-Wert durch Zugabe von 5 N Natronlauge auf einen Wert zwischen 3 – 5 eingestellt werden. Ein pH Wert von 5 darf nicht überschritten werden, da dies zu Eisenausfällungen führen kann.
6. Das Ergebnis muss aufgrund der Volumenzugaben korrigiert werden.

Vorbereitung

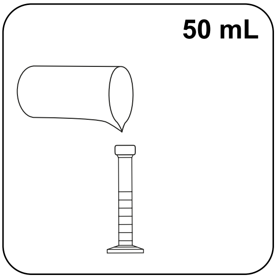
1. Sämtliche Glasware mit Reinigungsmittel reinigen und anschließend mit Leitungswasser spülen. Danach noch einmal mit Salzsäure (1:1) und VE-Wasser reinigen. Durch diese Schritte werden Ablagerungen entfernt, die zu leicht erhöhten Ergebnissen führen können.
2. Wenn die Probe 100 mg/L oder mehr Molybdate ($MoO_4{}^{2-}$) enthält, muss die Probenmessung unmittelbar im Anschluss der Zero-Messung erfolgen.
3. Für genauere Ergebnisse kann ein Reagenzienblindwert für jeden neuen Reagenzienbatch bestimmt werden. Hierzu wie beschrieben Vorgehen, jedoch VE-Wasser anstatt der Probe verwenden. Der erhaltene Messwert wird von den mit diesem Batch ermittelten Messwerten abgezogen.

Anmerkungen

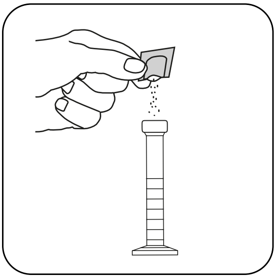
1. Bei Anwesenheit von Eisen entwickelt sich eine blaue Farbe. Eine kleine Menge ungelöstes Pulver hat keinen Einfluss auf das Ergebnis.

Durchführung der Bestimmung Eisen, gesamt (Fe in Mo) in Anwesenheit von Molybdat mit Vario Pulverpäckchen

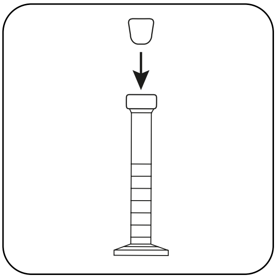
Die Methode im Gerät auswählen.



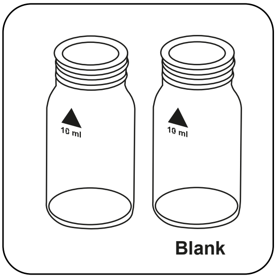
50 mL Probe in einen 50-mL-Mischzylinder geben.



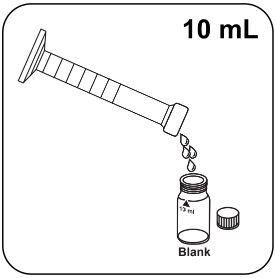
Ein **Vario (Fe in Mo) Rgt 1 Pulverpäckchen** zugeben.



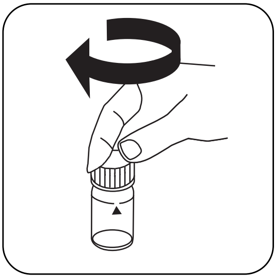
Mischzylinder mit einem Stopfen verschließen. Pulver durch Umschwenken lösen.



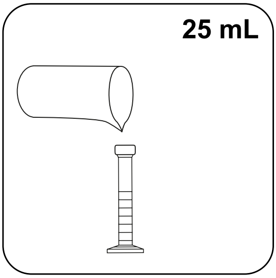
Zwei saubere 24-mm-Küvetten bereitstellen. Eine als Nullküvette kennzeichnen.



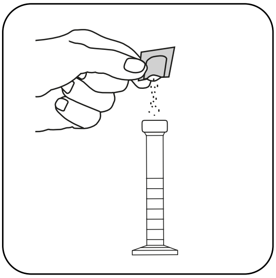
10 mL vorbereitete Probe in die Nullküvette füllen.



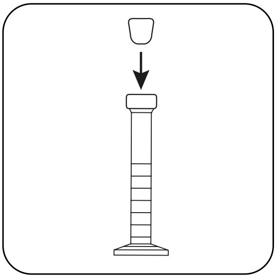
Küvette(n) verschließen.



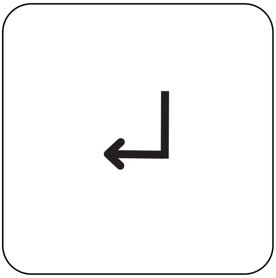
25 mL vorbereitete Probe in einen 25-mL-Mischzylinder geben.



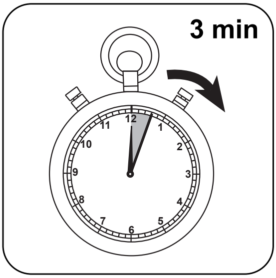
Ein **Vario (Fe in Mo) Rgt 2 Pulverpäckchen** zugeben.



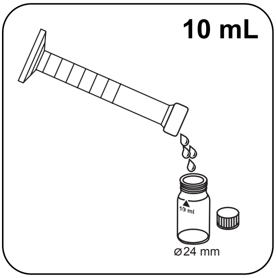
Mischzylinder mit einem Stopfen verschließen. Pulver durch Umschwenken lösen.



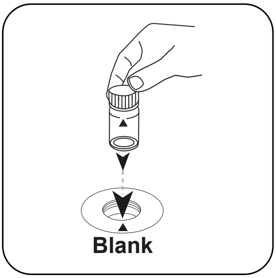
Taste **ENTER** drücken.



3 Minute(n) Reaktionszeit abwarten.



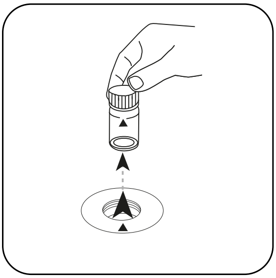
10 mL Probe in die Probenküvette geben.



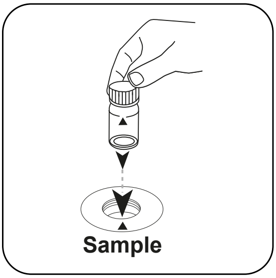
Die **Nullküvette** in den Messschacht stellen. Positionierung beachten.

Zero

Taste **ZERO** drücken.



Küvette aus dem Messschacht nehmen.



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

Test

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

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

Chemische Methode

TPTZ

Appendix

Störungen

Ausschließbare Störungen

1. pH-Wert Störung: Ein Proben pH nach Zugabe der Reagenz von kleiner 3 oder größer 4 kann die Farbausbildung behindern, da die entstandene Farbe zu schnell verblasst oder es zu einer Eintrübung kommen kann. Daher muss der pH-Wert vor Zugabe der Reagenz auf einen pH-Wert zwischen 3 und 5 in dem Messzylinder eingestellt werden:
   Tropfenweise eine geeignete Menge einer eisenfreien Säure oder Base wie 1 N Schwefelsäure oder 1 N Natronlauge zugeben.
   Eine Volumenkorrektur muss durchgeführt werden, falls eine signifikante Menge Säure oder Base zugegeben wurde.

Literaturverweise

G. Frederic Smith Chemical Co., The Iron Reagents, 3rd ed. (1980)

Eisen LR L (A) M225

0,03 - 2 mg/L Fe FE

Ferrozine / Thioglycolat

Material

Benötigtes Material (zum Teil optional):

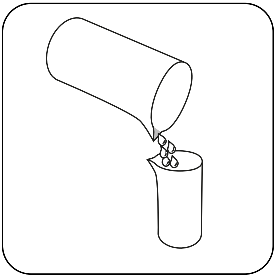
Reagenzien	Form/Menge	Bestell-Nr.
Säure / Alkalität P Indikator PA1	65 mL	56L013565
Calciumhärte Puffer CH2	65 mL	56L014465
KP962-Ammonium Persulphate Pulver	Pulver / 40 g	56P096240
KS63-FE6-Thioglycolat/Molybdat HR RGT	30 mL	56L006330
Eisen Reagenz FE6	65 mL	56L006365
Eisen Reagenz FE5	65 mL	56L006165

Vorbereitung

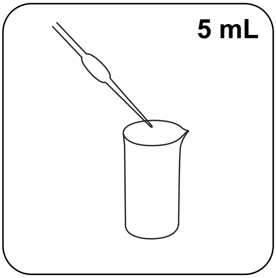
1. Wenn starke Komplexbildner in der Probe vorliegen, muss die Reaktionszeit verlängert werden, bis keine weitere Farbentwicklung mehr sichtbar ist. Sehr starke Eisen-Komplexe werden bei der Messung jedoch nicht erfasst. In diesem Fall müssen die Komplexbildner durch Oxidation mit Säure/Persulfat zerstört 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

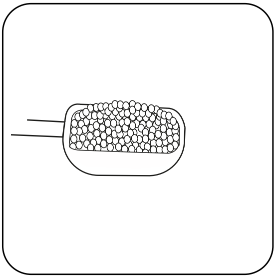
Gesamteisen setzt sich zusammen aus löslichem, komplexiertem und suspendiertem Eisen. Die Probe darf vor der Messung nicht filtriert weden. Um eine Homogenisierung der Probe zu gewährleisten, müssen abgesetzte Partikel unmittelbar vor der Probenahme durch kräftiges Schütteln gleichmäßig verteilt werden. 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.



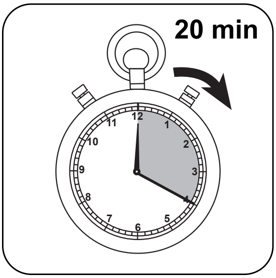
Ein geeignetes Aufschlussgefäß mit **50 mL homogenisierter Probe** füllen.



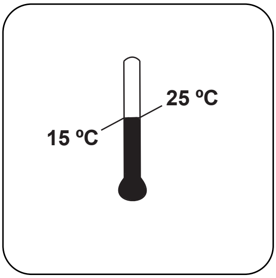
5 mL 1:1 Salzsäure zugeben.



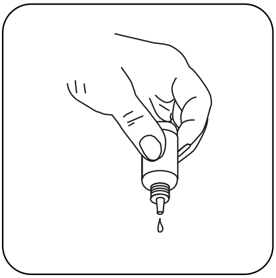
Einen Messlöffel KP 962 (Ammonium Persulfat Powder) zugeben.



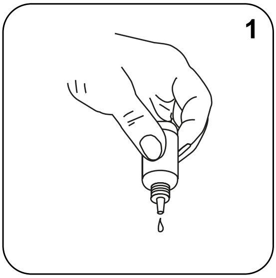
Die Probe für **20 Minuten kochen**. Ein Probevolumen von 25 mL sollte beibehalten werden, gegebenenfalls mit VE-Wasser aufüllen.



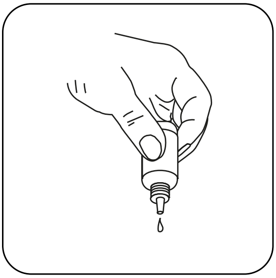
Die Probe auf **Raumtemperatur** abkühlen lassen.



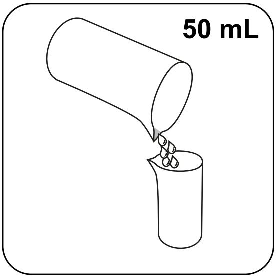
Die Tropfflaschen senkrecht halten und durch langsames Drücken gleich große Tropfen zugeben.



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!)**



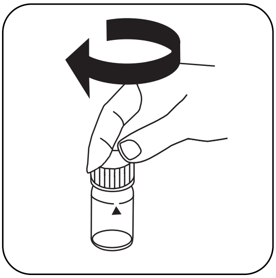
Die Probe mit **VE-Wasser auf 50 mL** auffüllen.

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

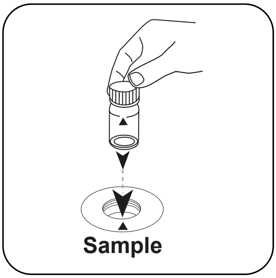
Die Methode im Gerät auswählen.

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

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



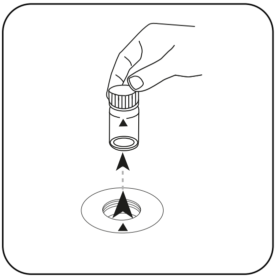
Küvette(n) verschließen.



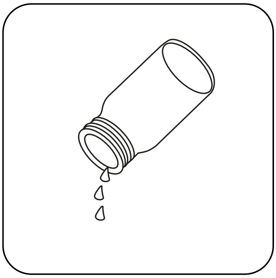
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

Zero

Taste **ZERO** drücken.

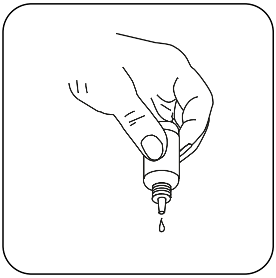


Küvette aus dem Messschacht nehmen.

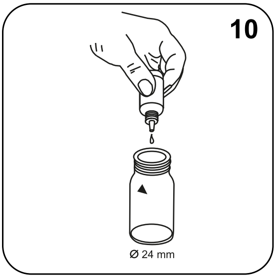


Küvette entleeren.

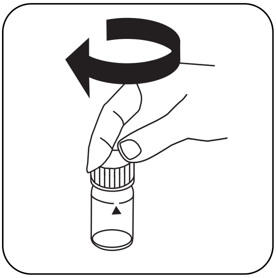
24-mm-Küvette mit **10 mL vorbereiteter Probe** füllen.



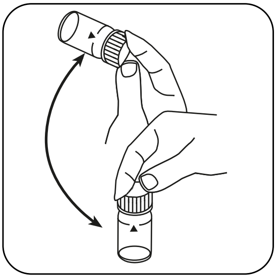
Die Tropfflaschen senkrecht halten und durch langsames Drücken gleich große Tropfen zugeben.



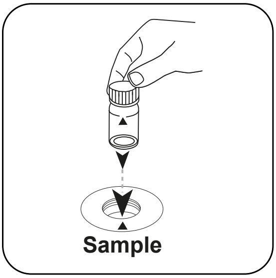
10 Tropfen Eisen Reagenz FE5 zugeben.



Küvette(n) verschließen.



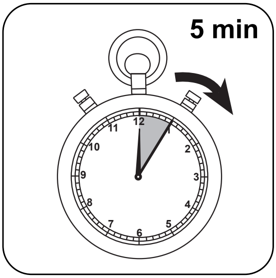
Inhalt durch Umschwenken mischen.



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

Test

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



5 Minute(n) Reaktionszeit abwarten.

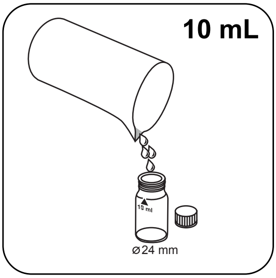
Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

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

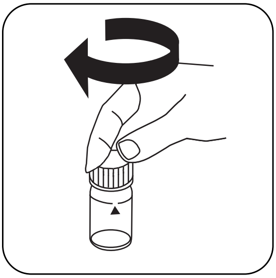
Durchführung der Bestimmung Eisen LR (A) mit Flüssigreagenz

Die Methode im Gerät auswählen.

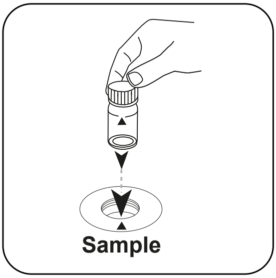
Für eine Bestimmung des gesamt gelösten Eisens muss die Probe vor der Bestimmung filtriert werden (Porenweite 0,45 µm). Andernfalls werden Eisenpartikel und suspendiertes Eisen mitbestimmt.



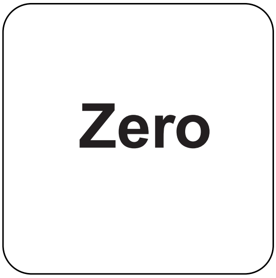
24-mm-Küvette mit **10 mL vorbereiteter Probe** füllen.



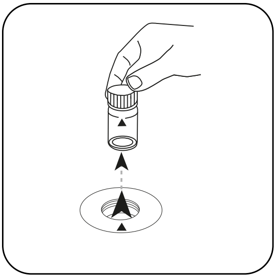
Küvette(n) verschließen.



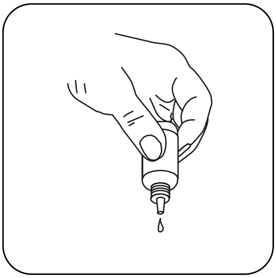
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



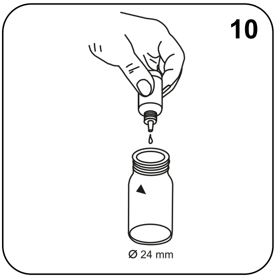
Taste **ZERO** drücken.



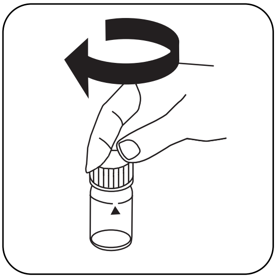
Küvette aus dem Messschacht nehmen.



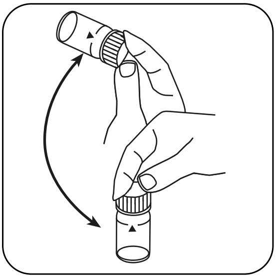
Die Tropfflaschen senkrecht halten und durch langsames Drücken gleich große Tropfen zugeben.



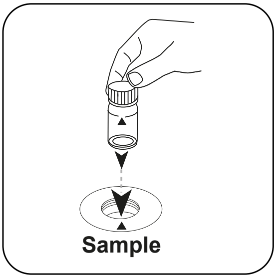
10 Tropfen Eisen Reagenz FE5 zugeben.



Küvette(n) verschließen.



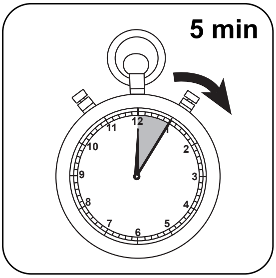
Inhalt durch Umschwenken mischen.



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

Test

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.

Chemische Methode

Ferrozine / Thioglycolat

Appendix

Störungen

Ausschließbare Störungen

1. Eine hohe Konzentration an Molybdat verursacht bei Verwendung von KS61 (Ferrozine/Thioglycolate) eine intensive gelbe Farbe. In diesem Fall ist ein Chemikalienblindwert erforderlich:

- Zwei saubere **24-mm-Kuvetten** bereitstellen.
- Eine Küvette als Nullküvette kennzeichnen.
- In eine saubere 24-mm-Küvette **10 ml Probe** geben (Nullküvette).
- In die Küvette **10 Tropfen KS63 (Thioglycolate)** geben.
- Die Küvette mit dem Küvettendeckel verschließen und den Inhalt durch Umschwenken mischen.
- Die Nullküvette in den Messschacht stellen. Positionierung beachten.
- Taste **ZERO** drücken.
- Kuvette aus dem Messschacht nehmen.
- In eine zweite saubere 24-mm-Küvette **10 ml Probe** geben (Probenküvette).
- Geben Sie **10 Tropfen KS61 (Ferrozine/Thioglycolate)** zu und gehen Sie weiter vor, wie in der Durchführung beschrieben.

Störung	Stört ab / [mg/L]
Co	8
Cu	2
Oxalat	500
CN^-	10
NO_2^-	

Literaturverweise

D. F. Boltz and J. A. Howell, eds., Colorimetric Determination of Nonmetals, 2nd ed., Vol. 8, p. 304 (1978). Carpenter, J.F. "A New Field Method for Determining the Levels of Iron Contamination in Oilfield Completion Brine", SPE International Symposium (2004)

Molybdat LR PP M251

0,03 - 3 mg/L Mo Mo1

Ternärer Komplex

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
VARIO Molybdenum LR, Set	1 St.	535450

Es wird außerdem folgendes Zubehör benötigt.

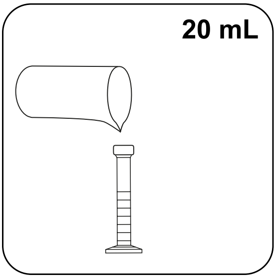
Zubehör	Verpackungseinheit	Bestell-Nr.
Mischzylinder mit Stopfen notwendiges Zubehör zu Bestimmung von Molybdän LR mit MD 100 (276140)	1 St.	19802650

Vorbereitung

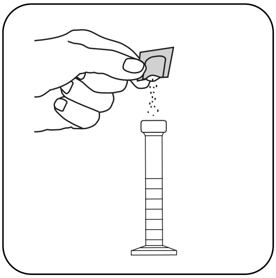
1. Stark alkalische oder saure Wässer müssen vor der Analyse in einen pH-Bereich zwischen 3 und 5 gebracht werden (mit 0,5 mol/l Schwefelsäure bzw. 1 mol/l Natronlauge).
2. Zur Vermeidung von Fehlern durch Ablagerungen, die Glasgeräte vor der Analyse mit Salzsäurelösung (ca. 20% ig) und anschließend mit VE-Wasser spülen.

Durchführung der Bestimmung Molybdat LR mit Vario Pulverpäckchen

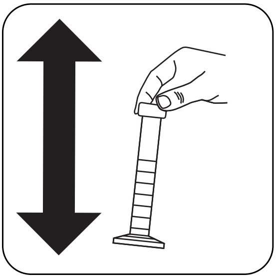
Die Methode im Gerät auswählen.



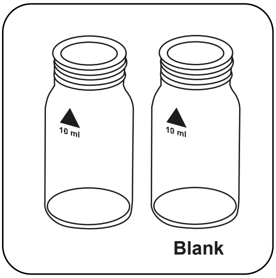
20 mL Probe in einen 25-mL-Mischzylinder geben.



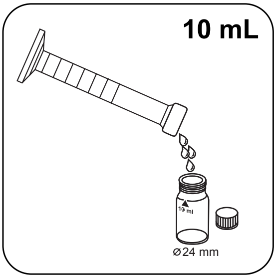
Ein **Vario Molybdenum 1 LR F20 Pulverpäckchen** zugeben.



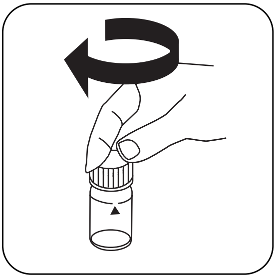
Mischzylinder mit einem Stopfen verschließen. Pulver durch Schütteln lösen.



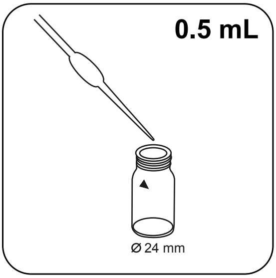
Zwei saubere 24-mm-Küvetten bereitstellen. Eine als Nullküvette kennzeichnen.



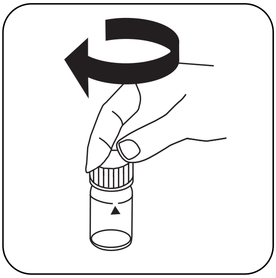
In jede Küvette **10 mL Probe** geben.



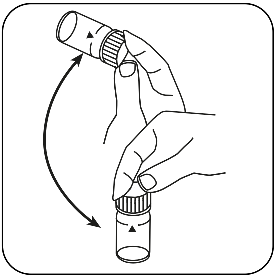
Nullküvette fest verschließen.



0.5 mL Molybdenum 2 LR Lösung in die Probenküvette geben.



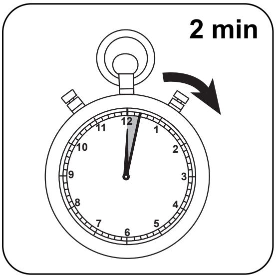
Küvette(n) verschließen.



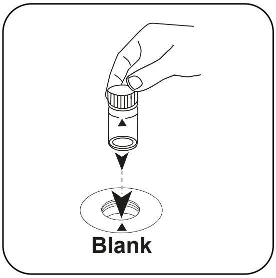
Inhalt durch Umschwenken mischen.

↵

Taste **ENTER** drücken.



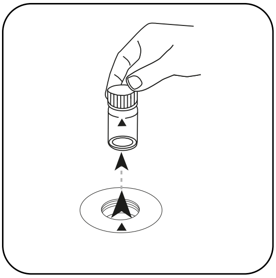
2 Minute(n) Reaktionszeit abwarten.



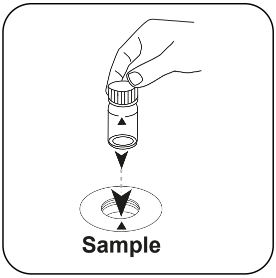
Die **Nullküvette** in den Messschacht stellen. Positionierung beachten.

Zero

Taste **ZERO** drücken.



Küvette aus dem Messschacht nehmen.



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

Test

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

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

Auswertung

Die folgende Tabelle gibt an wie die ausgegebenen Werte in andere Zitierformen umgewandelt werden können.

Einheit	Zitierform	Umrechnungsfaktor
mg/l	MoO_4	1
mg/l	Mo	0.6
mg/l	Na_2MoO_4	1.29

Chemische Methode

Ternärer Komplex

Appendix

Störungen

Störung	Stört ab / [mg/L]	Einfluss
Al	50	
Cr	1000	
Fe	50	
Ni	50	
NO_2^-	in allen Mengen	
Cu	10	Führt bei einer Reaktionszeit von mehr als 5 Minuten zu höheren Messwerten

Literaturverweise

Analytical Chemistry, 25(9) 1363 (1953)

Molybdat HR L M254

1 - 100 mg/L MoO_4 Mo2

Thioglycolat

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
Eisen Reagenz FE6	65 mL	56L006365

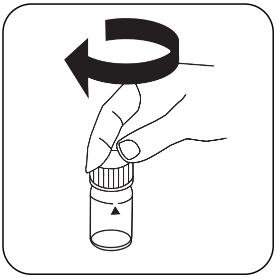
Probenahme

1. Die Durchführung des Tests muss direkt nach der Probenahme erfolgen. Molybdat lagert sich auf den Wänden des Probenahmegefäßes ab, was zu niedrigeren Messergebnissen führt.

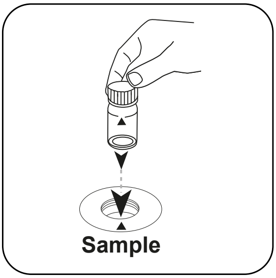
Durchführung der Bestimmung Molybdat HR mit Flüssigreagenz

Die Methode im Gerät auswählen.

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



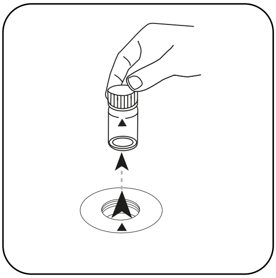
Küvette(n) verschließen.



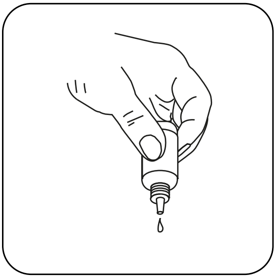
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

Zero

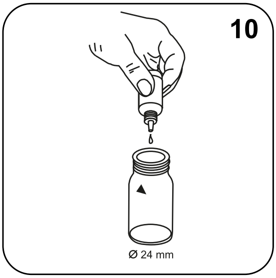
Taste **ZERO** drücken.



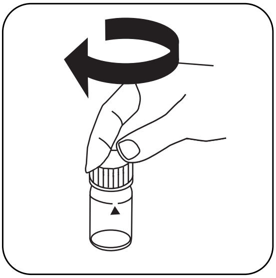
Küvette aus dem Messschacht nehmen.



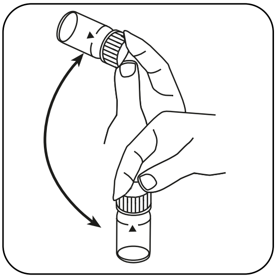
Die Tropfflaschen senkrecht halten und durch langsames Drücken gleich große Tropfen zugeben.



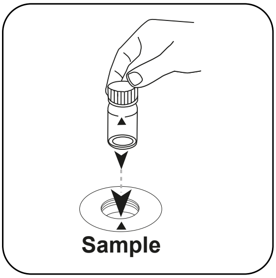
10 Tropfen Eisen Reagenz FE6 zugeben.



Küvette(n) verschließen.



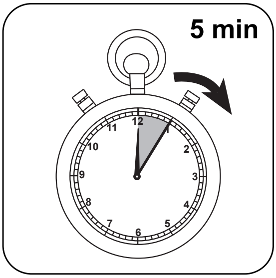
Inhalt durch Umschwenken mischen.



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

Test

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 Molybdat/ Molybdän.

Auswertung

Die folgende Tabelle gibt an wie die ausgegebenen Werte in andere Zitierformen umgewandelt werden können.

Einheit	Zitierform	Umrechnungsfaktor
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mg/l	Mo	0.6
mg/l	Na_2MoO_4	1.29

Chemische Methode

Thioglycolat

Appendix

Störungen

Ausschließbare Störungen

1. Die Störung von Niob, Tantal, Titanium und Zirkonium werden mit Citronensäure maskiert.
2. Die Störung von Vanadium(V) wird mit Kaliumfluorid maskiert.

Literaturverweise

Photometrische Analyse, Lange/ Vjedelek, Verlag Chemie 1980

Ozon T M300

0,02 - 2 mg/L O_3 O3

DPD / Glycin

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
Glycine f)	Tablette / 100	512170BT
Glycine f)	Tablette / 250	512171BT
Set DPD No. 1/No. 3#	je 100	517711BT
Set DPD No. 1/No. 3#	je 250	517712BT
Set DPD No. 1/No. 3 High Calcium#	je 100	517781BT
Set DPD No. 1/No. 3 High Calcium#	je 250	517782BT
Set DPD No. 1/Glycine #	je 100	517731BT
Set DPD No. 1/Glycine #	je 250	517732BT

Vorbereitung

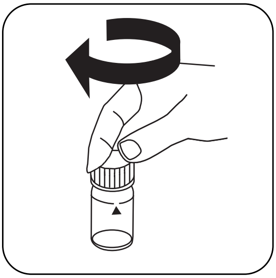
1. Reinigung der Küvetten:
   Da viele Haushaltsreiniger (z.B. Geschirrspülmittel) reduzierende Stoffe enthalten, kann es bei der nachfolgenden Bestimmung von Oxidationsmitteln (z.B. Ozon, Chlor) zu Minderbefunden kommen. Um diesen Messfehler auszuschließen, sollten die Glasgeräte chlorzehrungsfrei sein. 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 Ozon, 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 Ozon, neben Chlor mit Tablette

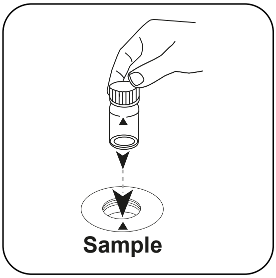
Die Methode im Gerät auswählen.

Wählen Sie zudem die Bestimmung: neben Chlor

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



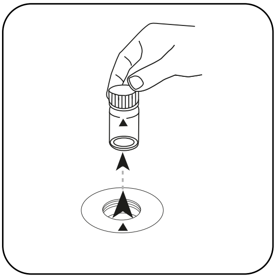
Küvette(n) verschließen.



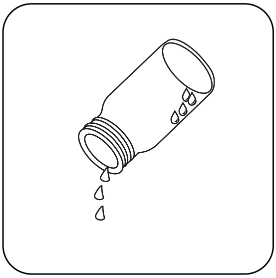
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

Zero

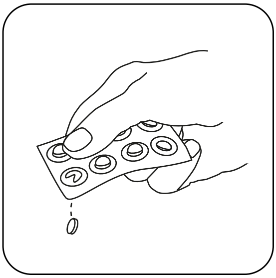
Taste **ZERO** drücken.



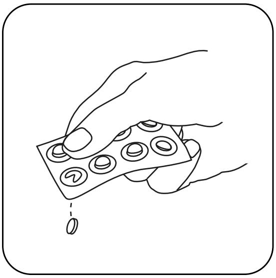
Küvette aus dem Messschacht nehmen.



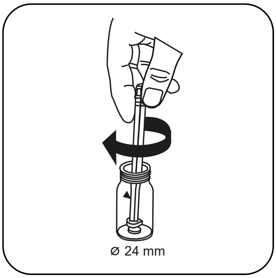
Die Küvette bis auf einige Tropfen entleeren.



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

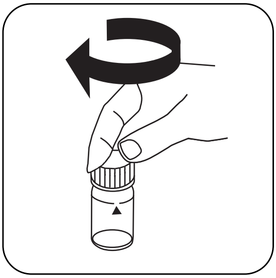


Eine **DPD No. 3 Tablette** zugeben.

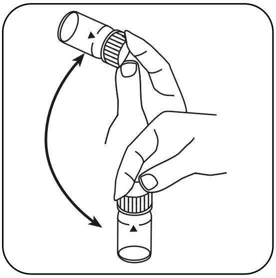


Tablette(n) unter leichter Drehung zerdrücken.

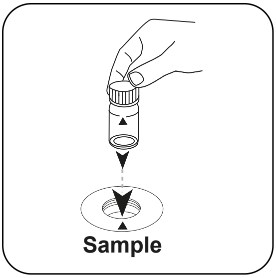
Küvette bis zur **10-mL-Marke** mit der **Probe** auffüllen.



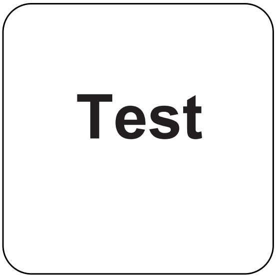
Küvette(n) verschließen.



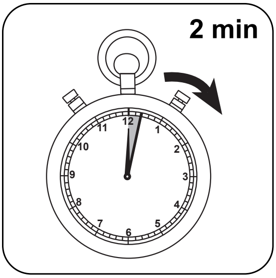
Tablette(n) durch Umschwenken lösen.



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

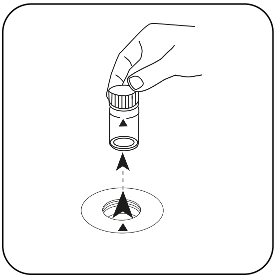


Taste **TEST** (XD: **START**) drücken.

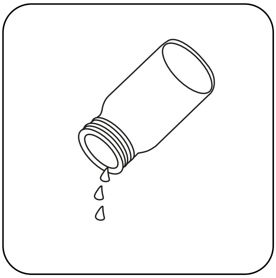


2 Minute(n) Reaktionszeit abwarten.

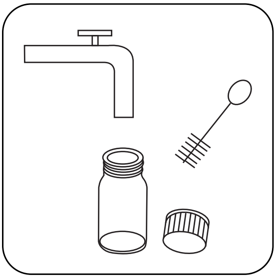
Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.



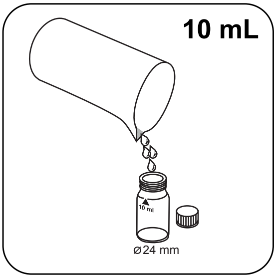
Küvette aus dem Messschacht nehmen.



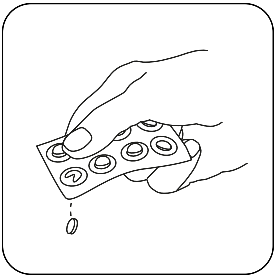
Küvette entleeren.



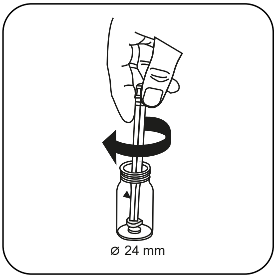
Die Küvette und den Küvettendeckel gründlich reinigen.



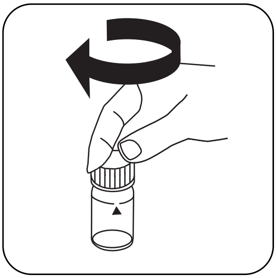
Eine **zweite Küvette** mit **10 mL Probe** füllen.



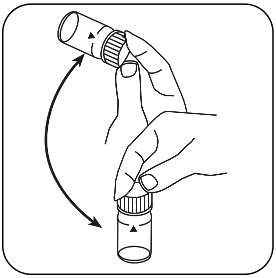
Eine **GLYCINE Tablette** zugeben.



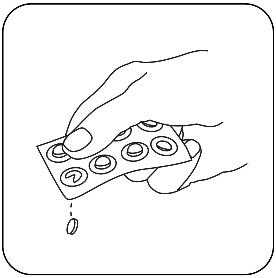
Tablette(n) unter leichter Drehung zerdrücken.



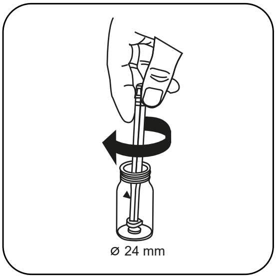
Küvette(n) verschließen.



Tablette(n) durch Umschwenken lösen.

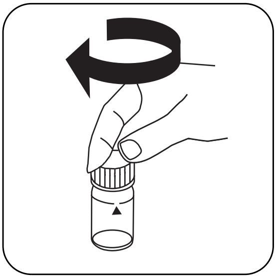


Eine DPD No. 1 Tablette und **eine DPD No. 3 Tablette** direkt aus der Folie in die erste Küvette geben.

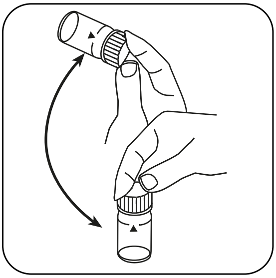


Tablette(n) unter leichter Drehung zerdrücken.

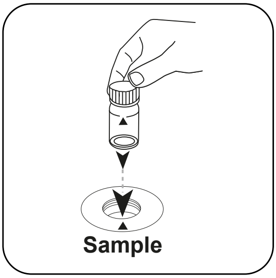
Die vorbereitete **Glycinlösung** in die vorbereitete Küvette füllen.



Küvette(n) verschließen.



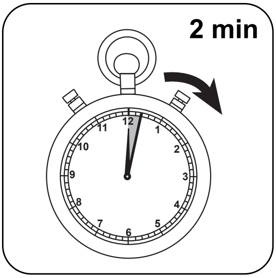
Tablette(n) durch Umschwenken lösen.



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

Test

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



2 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

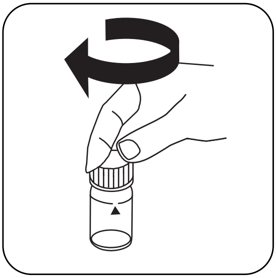
In der Anzeige erscheint das Ergebnis in mg/L Ozon; mg/l Gesamtchlor.

Durchführung der Bestimmung Ozon, in Abwesenheit von Chlor mit Tablette

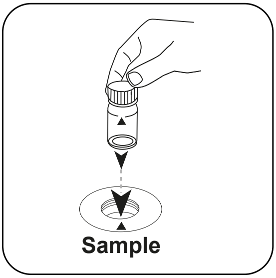
Die Methode im Gerät auswählen.

Wählen Sie zudem die Bestimmung: ohne Chlor

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



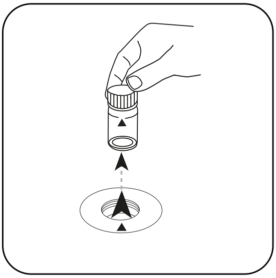
Küvette(n) verschließen.



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

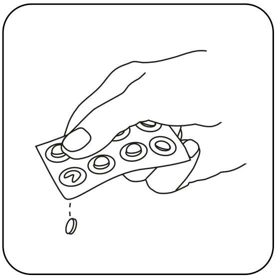
Zero

Taste **ZERO** drücken.

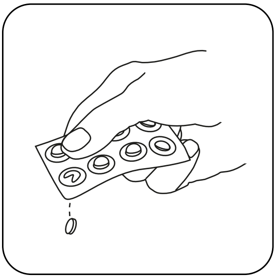


Küvette aus dem Messschacht nehmen.

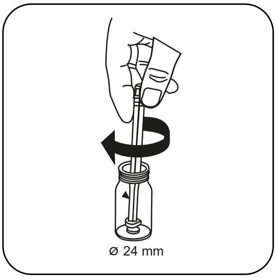
Die Küvette bis auf einige Tropfen entleeren.



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

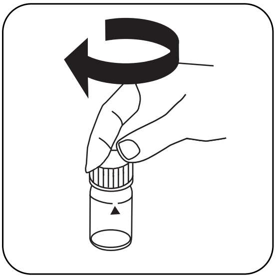


Eine **DPD No. 3 Tablette** zugeben.

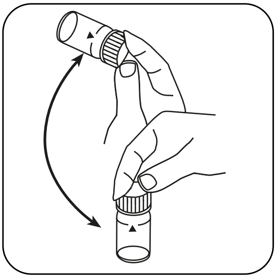


Tablette(n) unter leichter Drehung zerdrücken.

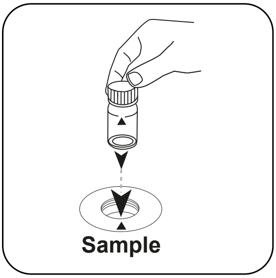
Küvette bis zur **10-mL-Marke** mit der **Probe** auffüllen.



Küvette(n) verschließen.



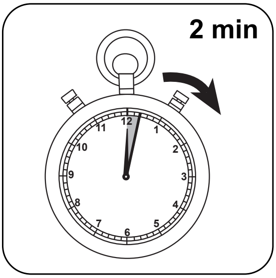
Tablette(n) durch Umschwenken lösen.



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

Test

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 Ozon.

Auswertung

Die folgende Tabelle gibt an wie die ausgegebenen Werte in andere Zitierformen umgewandelt werden können.

Einheit	Zitierform	Umrechnungsfaktor
mg/l	O_3	1
mg/l	Cl_2	1.4771

Chemische Methode

DPD / Glycin

Appendix

Störungen

Permanente Störungen

1. Alle in den Proben vorhandenen Oxidationsmittel reagieren wie Chlor, was zu Mehrbefunden führt.
2. Konzentrationen über 6 mg/L Ozon 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 versetzt und die Messung wiederholt (Plausibilitätstest).

Literaturverweise

Colorimetric Chemical Analytical Methods, 9th Edition, Lovibond

Abgeleitet von

DIN 38408-3:2011-04

[e)] Hilfsreagenz, alternativ zur DPD No. 1 / No. 3 bei Eintrübungen der Probe durch hohen Calciumionengehalt und/oder hohe Leitfähigkeit | [f)] Hilfsreagenz, wird zusätzlich für die Bestimmung Brom, Chlordioxid bzw. Ozon benötigt bei Anwesenheit von Chlor | [#] inklusive Rührstab

Polyacrylate L M338

1 - 30 mg/L Polyacryl POLY

Trübung

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
Kartusche C18	1 St.	56A020101
KS173-P2-2,4 Dinitrophenol Indicator	65 mL	56L017365
QAC Puffer QA2	65 mL	56L018365
Polyacrylate L Reagent Set	1 St.	56R019165
KS336-Propan-2-ol, 65 mL	65 mL	56L033665

Es wird außerdem folgendes Zubehör benötigt.

Zubehör	Verpackungseinheit	Bestell-Nr.
Pipette, 1000 µl	1 St.	365045
Pipettenspitzen, 0,1-1 ml (blau), 1000 Stück	1 St.	419073

Vorbereitung

- **Vorbereitung der Kartusche:**

1. Den Kolben einer geeigneten Spritze entfernen. Die C18-Kartusche an dem Spritzenzylinder befestigen.
2. 5 ml KS336 (Propan-2-ol) in den Spritzenzylinder geben.
3. Mit Hilfe des Kolbens das Lösemittel tropfenweise durch die Kartusche drücken.
4. Das durchgeflossene Lösemittel entfernen.
5. Den Kolben wieder entfernen. Den Spritzenzylinder mit 20 ml VE-Wasser füllen.
6. Mit Hilfe des Kolbens den Inhalt tropfenweise durch die Kartusche drücken.
7. Das durchgeflossene VE-Wasser verwerfen.
8. Die Kartusche ist nun einsatzbereit.

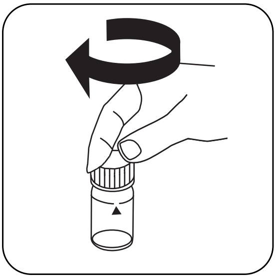
Anmerkungen

1. Wenn sich trotz korrekter Dosierung der Proben und Reagenzien keine oder nur eine leichte Trübung ausbildet, ist ein Aufkonzentrieren der Probe zur Erfassung der Polyacrylate/Polymere notwendig.
2. Abweichende Ergebnisse können auftreten, wenn Störungen aufgrund von Probenbestandteilen oder -verunreinigungen vorliegen. In diesen Fällen ist eine Beseitigung der Störungen notwendig.
3. Die Methode wurde unter Verwendung von Polyacrylsäure 2100 Natriumsalz im Bereich von 1-30 mg/L aufgenommen. Andere Polyacrylate/ Polymere ergeben abweichende Ergebnisse, wodurch der Messbereich variieren kann.

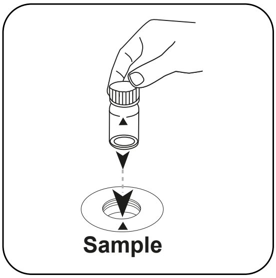
Durchführung der Bestimmung Polyacrylate mit Flüssigreagenz

Die Methode im Gerät auswählen.

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



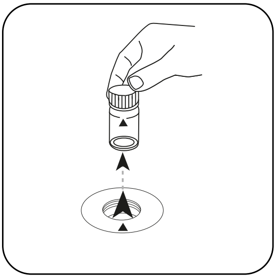
Küvette(n) verschließen.



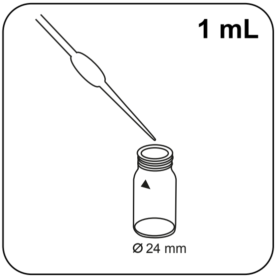
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

Zero

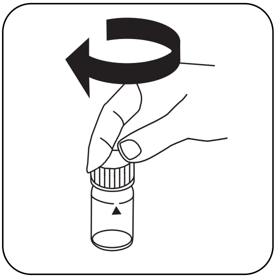
Taste **ZERO** drücken.



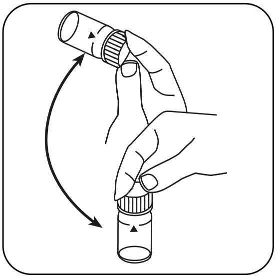
Küvette aus dem Messschacht nehmen.



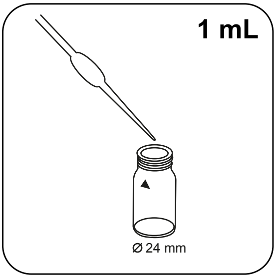
1 mL (25 Tropfen) Polyacrylat Puffer A1 Lösung in die Probenküvette geben.



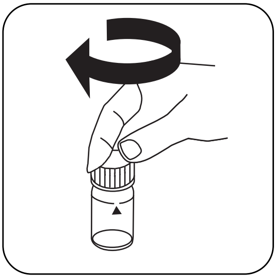
Küvette(n) verschließen.



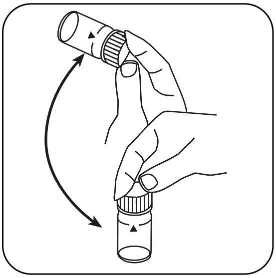
Inhalt durch Umschwenken mischen.



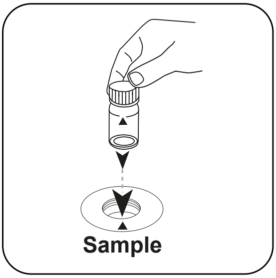
1 mL (25 Tropfen) Polyacrylat Fällmittel A2 Lösung in die Probenküvette geben.



Küvette(n) verschließen.



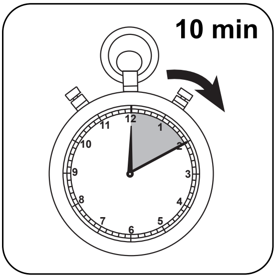
Inhalt durch Umschwenken mischen.



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

Test

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 Polyacrylsäure 2100 Natriumsalz.

Chemische Methode

Trübung

Appendix

Literaturverweise

W.B. Crummett, R.A. Hummel (1963), The Determination of Polyacrylamides in Water, American Water Works Association, 55 (2), pp. 209-219

Sulfat PP M360

5 - 100 mg/L SO_4^{2-} SO4

Bariumsulfat-Trübung

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
VARIO Sulfa 4 F10	Pulver / 100 St.	532160
ValidCheck Sulfat 75 mg/L	1 St.	48311325

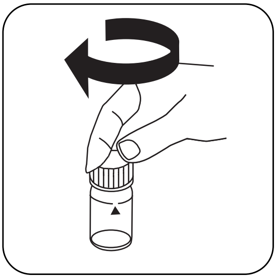
Anmerkungen

1. Sulfat verursacht eine fein verteilte Trübung.

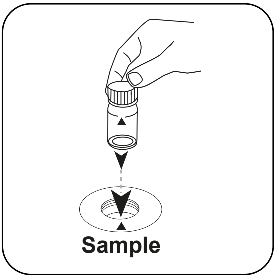
Durchführung der Bestimmung Sulfat mit Vario Pulverpäckchen

Die Methode im Gerät auswählen.

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



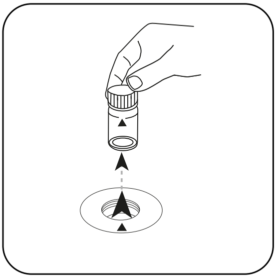
Küvette(n) verschließen.



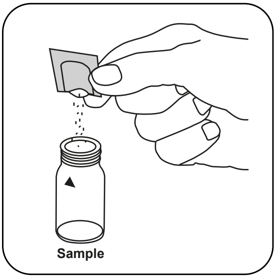
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

Zero

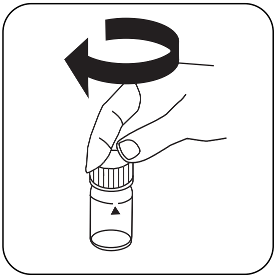
Taste **ZERO** drücken.



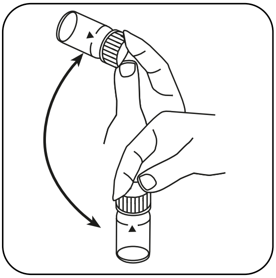
Küvette aus dem Messschacht nehmen.



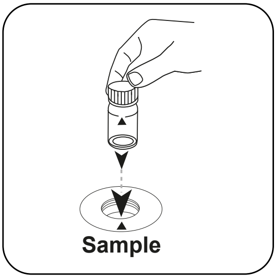
Ein **Vario Sulpha 4/ F10 Pulverpäckchen** zugeben.



Küvette(n) verschließen.



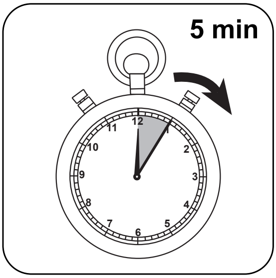
Inhalt durch Umschwenken mischen.



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

Test

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 Sulfat.

Chemische Methode

Bariumsulfat-Trübung

Appendix

Gemäß

Standard Method 4500-SO42- E
US EPA 375.4

Abgeleitet von

DIN ISO 15923-1 D49

Triazol PP M388

1 - 16 mg/L Benzotriazole or Tolyltriazole tri

Katalysierter UV-Aufschluss

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
VARIO Triazole RGT Powder Pack F25	Pulver / 100 St.	532200
VARIO Rochelle Salzlösung, 30 ml [h)]	30 mL	530640

Es wird außerdem folgendes Zubehör benötigt.

Zubehör	Verpackungseinheit	Bestell-Nr.
UV-Stiftlampe, 254 nm	1 St.	400740
UV-Schutzbrille, Orange	1 St.	400755

Gefahrenhinweise

Während die UV-Lampe in Betrieb ist, muss eine UV-Schutzbrille getragen werden.

Probenahme

1. Die Wasserprobe so schnell wie möglich nach der Probenahme messen.

Vorbereitung

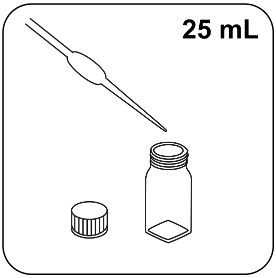
1. Zur Erzielung genauer Analysenergebnisse muss eine Probentemperatur von 20 °C bis 25 °C eingehalten werden.
2. Nitrit- oder boraxhaltige Wässer müssen vor der Analyse in einen pH-Bereich zwischen 4 und 6 gebracht werden (mit 1N Schwefelsäure).
3. Enthält die Probe mehr als 500 mg/L $CaCO_3$ Härte, werden 10 Tropfen Rochelle Salzlösung zugegeben.

Anmerkungen

1. Triazole Reagent Pulverpäckchen und UV-Lampe auf Anfrage erhältlich.
2. Zur Handhabung der UV-Lampe ist die Anleitung des Herstellers zu beachten. Die Oberfläche der UV-Lampe nicht berühren. Fingerabdrücke verätzen das Glas. Die UV-Lampe zwischen den Messungen mit einem weichen und sauberen Tuch abwischen.
3. Der Test unterscheidet nicht zwischen Tolyltriazole und Benzotriazole.

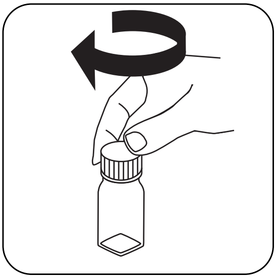
Durchführung der Bestimmung Benzotriazole / Tolyltriazole mit Vario Pulverpäckchen

Die Methode im Gerät auswählen.

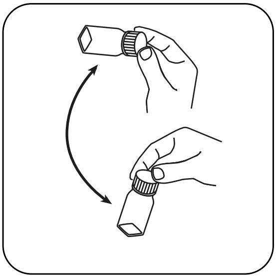


Das Aufschlussgefäß mit **25 mL** Probe füllen.

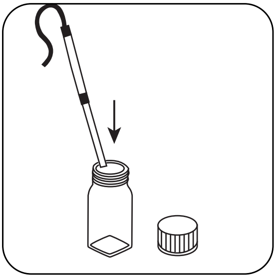
Ein **Pulverpäckchen** zugeben.



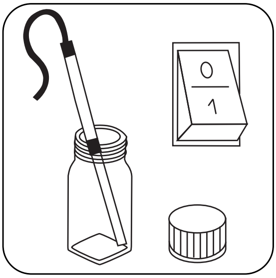
Aufschlussgefäß verschließen.



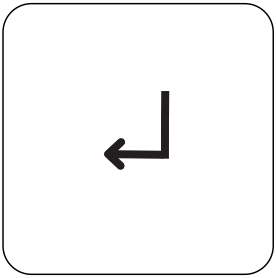
Das Pulver durch Umschwenken lösen.



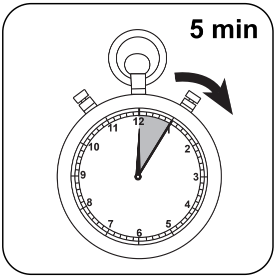
Die UV-Lampe in die Probe halten. **Achtung: UV-Schutzbrille tragen!**



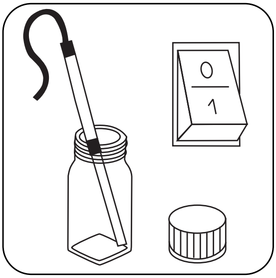
Die UV-Lampe einschalten.



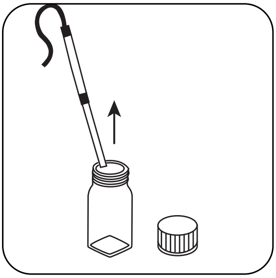
Taste **ENTER** drücken.



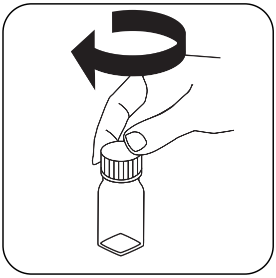
5 Minute(n) Reaktionszeit abwarten.



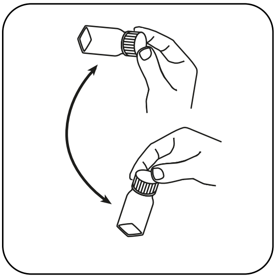
Die UV-Lampe ausschalten, wenn der Count-Down beendet ist.



UV-Lampe aus der Probe nehmen.

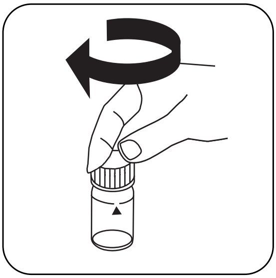


Aufschlussgefäß verschließen.

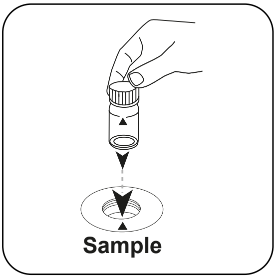


Inhalt durch Umschwenken mischen.

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



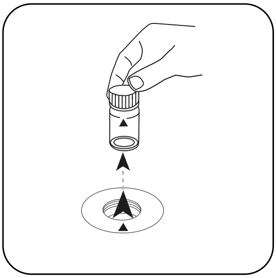
Küvette(n) verschließen.



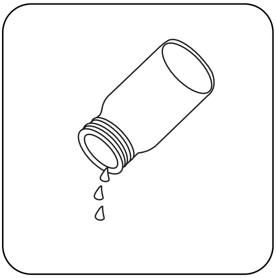
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

Zero

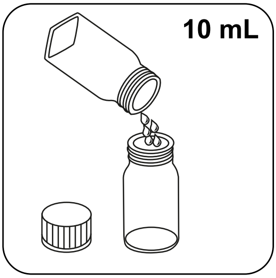
Taste **ZERO** drücken.



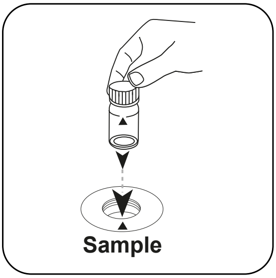
Küvette aus dem Messschacht nehmen.



Küvette entleeren.



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



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

Test

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

In der Anzeige erscheint das Ergebnis in mg/L Benzotriazole oder Tolyltriazole (Wechseln Sie zwischen den Zitierformen durch Drücken der Pfeiltasten nach oben/unten.).

Auswertung

Die folgende Tabelle gibt an wie die ausgegebenen Werte in andere Zitierformen umgewandelt werden können.

Einheit	Zitierform	Umrechnungsfaktor
mg/l	Benzotriazole	1
mg/l	Tolyltriazole	1.1177

Chemische Methode

Katalysierter UV-Aufschluss

Appendix

Störungen

Permanente Störungen

- Wird die Photolyse für mehr oder weniger als 5 Minuten durchgefürt, kann dies zu Minderbefunden führen.

Literaturverweise

Harp, D., Proceedings 45th International Water Conference, 299 (October 22-24, 1984)

[h)] Hilfsreagenz, wird zusätzlich bei Proben mit Härte größer 300 mg/l $CaCO_3$ verwendet

Zink L M405

0,1 - 2,5 mg/L Zn Zn

Zincon / EDTA

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
KS 89 - Cationic Suppressor	65 mL	56L008965
Zinc LR Reagent Set	1 St.	56R023965
Zink Puffer Z1B	65 mL	56L024365
Zink Indikator Z4P	Pulver / 20 g	56P024420

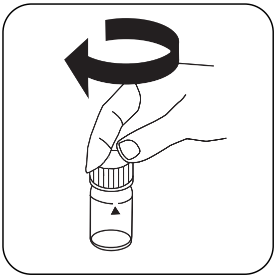
Anmerkungen

1. Für die richtige Dosierung muss der mit den Reagenzien mitgelieferte Messlöffel benutzt werden.
2. Dieser Test ist zur Bestimmung des freien, löslichen Zink geeignet. Zink, welches an starke Komplexierungsmittel gebunden ist, wird nicht erfasst.

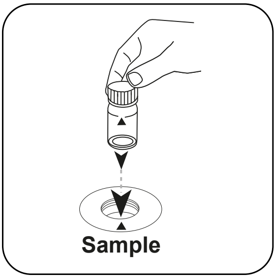
Durchführung der Bestimmung Zink mit Flüssigreagenz und Pulver

Die Methode im Gerät auswählen.

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



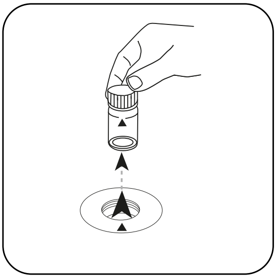
Küvette(n) verschließen.



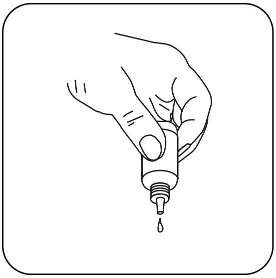
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

Zero

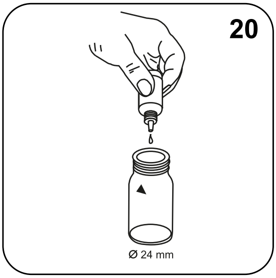
Taste **ZERO** drücken.



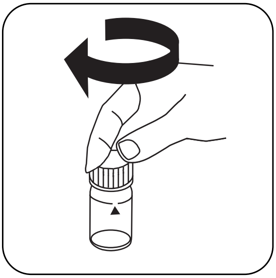
Küvette aus dem Messschacht nehmen.



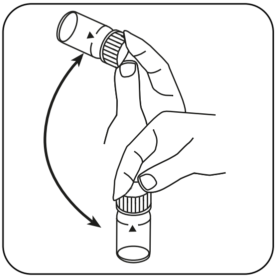
Die Tropfflaschen senkrecht halten und durch langsames Drücken gleich große Tropfen zugeben.



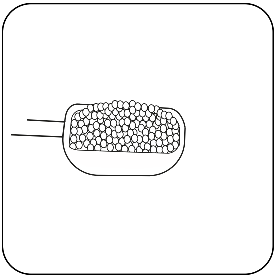
20 Tropfen Zink Puffer Z1B zugeben.



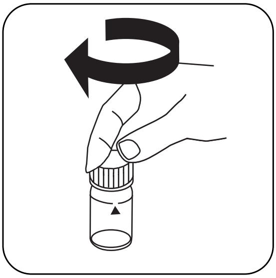
Küvette(n) verschließen.



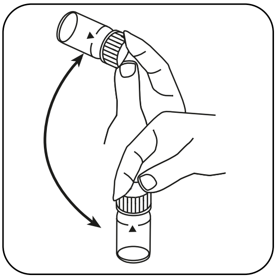
Inhalt durch Umschwenken mischen.



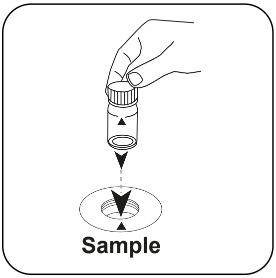
Einen Messlöffel Zink Indikator Z4P zugeben.



Küvette(n) verschließen.



Das Pulver durch Umschwenken lösen.



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

Test

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

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

Chemische Methode

Zincon / EDTA

Appendix

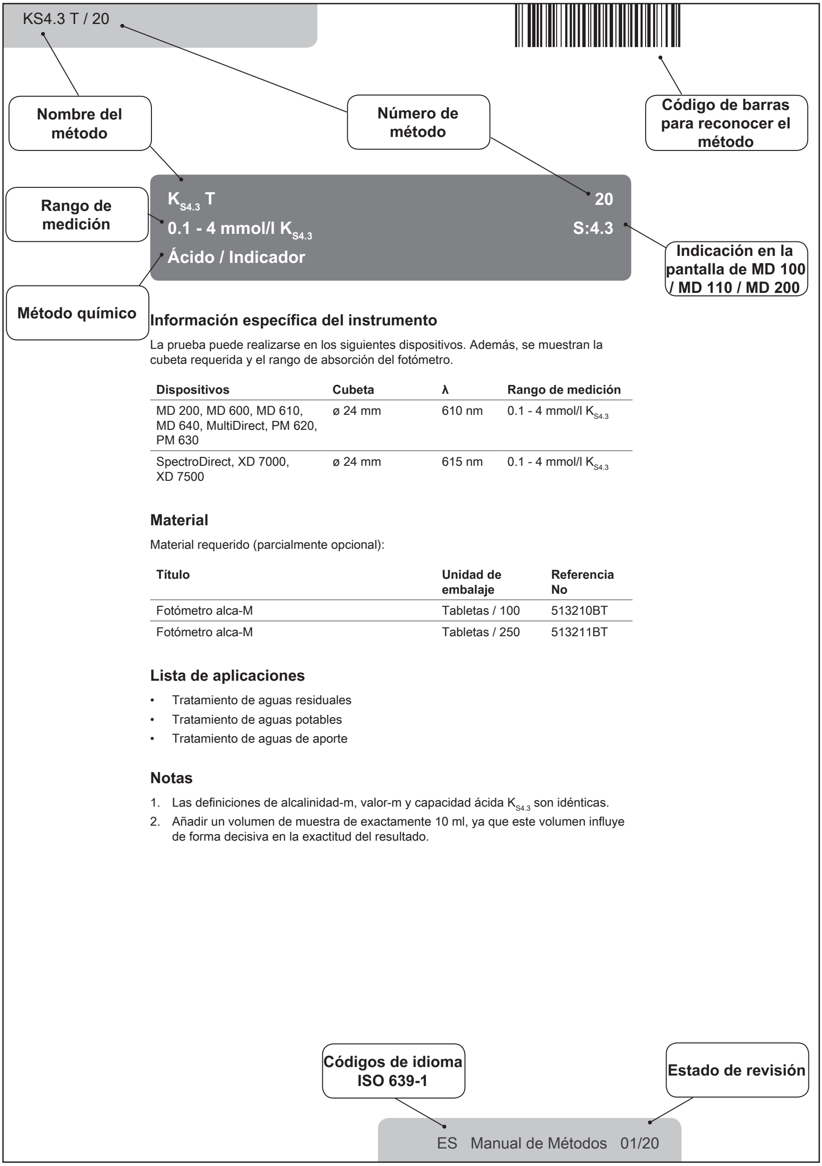
Störungen

Ausschließbare Störungen

- Kationen, wie quarternäre Ammoniumverbindungen, verursachen eine Farbänderung von rosarot nach violett, in Abhängigkeit der vorliegenden Kupferkonzentration. In diesem Fall der Probe tropfenweise KS89 (cationic surpressor) zugeben, bis eine orange/blaue Farbe sichtbar wird. Achtung: Nach Zugabe jeden Tropfens die Probe schwenken.

Literaturverweise

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989
S.M. Khopkar, Basic Concepts of Analytical Chemistry (2004), New Age International Ltd. Publishers, New Dheli, p. 75



KS4.3 T / 20

$K_{S4.3}$ T

20

0.1 - 4 mmol/l $K_{S4.3}$

S:4.3

Ácido / Indicador

Información específica del instrumento

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

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

Material

Material requerido (parcialmente opcional):

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

Lista de aplicaciones

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

Notas

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

ES Manual de Métodos 01/20

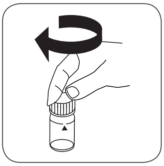
Realización de la determinación

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

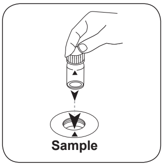
Seleccionar el método en el aparato.

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

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

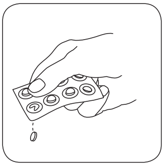


Cerrar la(s) cubeta(s).

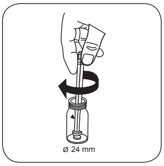


Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

• • •



Añadir **tableta ALKA-M-PHOTOMETER**.



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

Cerrar la(s) cubeta(s).

Aluminio PP M50

0.01 - 0.25 mg/L Al AL

Eriocromcianina R

Material

Material requerido (parcialmente opcional):

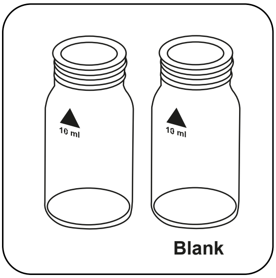
Reactivos	Unidad de embalaje	No. de referencia
Juego aluminio 20 ml VARIO	1 Cantidad	535000

Preparación

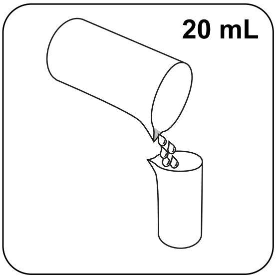
1. Para conseguir resultados de análisis exactos, la muestra acuosa deberá tener una temperatura entre 20 °C y 25 °C.
2. Para reducir errores por impurificaciones, lavar las cubetas y accesorios necesarios antes de su uso con una solución de ácido clorhídrico (aprox. 20%), enjuagándolos a continuación con agua desionizada.

Ejecución de la determinación Aluminio con sobres de polvos Vario

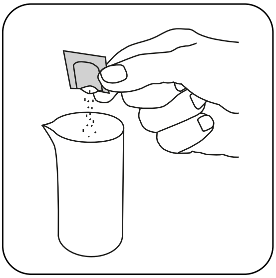
Seleccionar el método en el aparato.



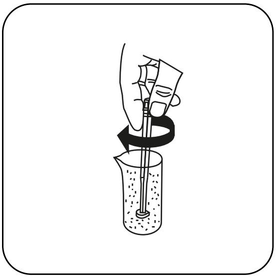
Preparar dos cubetas limpias de 24 mm. Identificar una como cubeta en blanco.



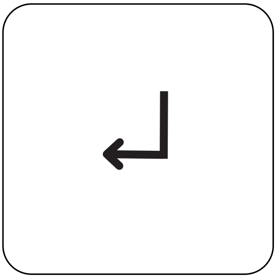
Añadir **20 mL de muestra** en un vaso de medición de 100 mL.



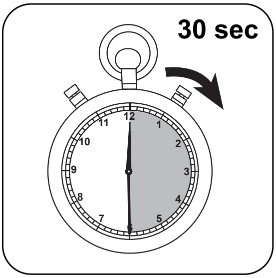
Añadir un **sobre de polvos Vario ALUMINIUM ECR F20** .



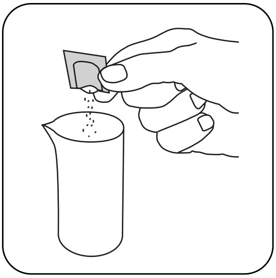
Disolver los polvos agitando.



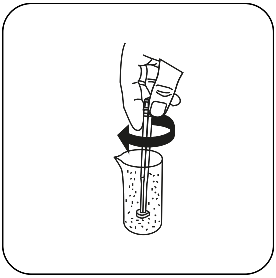
Pulsar la tecla **ENTER**.



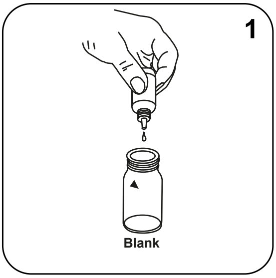
Esperar **30 segundos como periodo de reacción**.



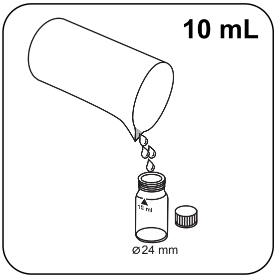
Añadir un **sobre de polvos Vario HEXAMINE F20** .



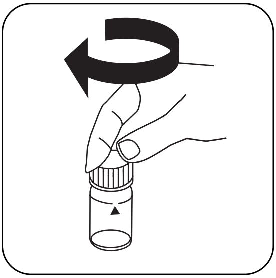
Disolver los polvos agitando.



Añadir **1 gotas de Vario ALUMINIUM ECR Masking Reagent** en la cubeta en blanco.



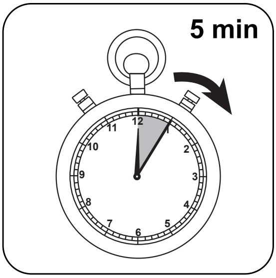
Añadir en cada cubeta **10 mL de muestra pretratada**.



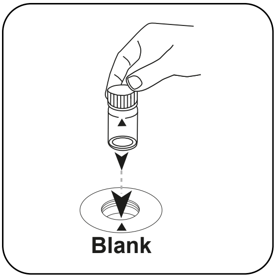
Cerrar la(s) cubeta(s).

↵

Pulsar la tecla **ENTER**.



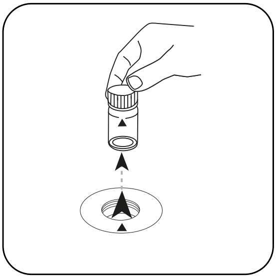
Esperar **5 minutos como periodo de reacción**.



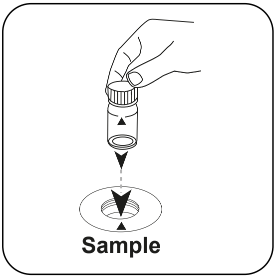
Poner la **cubeta en blanco** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

Zero

Pulsar la tecla **ZERO**.



Extraer la cubeta del compartimiento de medición.



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

Test

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

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

Evaluación

La siguiente tabla muestra cómo los valores de salida se pueden convertir a otros formularios de citas.

Unidad	Conversión	Factor de conversión
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Método químico

Eriocromcianina R

Apéndice

Interferencia

Interferencias extraibles

- La presencia de fluoruros y polifosfatos puede hacer disminuir el valor de los resultados. Esta influencia no suele tener mayor significado, a menos que el agua se fluorure artificialmente. En este caso puede usarse la tabla siguiente para determinar la concentración real de aluminio.

Fluoruro	**Valor visualizado: Aluminio [mg/L]**					
[mg/L F]	**0,05**	**0,10**	**0,15**	**0,20**	**0,25**	**0,30**
0,2	0,05	0,11	0,16	0,21	0,27	0,32
0,4	0,06	0,11	0,17	0,23	0,28	0,34
0,6	0,06	0,12	0,18	0,24	0,30	0,37
0,8	0,06	0,13	0,20	0,26	0,32	0,40
1,0	0,07	0,13	0,21	0,28	0,36	0,45
1,5	0,09	0,20	0,29	0,37	0,48	---

Bibliografía

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

De acuerdo a

Método APHA 3500-Al B

Bromo T M80

0.05 - 13 mg/L Br_2 Br

DPD

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
DPD nº1	Tabletas / 100	511050BT
DPD nº 1	Tabletas / 250	511051BT
DPD nº 1	Tabletas / 500	511052BT
DPD nº 1 High Calcium e)	Tabletas / 100	515740BT
DPD nº 1 High Calcium e)	Tabletas / 250	515741BT
DPD nº 1 High Calcium e)	Tabletas / 500	515742BT

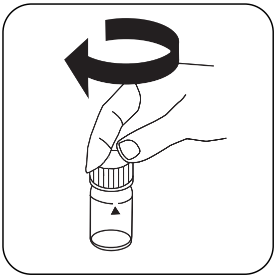
Preparación

1. Limpieza de las cubetas:
   Muchos productos de limpieza (p. ej., detergentes de lavavajillas) poseen componentes reductores, que pueden reducir los resultados en la determinación siguiente de oxidantes (p. ej., ozono, cloro). Para evitar estas alteraciones, los aparatos de vidrio deben estar exentos de componentes corrosivos al cloro. Para ello, deberá sumergir los aparatos de vidrio durante una hora en una solución de hipoclorito sódico (0,1 g/L), enjuagándolos minuciosamente a continuación con agua desionizada.
2. Evitar durante la preparación de la muestra la desgasificación de bromo, p. ej., al pipetar o agitar. La determinación se ha de realizar inmediatamente después de la toma de la muestra.
3. Las muestras acuosas muy ácidas o muy básicas se deberán neutralizar a un valor de pH entre 6 y 7 antes de realizar el análisis (con 0,5 mol/l de ácido sulfúrico o 1 mol/l de hidróxido sódico).

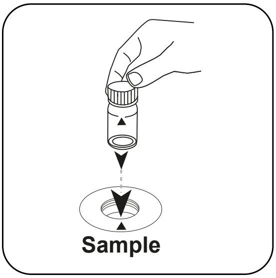
Ejecución de la determinación Bromo con tableta

Seleccionar el método en el aparato.

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



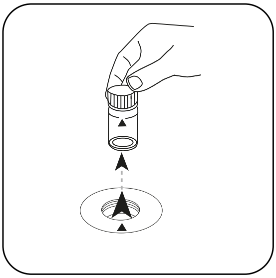
Cerrar la(s) cubeta(s).



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

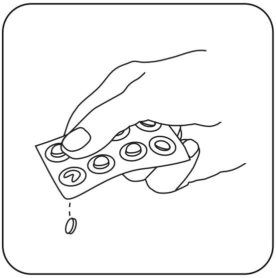
Zero

Pulsar la tecla **ZERO**.

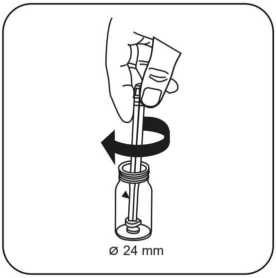


Extraer la cubeta del compartimiento de medición.

Vaciar la cubeta excepto algunas gotas.

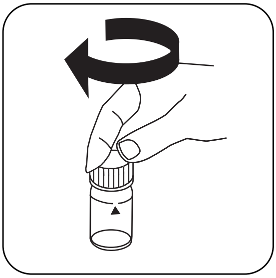


Añadir **tableta DPD No. 1**.

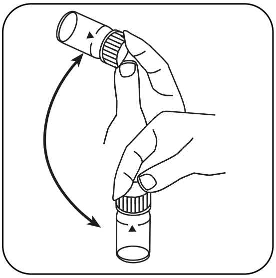


Triturar la(s) tableta(s) girando ligeramente.

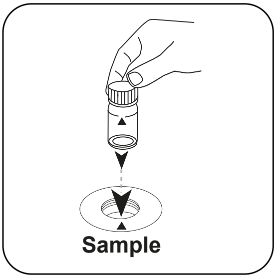
Llenar la cubeta con la **muestra** hasta la **marca de 10 mL** .



Cerrar la(s) cubeta(s).



Disolver la(s) tableta(s) girando.



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

Test

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

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

Método químico

DPD

Apéndice

Interferencia

Interferencias persistentes

1. Todos los elementos oxidantes existentes en la muestra reaccionan como el bromo, lo que produce un resultado más elevado.
2. Las concentraciones de bromo mayores a 22 mg/L pueden conducir a resultados de dentro del campo de medición hasta 0 mg/L. En este caso, se deberá diluir la muestra acuosa. Se mezclan 10 ml de muestra diluida con reactivo. A continuación se repite la medición (prueba de plausibilidad).

Derivado de

US EPA 330.5 (1983)
Método APHA 4500 Cl-G

e) Reactivo auxiliar, alternativo a DPD No.1/3 en enturbiamientos de la prueba debido a concentraciones elevadas de calcio y/o elevada conductividad

Cloro T M100

0.01 - 6.0 mg/L Cl_2 [a)] CL6

DPD

Material

Material requerido (parcialmente opcional):

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

Standards disponibles

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

Muestreo

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

Preparación

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

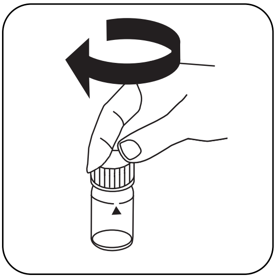
Notas

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

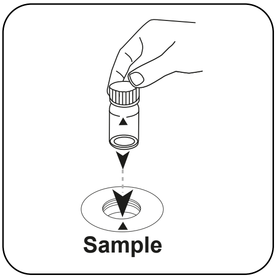
Ejecución de la determinación Cloro libre con tableta

Seleccionar el método en el aparato.

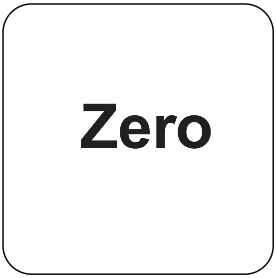
Llenar la cubeta de 24 mm con **10 mL de muestra** .



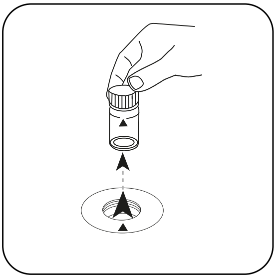
Cerrar la(s) cubeta(s).



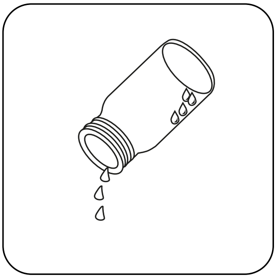
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



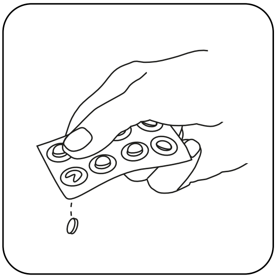
Pulsar la tecla **ZERO**.



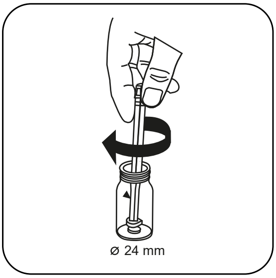
Extraer la cubeta del compartimiento de medición.



Vaciar la cubeta excepto algunas gotas.

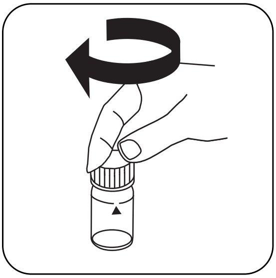


Añadir **tableta DPD No. 1**.

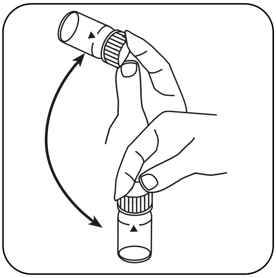


Triturar la(s) tableta(s) girando ligeramente.

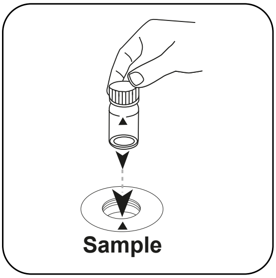
Llenar la cubeta con la **muestra** hasta la **marca de 10 mL** .



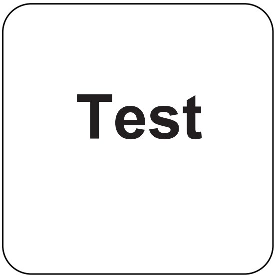
Cerrar la(s) cubeta(s).



Disolver la(s) tableta(s) girando.



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



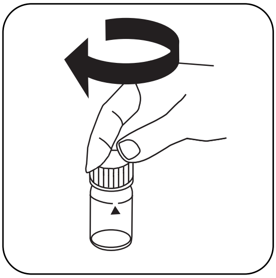
Pulsar la tecla **TEST** (XD: **START**).

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

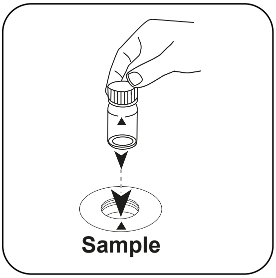
Ejecución de la determinación Cloro total con tableta

Seleccionar el método en el aparato.

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



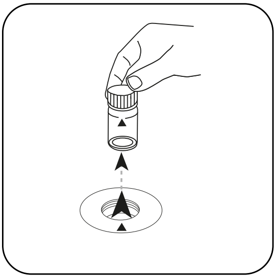
Cerrar la(s) cubeta(s).



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

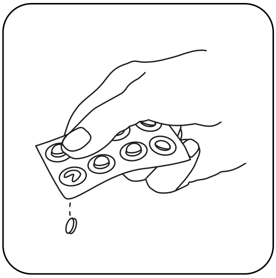
Zero

Pulsar la tecla **ZERO**.

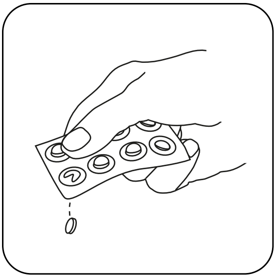


Extraer la cubeta del compartimiento de medición.

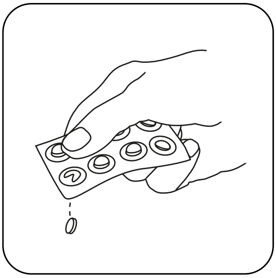
Vaciar la cubeta excepto algunas gotas.



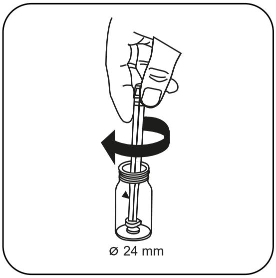
Añadir **tableta DPD No. 1**.



Añadir **tableta DPD No. 3**.

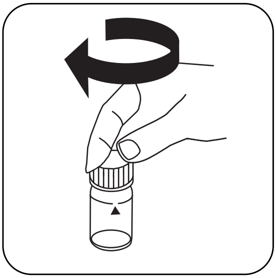


Alternativa a la tableta DPD No 1 y No 3, se puede agregar una tableta DPD No. 4.

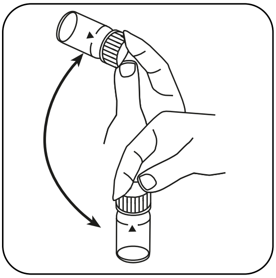


Triturar la(s) tableta(s) girando ligeramente.

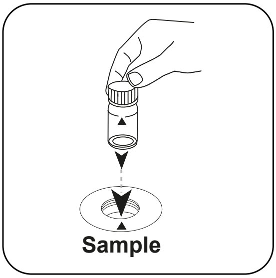
Llenar la cubeta con la **muestra** hasta la **marca de 10 mL** .



Cerrar la(s) cubeta(s).



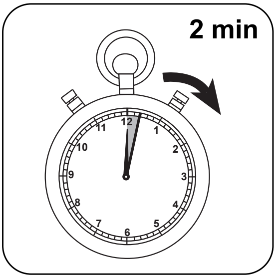
Disolver la(s) tableta(s) girando.



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

Test

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



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

Finalizado el periodo de reacción se realizará la determinación automáticamente.

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

Método químico

DPD

Apéndice

Interferencia

Interferencias persistentes

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

Interferencias extraibles

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

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

Validación del método

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

Conforme a

EN ISO 7393-2

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

Cloro L M101

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

DPD

Material

Material requerido (parcialmente opcional):

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

Standards disponibles

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

Muestreo

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

Preparación

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

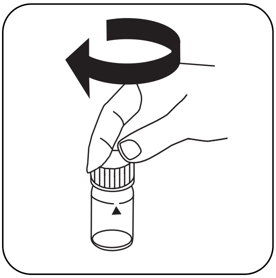
Notas

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

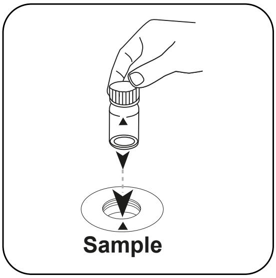
Ejecución de la determinación Cloro libre con reactivos líquidos

Seleccionar el método en el aparato.

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



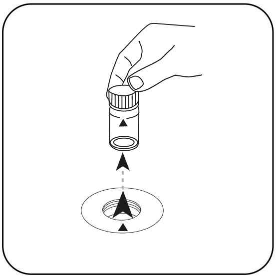
Cerrar la(s) cubeta(s).



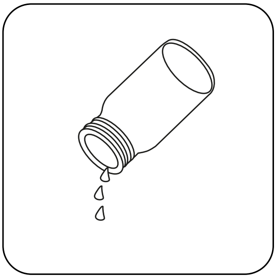
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

Zero

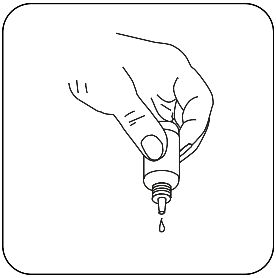
Pulsar la tecla **ZERO**.



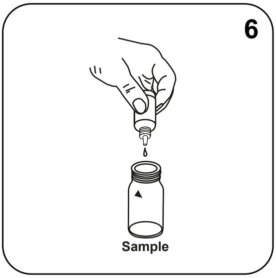
Extraer la cubeta del compartimiento de medición.



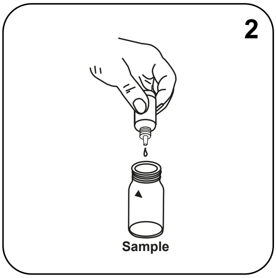
Vaciar la cubeta.



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

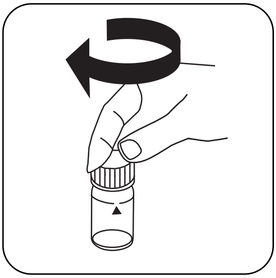


Añadir **6 gotas de DPD 1 Buffer Solution** en la cubeta con la muestra.

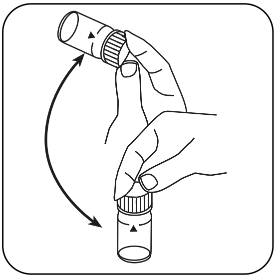


Añadir **2 gotas de DPD 1 Reagent Solution** en la cubeta con la muestra.

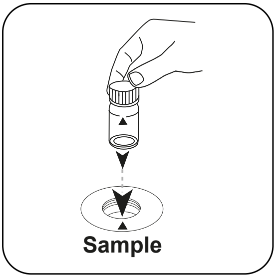
Llenar la cubeta con la **muestra** hasta la **marca de 10 mL** .



Cerrar la(s) cubeta(s).



Mezclar el contenido girando.



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

Test

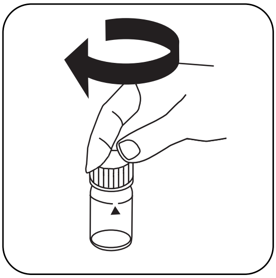
Pulsar la tecla **TEST** (XD: **START**).

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

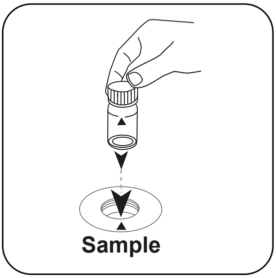
Ejecución de la determinación Cloro total con reactivos líquidos

Seleccionar el método en el aparato.

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



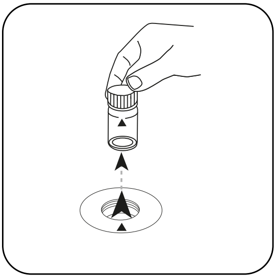
Cerrar la(s) cubeta(s).



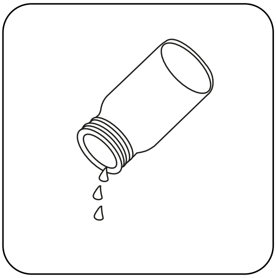
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

Zero

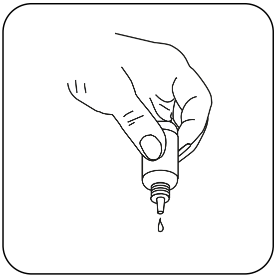
Pulsar la tecla **ZERO**.



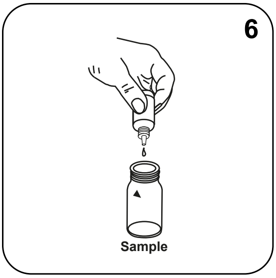
Extraer la cubeta del compartimiento de medición.



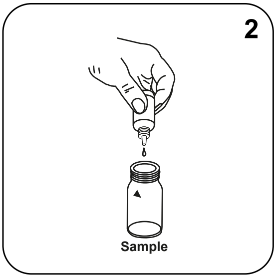
Vaciar la cubeta.



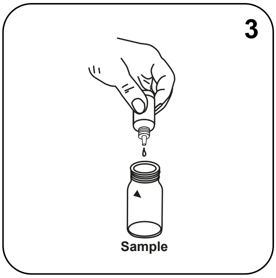
Mantener la botella cuentagotas vertical y añadir gotas del mismo tamaño presionando lentamente.



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

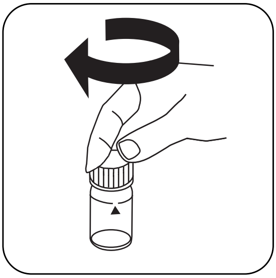


Añadir **2 gotas de DPD 1 Reagent Solution** en la cubeta con la muestra.

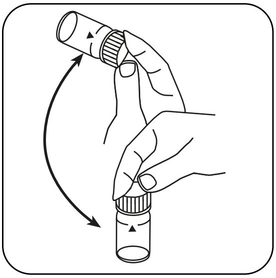


Añadir **3 gotas de DPD 3 Solution** en la cubeta con la muestra.

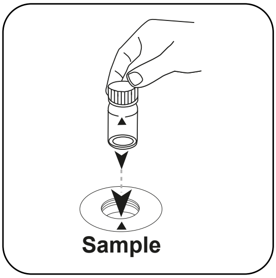
Llenar la cubeta con la **muestra** hasta la **marca de 10 mL** .



Cerrar la(s) cubeta(s).



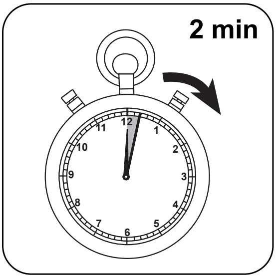
Mezclar el contenido girando.



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

Test

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



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

Finalizado el periodo de reacción se realizará la determinación automáticamente.

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

Método químico

DPD

Apéndice

Interferencia

Interferencias persistentes

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

Interferencias extraibles

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

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

Conforme a

EN ISO 7393-2

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

Cloro HR (KI) T M105

5 - 200 mg/L Cl_2 CLHr

KI / ácido

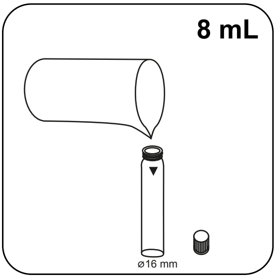
Material

Material requerido (parcialmente opcional):

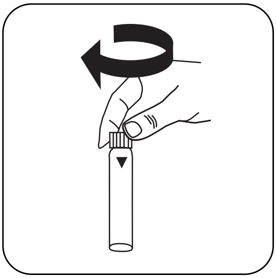
Reactivos	Unidad de embalaje	No. de referencia
Cloro HR (KI)	Tabletas / 100	513000BT
Cloro HR (KI)	Tabletas / 250	513001BT
Acidificante GP	Tabletas / 100	515480BT
Acidificante GP	Tabletas / 250	515481BT
Juego cloro HR (KI)/acidificante GP#	100 cada	517721BT
Juego cloro HR (KI)/acidificante GP#	250 cada	517722BT
Cloro HR (KI)	Tabletas / 100	501210
Cloro HR (KI)	Tabletas / 250	501211

Ejecución de la determinación Cloro HR (KI) con tableta

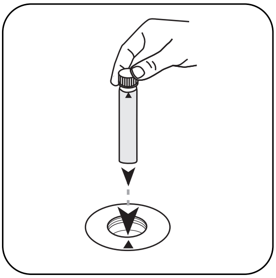
Seleccionar el método en el aparato.



Llenar la cubeta de 16 mm con **8 mL de muestra** .



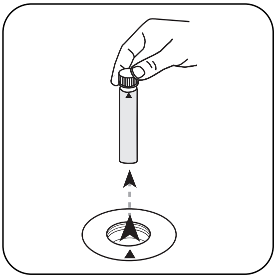
Cerrar la(s) cubeta(s).



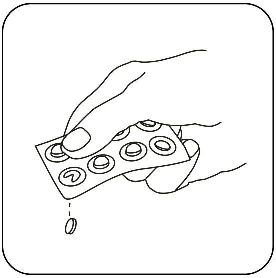
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

Zero

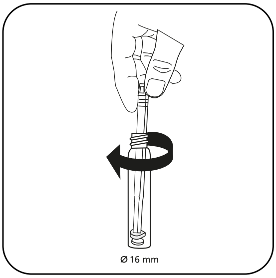
Pulsar la tecla **ZERO**.



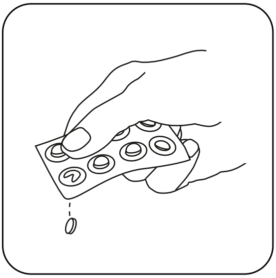
Extraer la **cubeta** del compartimiento de medición.



Añadir **tableta Chlorine HR (KI)**.

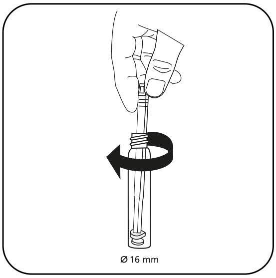


Triturar la(s) tableta(s) girando ligeramente.

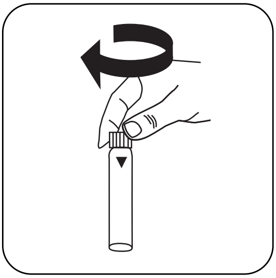


Añadir **tableta ACIDIFYING GP**.

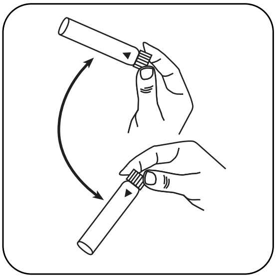
ES



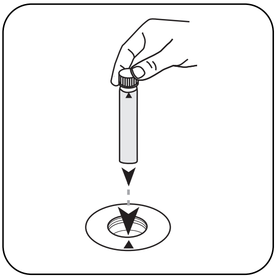
Triturar la(s) tableta(s) girando ligeramente.



Cerrar la(s) cubeta(s).



Disolver la(s) tableta(s) girando.



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

Test

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

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

Método químico

KI / ácido

Apéndice

Interferencia

Interferencias persistentes

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

Validación del método

Límite de detección	1.29 mg/L
Límite de determinación	3.86 mg/L
Límite del rango de medición	200 mg/L
Sensibilidad	83.96 mg/L / Abs
Intervalo de confianza	1.14 mg/L
Desviación estándar	0.45 mg/L
Coeficiente de variación	0.45 %

Derivado de

EN ISO 7393-3

Dióxido de cloro T M120

0.02 - 11 mg/L ClO_2 CLO2

DPD / Glicina

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
DPD nº1	Tabletas / 100	511050BT
DPD nº 1	Tabletas / 250	511051BT
DPD nº 1	Tabletas / 500	511052BT
DPD nº 3	Tabletas / 100	511080BT
DPD nº 3	Tabletas / 250	511081BT
DPD nº 3	Tabletas / 500	511082BT
Glicina f)	Tabletas / 100	512170BT
Glicina f)	Tabletas / 250	512171BT
DPD nº 3 High Calcium e)	Tabletas / 100	515730BT
DPD nº 3 High Calcium e)	Tabletas / 250	515731BT
DPD nº 3 High Calcium e)	Tabletas / 500	515732BT
DPD nº 1 High Calcium e)	Tabletas / 100	515740BT
DPD nº 1 High Calcium e)	Tabletas / 250	515741BT
DPD nº 1 High Calcium e)	Tabletas / 500	515742BT
Juego DPD nº 1/nº 3#	100 cada	517711BT
Juego DPD nº 1/nº 3#	250 cada	517712BT
Juego DPD nº 1/glicina #	100 cada	517731BT
Juego DPD nº 1/glicina #	250 cada	517732BT
Juego DPD nº 1/nº 3 High Calcium#	100 cada	517781BT
Juego DPD nº 1/nº 3 High Calcium#	250 cada	517782BT
DPD nº 3 Evo	Tabletas / 100	511420BT
DPD nº 3 Evo	Tabletas / 250	511421BT
DPD nº 3 Evo	Tabletas / 500	511422BT

Muestreo

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

Preparación

1. Limpieza de las cubetas:
   Muchos productos de limpieza (p. ej., detergentes de lavavajillas) poseen componentes reductores, que pueden reducir los resultados en la determinación del Dióxido de cloro. Para evitar estas alteraciones, los aparatos de vidrio deben estar exentos de componentes corrosivos al cloro. Para ello, deberá sumergir los aparatos de vidrio durante una hora en una solución de hipoclorito sódico (0,1 g/L), enjuagándolos minuciosamente a continuación con agua desionizada.
2. Las muestras acuosas muy ácidas o muy básicas se deberán neutralizar a un valor de pH entre 6 y 7 antes de realizar el análisis (con 0,5 mol/l de ácido sulfúrico o 1 mol/l de hidróxido sódico).

Notas

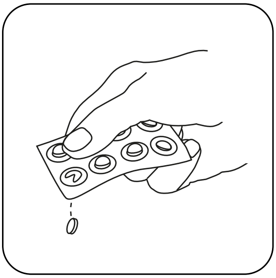
1. Las tabletas EVO pueden utilizarse como alternativa a la tableta estándar correspondiente (por ejemplo, DPD nº 3 EVO en lugar de DPD nº 3).

Ejecución de la determinación Dióxido de cloro con tableta, en presencia de cloro

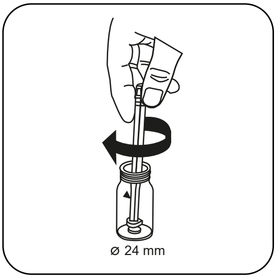
Seleccionar el método en el aparato.

Seleccione además la determinación: junto a cloro

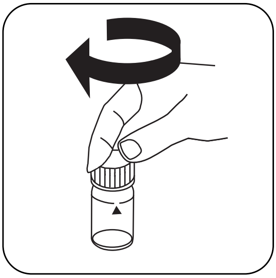
Llenar la cubeta de 24 mm con **10 mL de muestra** .



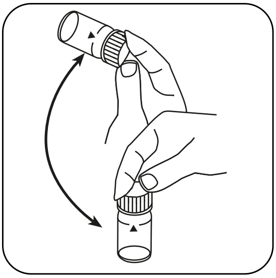
Añadir **tableta GLYCINE**.



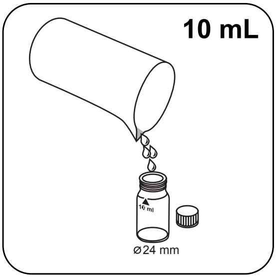
Triturar la(s) tableta(s) girando ligeramente.



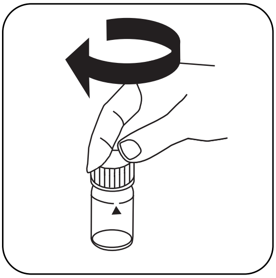
Cerrar la(s) cubeta(s).



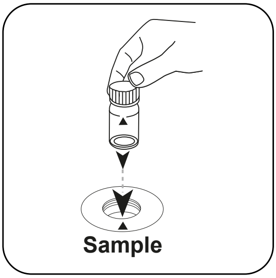
Disolver la(s) tableta(s) girando.



Llenar una **segunda cubeta** con **10 mL de muestra**.



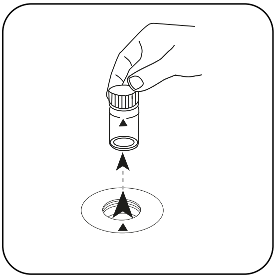
Cerrar la(s) cubeta(s).



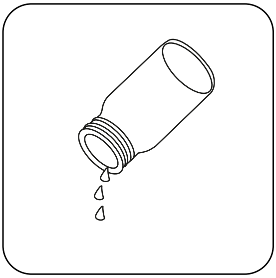
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

Zero

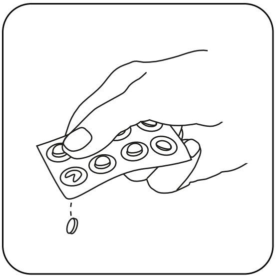
Pulsar la tecla **ZERO**.



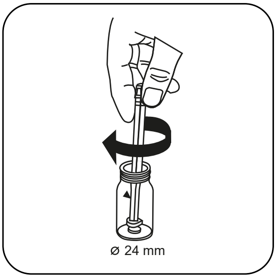
Extraer la cubeta del compartimiento de medición.



Vaciar la cubeta.

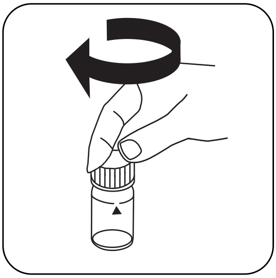


Añadir **tableta DPD No. 1**.

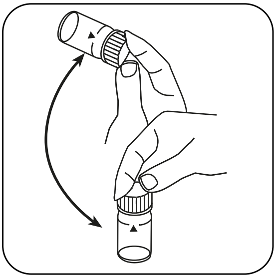


Triturar la(s) tableta(s) girando ligeramente.

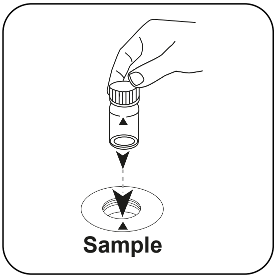
Llenar la **solución de glicina** preparada en la cubeta preparada.



Cerrar la(s) cubeta(s).



Disolver la(s) tableta(s) girando.



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

Test

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

A continuación se visualizará el resultado en mg/L Dióxido de cloro.

Evaluación

La siguiente tabla muestra cómo los valores de salida se pueden convertir a otros formularios de citas.

Unidad	Conversión	Factor de conversión
mg/l	ClO_2	1
mg/l	Cl_2 frei	0.525
mg/l	Cl_2 geb.	0.525
mg/l	ges. Cl_2	0.525

Método químico

DPD / Glicina

Apéndice

Interferencia

Interferencias persistentes

1. Todos los elementos oxidantes existentes en la muestra producen un resultado más elevado.

Interferencias extraibles

1. Las concentraciones de dióxido de cloro mayores a 19 mg/L pueden conducir a resultados de dentro del campo de medición hasta 0 mg/L. En este caso, se deberá diluir la muestra acuosa con agua libre de dióxido de cloro. Se mezclan 10 ml de muestra diluida con reactivo y se repite la medición.

Derivado de

DIN 38408, parte 5

(e) Reactivo auxiliar, alternativo a DPD No.1/3 en enturbiamientos de la prueba debido a concentraciones elevadas de calcio y/o elevada conductividad | (f) Reactivo auxiliar, necesario adicionalmente para la determinación de bromo, dióxido de cloro y ozono en presencia de cloro

Cobre T M150

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

Biquinolina

Material

Material requerido (parcialmente opcional):

Reactivos	**Unidad de embalaje**	**No. de referencia**
Cobre nº 1	Tabletas / 100	513550BT
Cobre nº 1	Tabletas / 250	513551BT
Cobre nº 2	Tabletas / 100	513560BT
Cobre nº 2	Tabletas / 250	513561BT
Juego cobre nº 1/nº 2[#]	100 cada	517691BT
Juego cobre nº 1/nº 2[#]	250 cada	517692BT
ValidCheck cobre 2 mg/l	1 Cantidad	48141525

Preparación

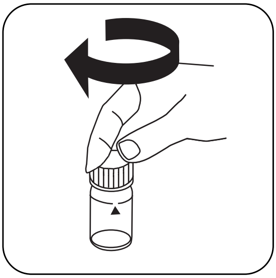
1. Las muestras acuosas muy alcalinas o muy ácidas se deberán neutralizar a un valor de pH de 4 a 6.

Ejecución de la determinación Cobre libre con tableta

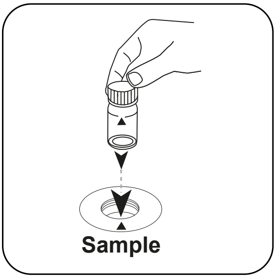
Seleccionar el método en el aparato.

Seleccione además la determinación: libre

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



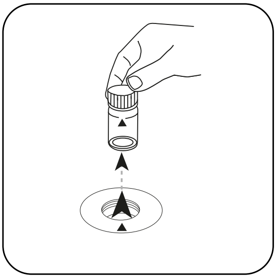
Cerrar la(s) cubeta(s).



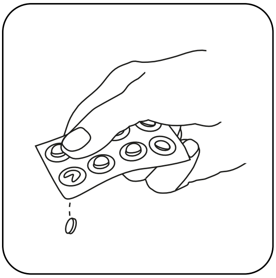
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

Zero

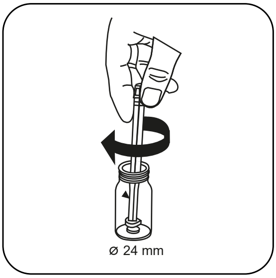
Pulsar la tecla **ZERO**.



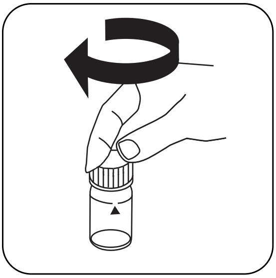
Extraer la cubeta del compartimiento de medición.



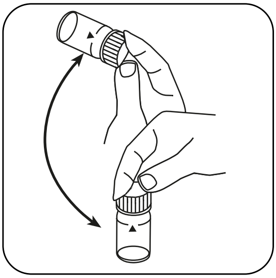
Añadir **tableta COPPER No. 1**.



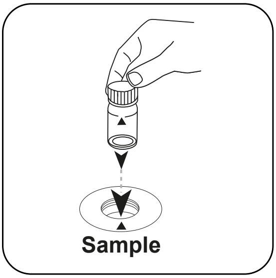
Triturar la(s) tableta(s) girando ligeramente.



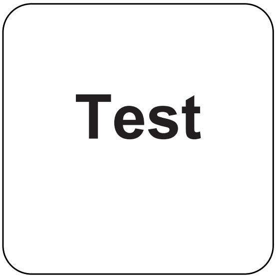
Cerrar la(s) cubeta(s).



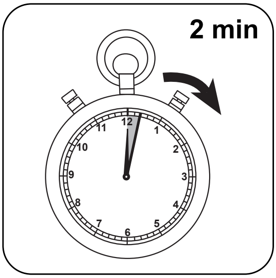
Disolver la(s) tableta(s) girando.



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



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



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

Finalizado el periodo de reacción se realizará la determinación automáticamente.

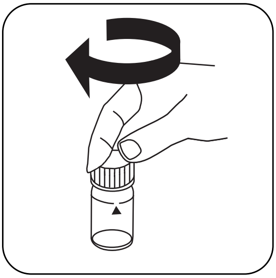
A continuación se visualizará el resultado en mg/L Cobre libre.

Ejecución de la determinación Cobre total con tableta

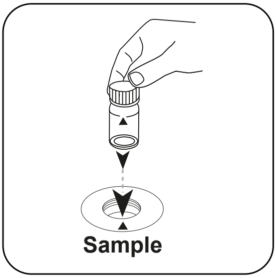
Seleccionar el método en el aparato.

Seleccione además la determinación: total

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



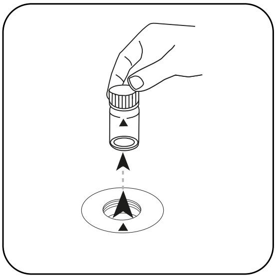
Cerrar la(s) cubeta(s).



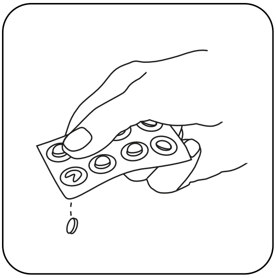
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

Zero

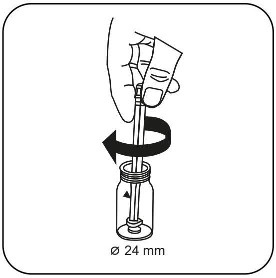
Pulsar la tecla **ZERO**.



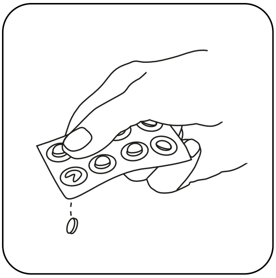
Extraer la cubeta del compartimiento de medición.



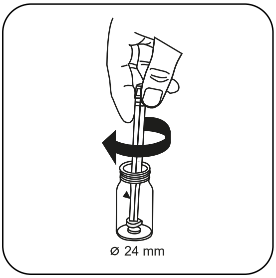
Añadir **tableta COPPER No. 1**.



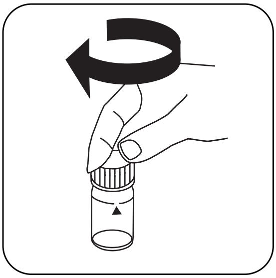
Triturar la(s) tableta(s) girando ligeramente y disolver.



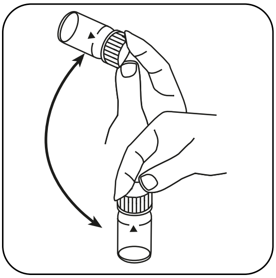
Añadir **tableta COPPER No. 2**.



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

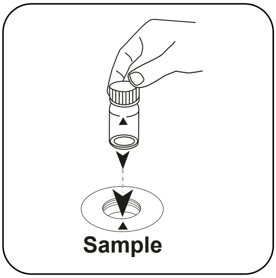


Cerrar la(s) cubeta(s).



Disolver la(s) tableta(s) girando.

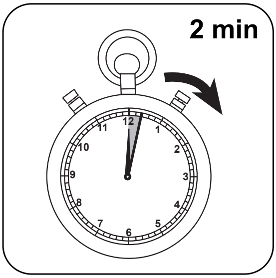
ES



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

Test

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



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

Finalizado el periodo de reacción se realizará la determinación automáticamente.

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

Método químico

Biquinolina

Apéndice

Interferencia

Interferencias persistentes

1. Cianuro CN^- y Plata Ag^+ perturban la determinación.

Validación del método

Límite de detección	0.05 mg/L
Límite de determinación	0.15 mg/L
Límite del rango de medición	5 mg/L
Sensibilidad	3.8 mg/L / Abs
Intervalo de confianza	0.026 mg/L
Desviación estándar	0.011 mg/L
Coeficiente de variación	0.42 %

Bibliografía

Photometrische Analyse, Lange/Vedjelek, Verlag Chemie 1980

[a] Posible determinación de libre, combinado, total

Hierro en Mo PP M224

0.01 - 1.8 mg/L Fe FEM

TPTZ

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Juego de reactivo para Fe en MO VARIO	1 Set	536010

Muestreo

1. Realizar la toma de muestras en botellas de vidrio o plástico limpias. Éstas deben haberse limpiado con 6 N (1:1) de ácido clorhídrico y a continuación con agua desionizada.
2. Para que la muestra se conserve para un análisis posterior, el valor de pH debe reducirse por debajo de 2. Para ello, añadir 2 ml aprox. de ácido clorhídrico concentrado por litro de muestra. Si la muestra se analiza directamente, no es necesaria la adición.
3. Para determinar el hierro disuelto, la muestra debe filtrarse con un filtro de 0,45µm o comparable, inmediatamente después de la toma de la muestra y antes de la acidificación.
4. Las muestras conservadas no deben almacenarse más de 6 meses a temperatura ambiente.
5. Antes del análisis debe ajustarse el valor de pH añadiendo 5 N de hidróxido sódico, a un valor entre 3 – 5. No debe superarse un valor de pH de 5, ya que puede causar precipitaciones de hierro.
6. El resultado debe corregirse debido a las adiciones de volumen.

Preparación

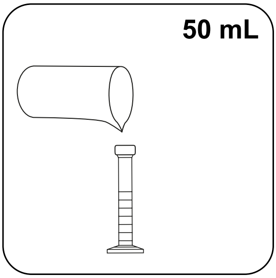
1. Limpiar todos los aparatos con producto limpiador y a continuación enjuagar con agua corriente. Después limpiar de nuevo con ácido clorhídrico (1:1) y con agua desionizada. Siguiendo estos pasos se eliminan los sedimentos que pueden producir muy fácilmente resultados superiores.
2. Si la muestra contiene 100 mg/L o más de molibdato (MoO_4^{2-}), la medición de la muestra debe realizarse inmediatamente después de la medición cero.
3. Para obtener unos resultados más exactos, puede determinarse un ensayo en blanco reactivo para cada nuevo lote de reactivos. Para ello, proceder según se describe, pero usando agua desionizada en lugar de la muestra. El valor de medición obtenido se resta de los valores de medición calculados con este lote.

Notas

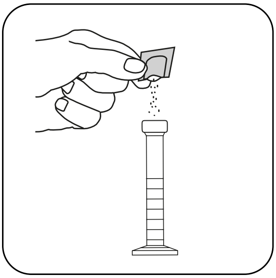
1. En presencia de hierro se forma un color azul. Una cantidad pequeña de polvo sin disolver no influye sobre el resultado.

Ejecución de la determinación Hierro, total (Fe en Mo) en presencia de molibdato con sobres de polvos Vario

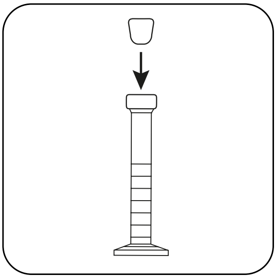
Seleccionar el método en el aparato.



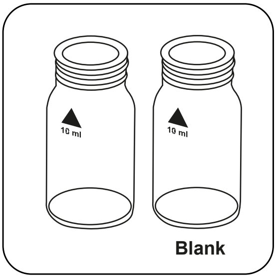
Añadir **50 mL de muestra** en un cilindro de mezcla de 50 mL.



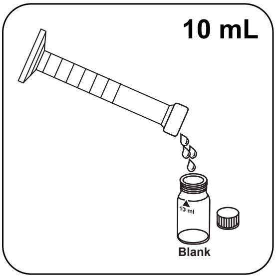
Añadir un **sobre de polvos Vario (Fe in Mo) Rgt 1** .



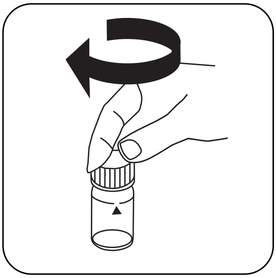
Cerrar el cilindro de mezcla con un tapón. Disolver los polvos girando.



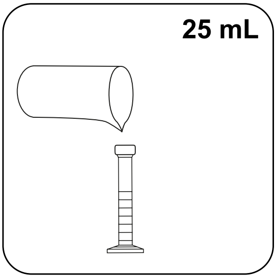
Preparar dos cubetas limpias de 24 mm. Identificar una como cubeta en blanco.



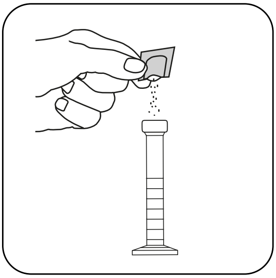
Llenar **10 mL de la muestra preparada** en la cubeta en blanco.



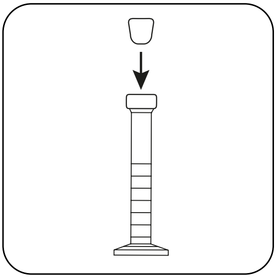
Cerrar la(s) cubeta(s).



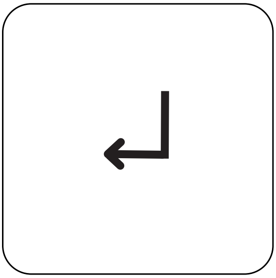
Añadir **25 mL de muestra preparada**en un cilindro de mezcla de 25 mL.



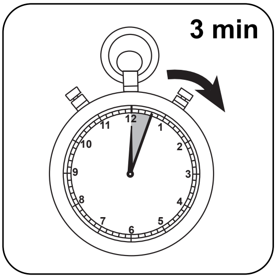
Añadir un **sobre de polvos Vario (Fe in Mo) Rgt 2** .



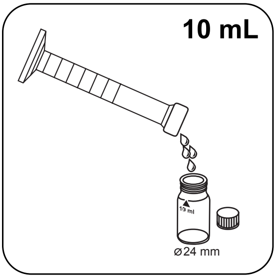
Cerrar el cilindro de mezcla con un tapón. Disolver los polvos girando.



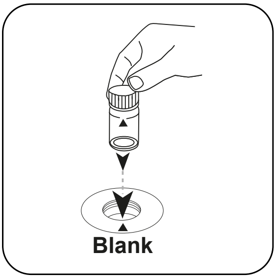
Pulsar la tecla **ENTER**.



Esperar **3 minutos como periodo de reacción**.



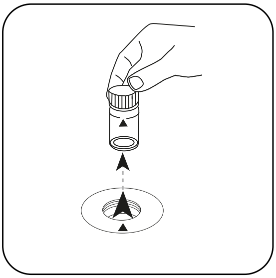
Añadir **10 mL de muestra** en la cubeta con la muestra.



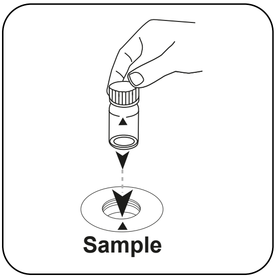
Poner la **cubeta en blanco** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

Zero

Pulsar la tecla **ZERO**.



Extraer la cubeta del compartimiento de medición.



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

Test

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

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

Método químico

TPTZ

Apéndice

Interferencia

Interferencias extraibles

1. Perturbación del valor de pH: Un pH de la muestra menor de 3 o mayor de 4 después de añadir el reactivo puede perturbar la formación del color, ya que el obtenido desaparece demasiado rápidamente o puede producirse un enturbiamiento. Por ello, el valor de pH debe ajustarse entre 3 y 5 en el cilindro de medición antes de añadir el reactivo:
   Añadir gota a gota una cantidad apropiada de un ácido o base sin hierro como 1 N ácido sulfúrico o 1 N hidróxido sódico.
   Debe realizarse una corrección del volumen si se añadió una cantidad importante de ácido o base.

Bibliografía

G. Frederic Smith Chemical Co., The Iron Reagents, 3rd ed. (1980)

Hierro LR L (A) M225

0.03 - 2 mg/L Fe FE

Ferrocina / Tioglicolato

Material

Material requerido (parcialmente opcional):

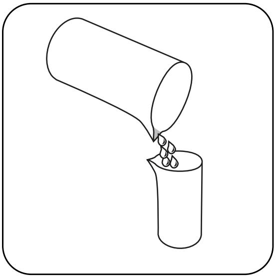
Reactivos	Unidad de embalaje	No. de referencia
Acidez / Alcalinidad P Indicador PA1	65 mL	56L013565
Tampón de dureza cálcica CH2	65 mL	56L014465
KP962-Polvo de persulfato amónico	Polvos / 40 g	56P096240
KS63-FE6-Tioglicolato/molibdato HR RGT	30 mL	56L006330
KS63-FE6-Tioglicolato/molibdato HR RGT	65 mL	56L006365
KS61-FE5-Ferrocina/tioglicolato	65 mL	56L006165

Preparación

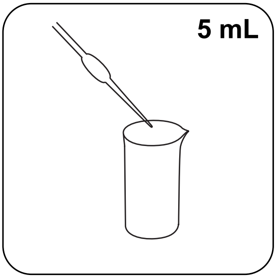
1. Si existen en la muestra formadores de complejos fuertes, debe prolongarse el periodo de reacción hasta que no pueda apreciarse ninguna colorea. Los complejos de hierro muy fuertes no se registran en la medición. En este caso deben destruirse los formadores de complejos mediante oxidación con ácido/persulfato y neutralizarse a continuación la muestra con pH 6 – 9.
2. Para la determinación de todo el hierro disuelto y en suspensión, la muestra debe hervirse con ácido/persulfato. Neutralice a continuación con pH 6 – 9 y rellene con agua desionizada de nuevo hasta el volumen original.

Disgregación

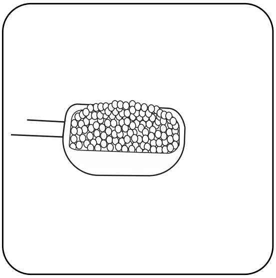
El hierro total se compone de hierro soluble, complejado y suspendido. La muestra no debe filtrarse antes de la medición. Para garantizar una homogeneización de la muestra, las partículas sedimentadas deben distribuirse uniformemente agitando enérgicamente, inmediatamente antes de tomar la muestra. Para la determinación del hierro soluble total (incluidos los compuestos de hierro complejos) es necesario el filtrado de la muestra.Los aparatos y reactivos necesarios para determinar el hierro total no se incluyen en el volumen de suministro estándar.



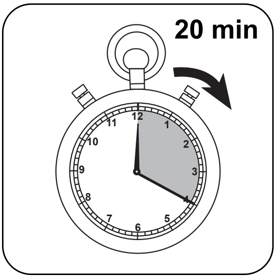
Llenar un recipiente de disgregación apropiado con **50 mL de muestra homogeneizada**.



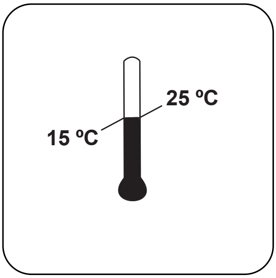
Añadir **5 mL de 1:1 ácido clorhídrico**.



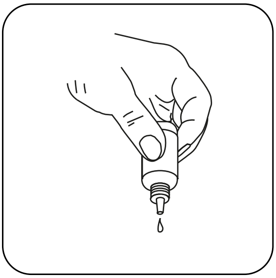
Añadir **una cuchara de KP 962 (Ammonium Persulfat Powder)**.



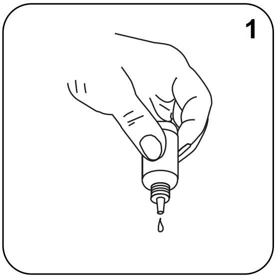
Hervir la muestra durante **20 minutos** . Debe mantenerse un volumen de muestra de 25 mL, si conviene rellenar con agua desionizada.



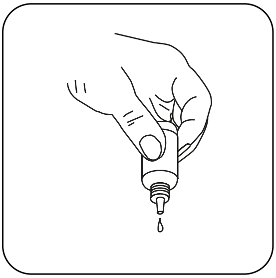
Dejar enfriar la muestra a **temperatura ambiente**.



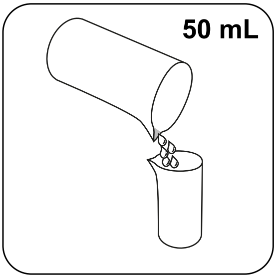
Mantener la botella cuentagotas vertical y añadir gotas del mismo tamaño presionando lentamente.



Añadir **1 gotas de Acidity / Alkalinity P Indicator PA1**.



Añadir gota a gota **Hardness Calcium Buffer CH2** en la misma muestra hasta que adquiera una coloración de rosa pálido a roja. **(¡Atención: después de añadir cada gota debe agitarse la muestra!)**



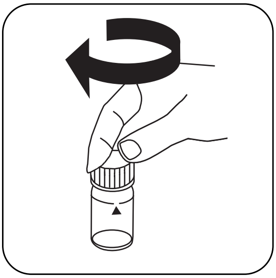
Rellenar la muestra con **agua desionizada hasta 50 mL** .

Ejecución de la determinación Hierro, total LR (A) con reactivo líquido

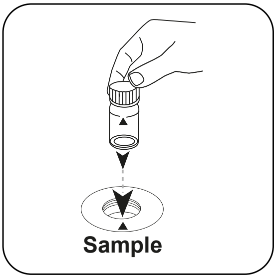
Seleccionar el método en el aparato.

Para la determinación de **Hierro, total LR realizar la disgregación** descrita.

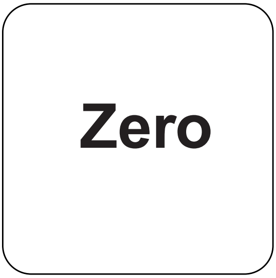
Llenar la cubeta de 24 mm con **10 mL de agua desionizada**.



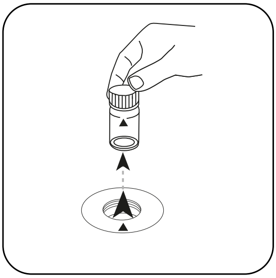
Cerrar la(s) cubeta(s).



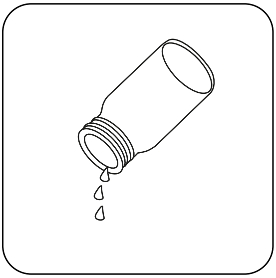
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



Pulsar la tecla **ZERO**.

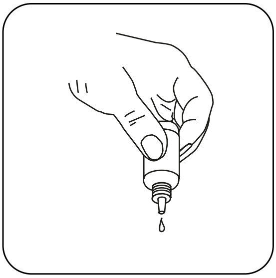


Extraer la cubeta del compartimiento de medición.

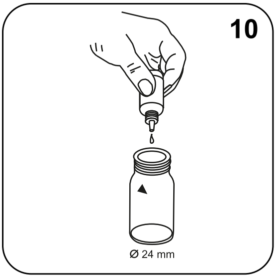


Vaciar la cubeta.

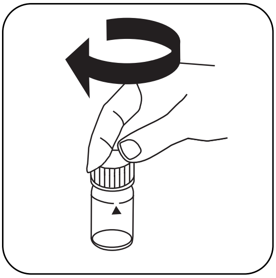
Llenar la cubeta de 24 mm con **10 mL de la muestra preparada** .



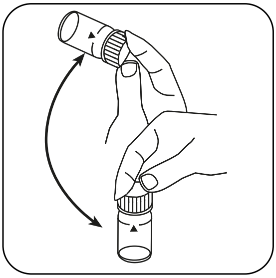
Mantener la botella cuentagotas vertical y añadir gotas del mismo tamaño presionando lentamente.



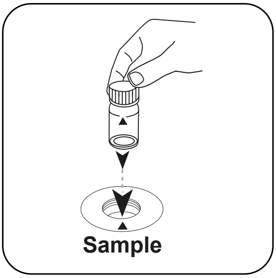
Añadir **10 gotas de Iron Reagent FE5**.



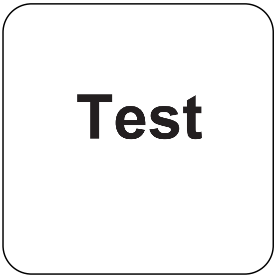
Cerrar la(s) cubeta(s).



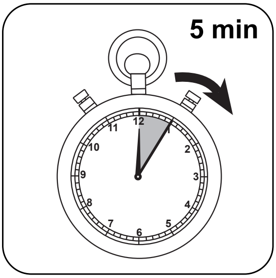
Mezclar el contenido girando.



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



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



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

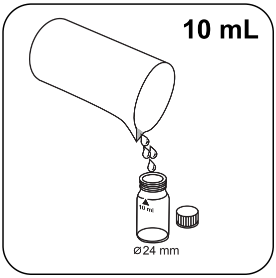
Finalizado el periodo de reacción se realizará la determinación automáticamente.

A continuación se visualizará el resultado en mg/L Hierro total o, en caso de utilizar una muestra filtrada, mg/l de Hierro soluble.

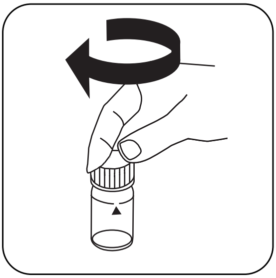
Ejecución de la determinación Hierro, LR (A) con reactivo líquido

Seleccionar el método en el aparato.

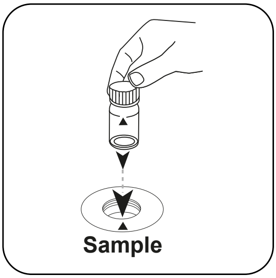
Para una determinación del hierro disuelto total, debe filtrarse la muestra antes de la determinación (porosidad 0,45 µm). De lo contrario, se determinan conjuntamente las partículas de hierro y el hierro en suspensión.



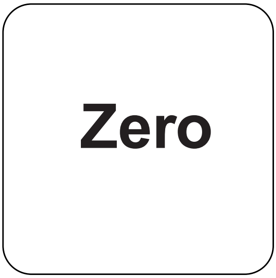
Llenar la cubeta de 24 mm con **10 mL de la muestra preparada** .



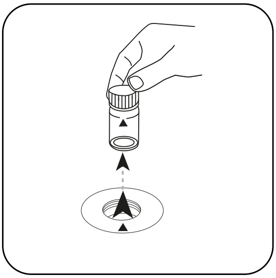
Cerrar la(s) cubeta(s).



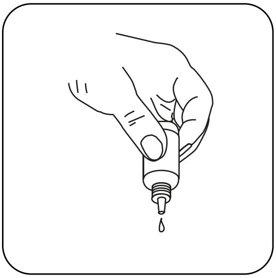
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



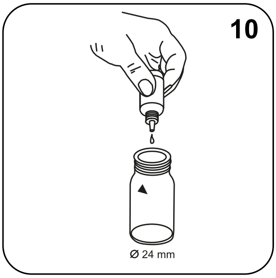
Pulsar la tecla **ZERO**.



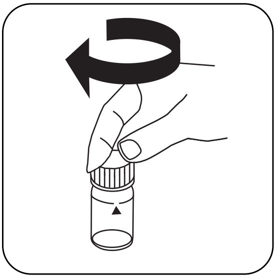
Extraer la cubeta del compartimiento de medición.



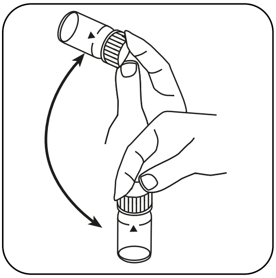
Mantener la botella cuentagotas vertical y añadir gotas del mismo tamaño presionando lentamente.



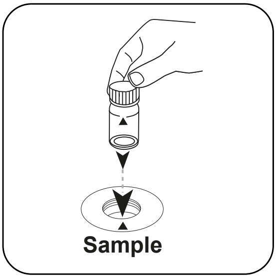
Añadir **10 gotas de Iron Reagent FE5**.



Cerrar la(s) cubeta(s).



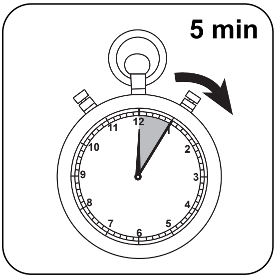
Mezclar el contenido girando.



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

Test

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



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

Finalizado el periodo de reacción se realizará la determinación automáticamente.

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

Método químico

Ferrocina / Tioglicolato

Apéndice

Interferencia

Interferencias extraibles

1. Una alta concentración de molibdato produce un color amarillo intenso cuando se usa KS61 (ferrocina/tioglicolato). En este caso, es necesario un ensayo en blanco químico:
   - Preparar dos **cubetas limpias de 24 mm**.
   - Marcar una cubeta como cubeta en blanco.
   - Añadir **10 ml de muestra** en una cubeta limpia de 24 mm (cubeta en blanco).
   - Añadir en la cubeta **10 gotas de KS63 (tioglicolato)**.
   - Cerrar la cubeta con la tapa y mezclar el contenido girando.
   - Colocar la cubeta en blanco en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!
   - Pulsar la tecla **ZERO**.
   - Extraer la cubeta del compartimiento de medición.
   - Añadir **10 ml de muestra** en una segunda cubeta limpia de 24 mm (cubeta de muestra).
   - Añadir **10 gotas de KS61 (ferrocina/tioglicolato)** y proceder como se describe en la ejecución.

Interferencia	de / [mg/L]
Co	8
Cu	2
Oxalat	500
CN^-	10
NO_2^-	

Bibliografía

D. F. Boltz and J. A. Howell, eds., Colorimetric Determination of Nonmetals, 2nd ed., Vol. 8, p. 304 (1978). Carpenter, J.F. "A New Field Method for Determining the Levels of Iron Contamination in Oilfield Completion Brine", SPE International Symposium (2004)

Molibdato LR PP M251

0.03 - 3 mg/L Mo Mo1

Complejo Ternario

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Molibdeno LR, juego VARIO	1 Cantidad	535450

Se requieren los siguientes accesorios.

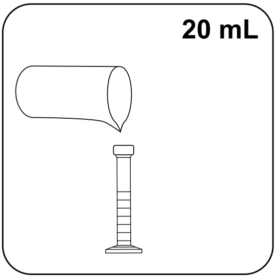
Accesorios	Unidad de embalaje	No. de referencia
Cilindro de mezcla con tapón, accesorio necesario para la determinación de molibdeno LR con MD 100 (276140)	1 Cantidad	19802650

Preparación

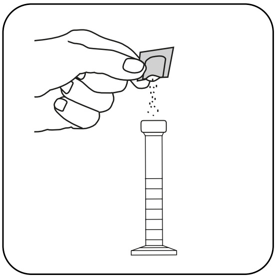
1. Las muestras acuosas muy ácidas o muy básicas se deberán neutralizar a un valor de pH entre 3 y 5 antes de realizar el análisis (con 0,5 mol/l de ácido sulfúrico o 1 mol/l de hidróxido sódico).
2. Para minimizar errores por residuos, lavar antes de usarlos los aparatos de vidrio necesarios con una solución de ácido clorhídrico (aprox. 20%), enjuagándolos a continuación con agua desionizada.

Ejecución de la determinación Molibdato LR con sobres de polvos Vario

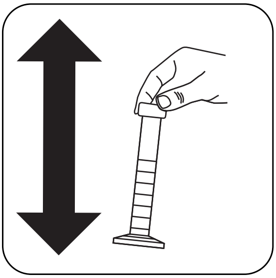
Seleccionar el método en el aparato.



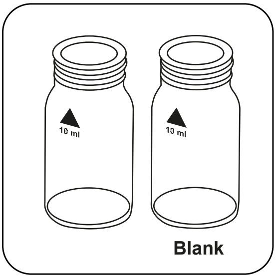
Añadir **20 mL de muestra** en un cilindro de mezcla de 25 mL.



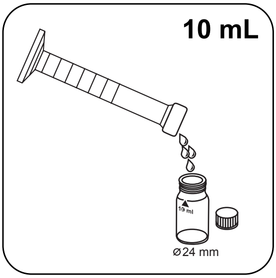
Añadir un **sobre de polvos Vario Molybdenum 1 LR F20** .



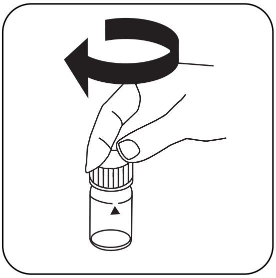
Cerrar el cilindro de mezcla con un tapón. Disolver los polvos agitando.



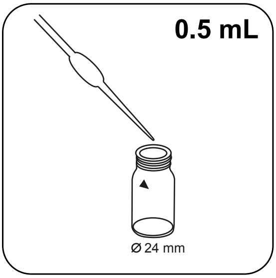
Preparar dos cubetas limpias de 24 mm. Identificar una como cubeta en blanco.



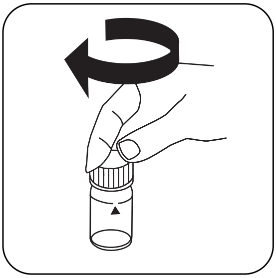
Añadir en cada cubeta **10 mL de muestra**.



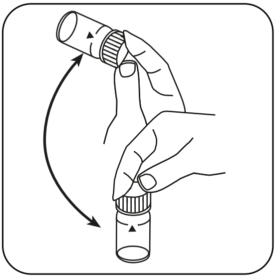
Cerrar firmemente la **cubeta en blanco**.



Añadir **0.5 mL de solución Molybdenum 2 LR** en la cubeta de muestra.



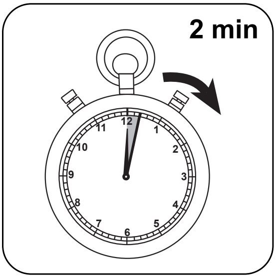
Cerrar la(s) cubeta(s).



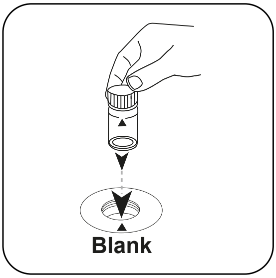
Mezclar el contenido girando.

↵

Pulsar la tecla **ENTER**.



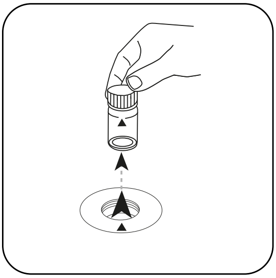
Esperar **2 minutos como periodo de reacción**.



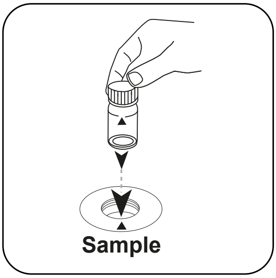
Poner la **cubeta en blanco** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

Zero

Pulsar la tecla **ZERO**.



Extraer la cubeta del compartimiento de medición.



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

Test

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

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

Evaluación

La siguiente tabla muestra cómo los valores de salida se pueden convertir a otros formularios de citas.

Unidad	Conversión	Factor de conversión
mg/l	MoO_4	1
mg/l	Mo	0.6
mg/l	Na_2MoO_4	1.29

Método químico

Complejo Ternario

Apéndice

Interferencia

Interferencia	de / [mg/L]	Influencia
Al	50	
Cr	1000	
Fe	50	
Ni	50	
NO_2^-	en todas las cantidades	
Cu	10	Leads to higher readings with a response time of more than 5 minutes

Bibliografía

Analytical Chemistry, 25(9) 1363 (1953)

Molibdato HR L M254

1 - 100 mg/L MoO_4 Mo2

Tioglicolato

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
KS63-FE6-Tioglicolato/molibdato HR RGT	65 mL	56L006365

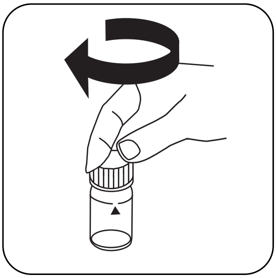
Muestreo

1. La determinación se ha de realizar inmediatamente después de la toma de la muestra. El molibdato se deposita en las paredes del recipiente de toma de la muestra, lo que produce unos resultados menores.

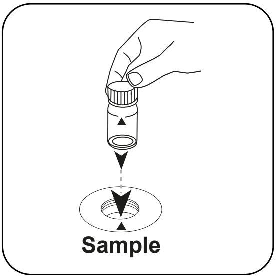
Ejecución de la determinación Molibdato HR con reactivo líquido

Seleccionar el método en el aparato.

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



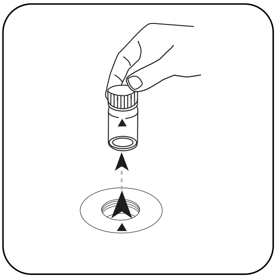
Cerrar la(s) cubeta(s).



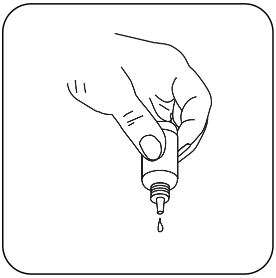
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

Zero

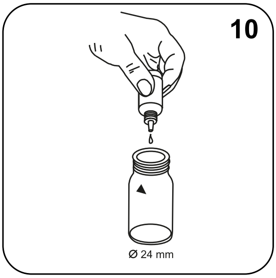
Pulsar la tecla **ZERO**.



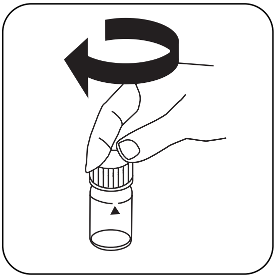
Extraer la cubeta del compartimiento de medición.



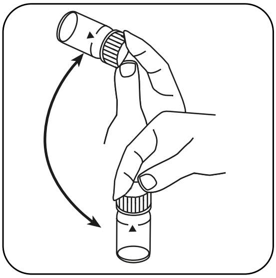
Mantener la botella cuentagotas vertical y añadir gotas del mismo tamaño presionando lentamente.



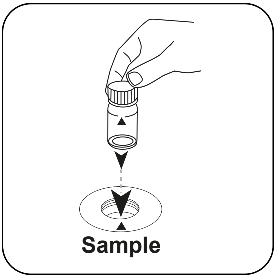
Añadir **10 gotas de Iron Reagent FE6**.



Cerrar la(s) cubeta(s).



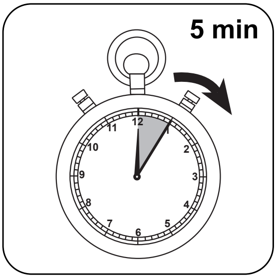
Mezclar el contenido girando.



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

Test

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



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

Finalizado el periodo de reacción se realizará la determinación automáticamente.

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

Evaluación

La siguiente tabla muestra cómo los valores de salida se pueden convertir a otros formularios de citas.

Unidad	Conversión	Factor de conversión
mg/l	MoO_4	1
mg/l	Mo	0.6
mg/l	Na_2MoO_4	1.29

Método químico

Tioglicolato

Apéndice

Interferencia

Interferencias extraibles

1. La perturbación de niobio, tántalo, titanio y circonio se enmascara con ácido cítrico.
2. La perturbación de vanadio (V) se enmascara con fluoruro potásico.

Bibliografía

Photometrische Analyse, Lange/ Vjedelek, Verlag Chemie 1980

Ozono T M300

0.02 - 2 mg/L O_3 O3

DPD / Glicina

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
DPD nº1	Tabletas / 100	511050BT
DPD nº 1	Tabletas / 250	511051BT
DPD nº 1	Tabletas / 500	511052BT
DPD nº 3	Tabletas / 100	511080BT
DPD nº 3	Tabletas / 250	511081BT
DPD nº 3	Tabletas / 500	511082BT
DPD nº 1 High Calcium e)	Tabletas / 100	515740BT
DPD nº 1 High Calcium e)	Tabletas / 250	515741BT
DPD nº 1 High Calcium e)	Tabletas / 500	515742BT
DPD nº 3 High Calcium e)	Tabletas / 100	515730BT
DPD nº 3 High Calcium e)	Tabletas / 250	515731BT
DPD nº 3 High Calcium e)	Tabletas / 500	515732BT
Glicina f)	Tabletas / 100	512170BT
Glicina f)	Tabletas / 250	512171BT
Juego DPD nº 1/nº 3#	100 cada	517711BT
Juego DPD nº 1/nº 3#	250 cada	517712BT
Juego DPD nº 1/nº 3 High Calcium#	100 cada	517781BT
Juego DPD nº 1/nº 3 High Calcium#	250 cada	517782BT
Juego DPD nº 1/glicina #	100 cada	517731BT
Juego DPD nº 1/glicina #	250 cada	517732BT

Preparación

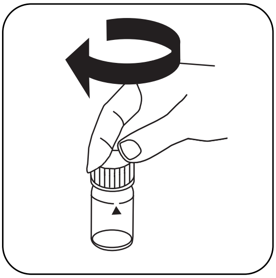
1. Limpieza de las cubetas:
   Muchos productos de limpieza (p. ej., detergentes de lavavajillas) poseen componentes reductores, que pueden reducir los resultados en la determinación siguiente de oxidantes (p. ej., ozono, cloro). Para evitar estas alteraciones, los aparatos de vidrio deben estar exentos de componentes corrosivos al cloro. Para ello, deberá sumergir los aparatos de vidrio durante una hora en una solución de hipoclorito sódico (0,1 g/L), enjuagándolos minuciosamente a continuación con agua desionizada.
2. Evitar durante la preparación de la muestra la desgasificación de ozono, p. ej., al pipetar o agitar. La determinación se ha de realizar inmediatamente después de la toma de la muestra.
3. Las muestras acuosas muy ácidas o muy básicas se deberán neutralizar a un valor de pH entre 6 y 7 antes de realizar el análisis (con 0,5 mol/l de ácido sulfúrico o 1 mol/l de hidróxido sódico).

Ejecución de la determinación Ozono, con tableta en presencia de cloro

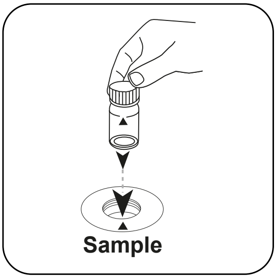
Seleccionar el método en el aparato.

Seleccione además la determinación: en presencia de Cloro

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



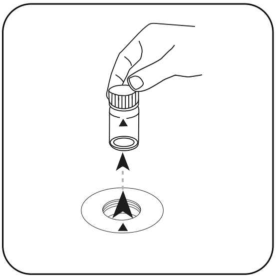
Cerrar la(s) cubeta(s).



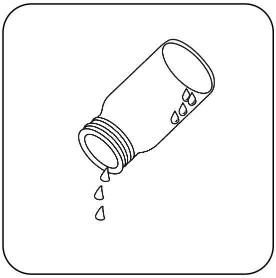
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

Zero

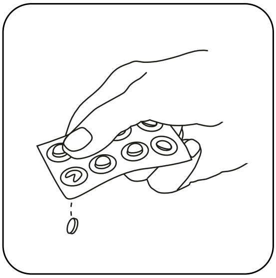
Pulsar la tecla **ZERO**.



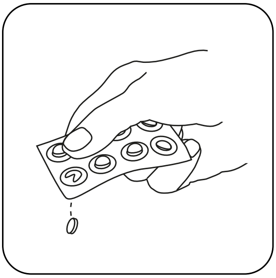
Extraer la cubeta del compartimiento de medición.



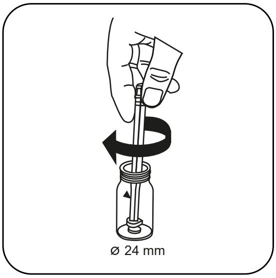
Vaciar la cubeta excepto algunas gotas.



Añadir **tableta DPD No. 1**.

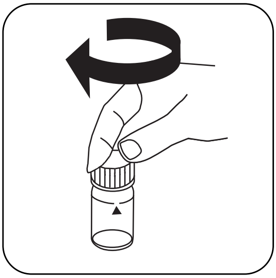


Añadir **tableta DPD No. 3**.

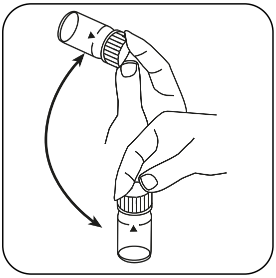


Triturar la(s) tableta(s) girando ligeramente.

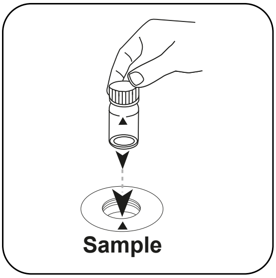
Llenar la cubeta con la **muestra** hasta la **marca de 10 mL** .



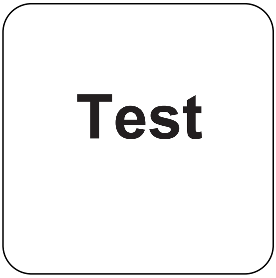
Cerrar la(s) cubeta(s).



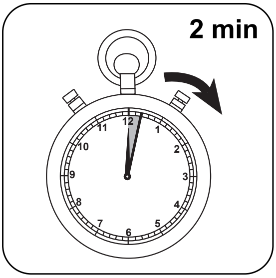
Disolver la(s) tableta(s) girando.



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

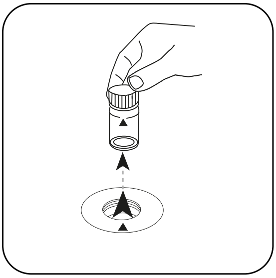


Pulsar la tecla **TEST** (XD: **START**).

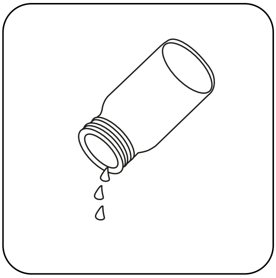


Esperar **2 minutos como periodo de reacción**.

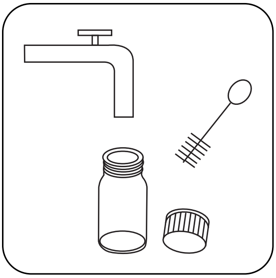
Finalizado el periodo de reacción se realizará la determinación automáticamente.



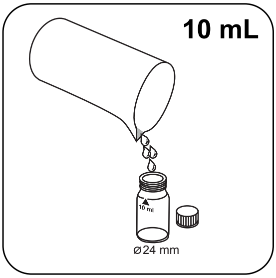
Extraer la cubeta del compartimiento de medición.



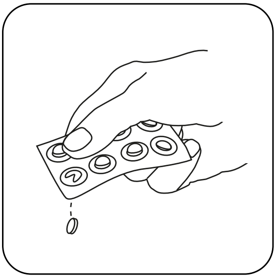
Vaciar la cubeta.



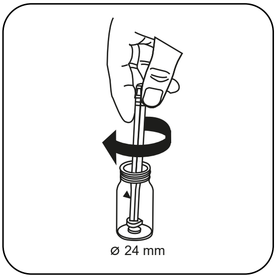
Limpiar a fondo la cubeta y la tapa.



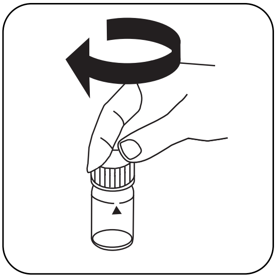
Llenar una **segunda cubeta** con **10 mL de muestra**.



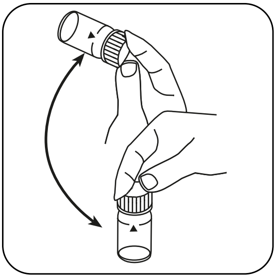
Añadir **tableta GLYCINE**.



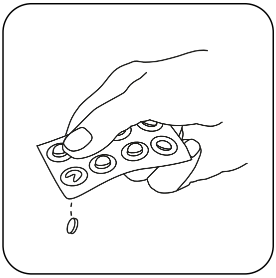
Triturar la(s) tableta(s) girando ligeramente.



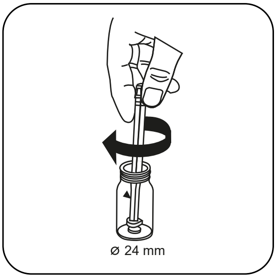
Cerrar la(s) cubeta(s).



Disolver la(s) tableta(s) girando.

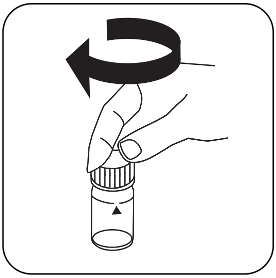


Añadir **una tableta DPD No. 1** y **una tableta DPD No. 3** directamente de su envoltura, en la primera cubeta.

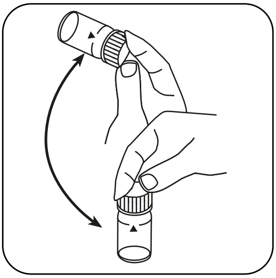


Triturar la(s) tableta(s) girando ligeramente.

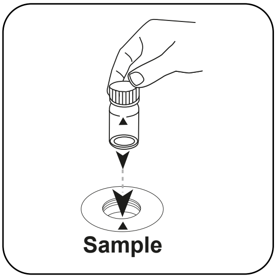
Llenar la **solución de glicina** preparada en la cubeta preparada.



Cerrar la(s) cubeta(s).



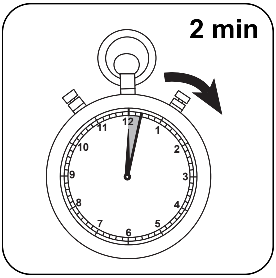
Disolver la(s) tableta(s) girando.



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

Test

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



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

Finalizado el periodo de reacción se realizará la determinación automáticamente.

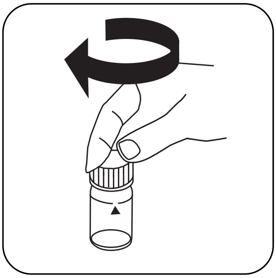
A continuación se visualizará el resultado en mg/L Ozono; mg/l cloro total.

Ejecución de la determinación Ozono, con tableta en ausencia de cloro

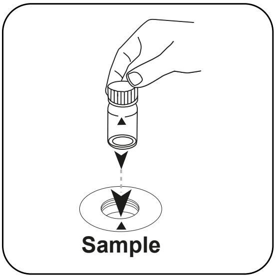
Seleccionar el método en el aparato.

Seleccione además la determinación: sin cloro

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



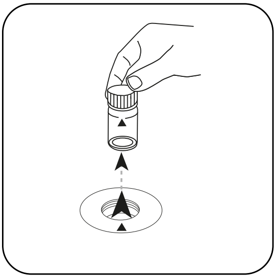
Cerrar la(s) cubeta(s).



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

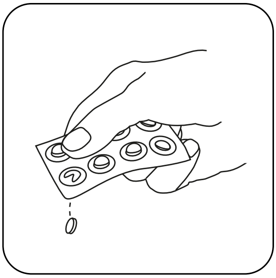
Zero

Pulsar la tecla **ZERO**.

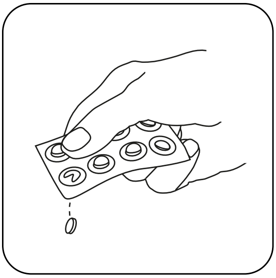


Extraer la cubeta del compartimiento de medición.

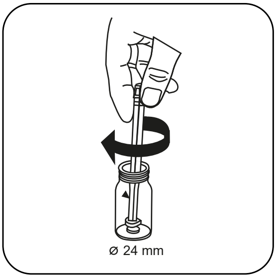
Vaciar la cubeta excepto algunas gotas.



Añadir **tableta DPD No. 1**.

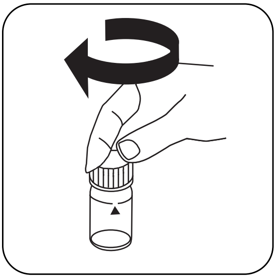


Añadir **tableta DPD No. 3**.

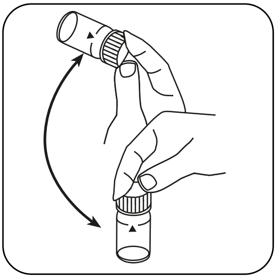


Triturar la(s) tableta(s) girando ligeramente.

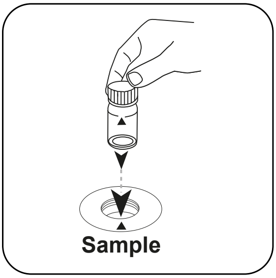
Llenar la cubeta con la **muestra** hasta la **marca de 10 mL** .



Cerrar la(s) cubeta(s).



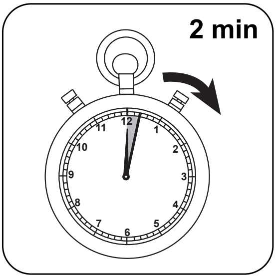
Disolver la(s) tableta(s) girando.



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

Test

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



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

Finalizado el periodo de reacción se realizará la determinación automáticamente.

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

Evaluación

La siguiente tabla muestra cómo los valores de salida se pueden convertir a otros formularios de citas.

Unidad	Conversión	Factor de conversión
mg/l	O_3	1
mg/l	Cl_2	1.4771

Método químico

DPD / Glicina

Apéndice

Interferencia

Interferencias persistentes

1. Todos los elementos oxidantes existentes en la muestra reaccionan como el cloro, lo que produce un resultado más elevado.
2. Las concentraciones de peróxido de ozono mayores a 6 mg/L pueden conducir a resultados de dentro del campo de medición hasta 0 mg/L. En este caso, se deberá diluir la muestra acuosa. Se mezclan 10 ml de muestra diluida con reactivo y se repite la medición (prueba de plausibilidad).

Bibliografía

Colorimetric Chemical Analytical Methods, 9th Edition, Lovibond

Derivado de

DIN 38408-3:2011-04

[e)] Reactivo auxiliar, alternativo a DPD No.1/3 en enturbiamientos de la prueba debido a concentraciones elevadas de calcio y/o elevada conductividad | [f)] Reactivo auxiliar, necesario adicionalmente para la determinación de bromo, dióxido de cloro y ozono en presencia de cloro

Poliacrilato L M338

1 - 30 mg/L Polyacryl POLY

Turbidez

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Cartucho C18	1 Cantidad	56A020101
KS173-P2-2,4 Indicador de dinitrofenol	65 mL	56L017365
KS183-QA2-MO1-P3-Ácido nítrico	65 mL	56L018365
Polyacrylate L Reagent Set	1 Cantidad	56R019165
KS336-Propan-2-ol, 65 mL	65 mL	56L033665

Se requieren los siguientes accesorios.

Accesorios	Unidad de embalaje	No. de referencia
Pipette, 1000 µl	1 Cantidad	365045
Puntas de pipetas, 0,1-1 ml (azules) 1.000 unidades	1 Cantidad	419073

Preparación

- **Preparación del cartucho:**

1. Extraer el émbolo de una jeringuilla apropiada. Fijar el cartucho C18 en el cilindro de la jeringuilla.
2. Añadir 5 ml de KS336 (alcohol isopropílico) en el cilindro de la jeringuilla.
3. Presionar el disolvente gota a gota a través del cartucho por medio del émbolo.
4. Extraer el disolvente circulado.
5. Extraer de nuevo el émbolo. Llenar el cilindro de la jeringuilla con 20 ml de agua desionizada.
6. Presionar el contenido gota a gota a través del cartucho por medio del émbolo.
7. Descartar el agua desionizada circulada.
8. Ahora el cartucho está listo para usarse.

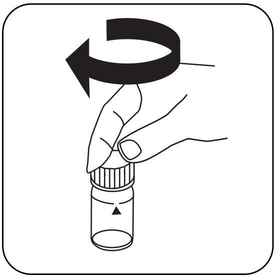
Notas

1. Si a pesar de la dosificación correcta de las muestras y reactivos no se forma enturbiamiento o solo ligero, es necesaria una concentración superior de la muestra para detectar poliacrilato/polímero.
2. Pueden producirse resultados diferentes si existen perturbaciones debido a componentes o contaminaciones de las muestras. En estos casos es necesaria la eliminación de las perturbaciones.
3. El método fue incluido utilizando ácido poliacrílico 2100 de sales de sodio en el rango de 1-30 mg/L. Otros poliacrilatos/polímeros proporcionan resultados diferentes, por lo que puede variar el rango de medición.

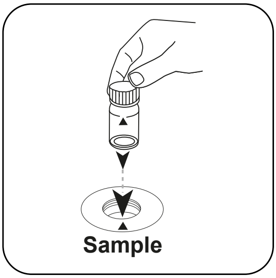
Ejecución de la determinación Poliacrilato con reactivo líquido

Seleccionar el método en el aparato.

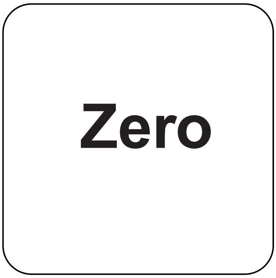
Llenar la cubeta de 24 mm con **10 mL de muestra** .



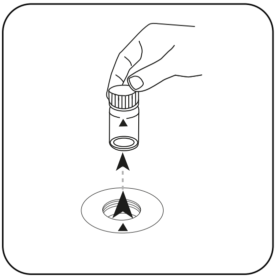
Cerrar la(s) cubeta(s).



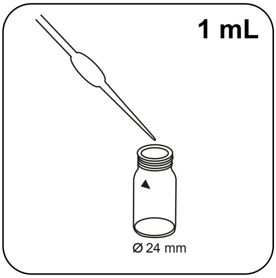
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



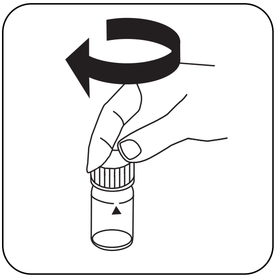
Pulsar la tecla **ZERO**.



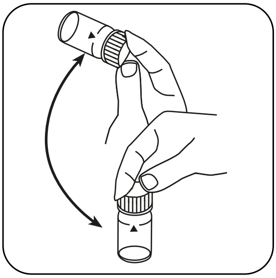
Extraer la cubeta del compartimiento de medición.



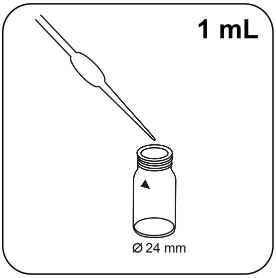
Añadir **1 mL de solución (25 drops) Polyacrylate Buffer A1** en la cubeta de muestra.



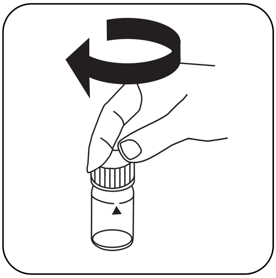
Cerrar la(s) cubeta(s).



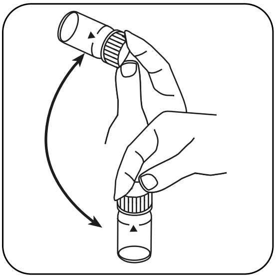
Mezclar el contenido girando.



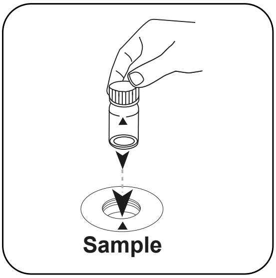
Añadir **1 mL de solución (25 drops) Polyacrylate Precipitant A2** en la cubeta de muestra.



Cerrar la(s) cubeta(s).



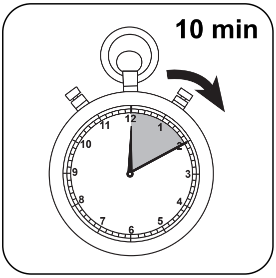
Mezclar el contenido girando.



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

Test

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



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

Finalizado el periodo de reacción se realizará la determinación automáticamente.

A continuación se visualizará el resultado en mg/L Ácido poliacrílico 2100 sal de sodio.

Método químico

Turbidez

Apéndice

Bibliografía

W.B. Crummett, R.A. Hummel (1963), The Determination of Polyacrylamides in Water, American Water Works Association, 55 (2), pp. 209-219

Sulfato PP M360

5 - 100 mg/L $SO_4^{\ 2-}$ SO4

Sulfato bárico-turbidez

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Sulfato 4 F10 VARIO	Polvos / 100 Cantidad	532160
ValidCheck sulfato 75 mg/l	1 Cantidad	48311325

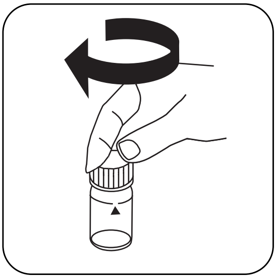
Notas

1. El sulfato provoca un enturbiamiento finamente distribuido.

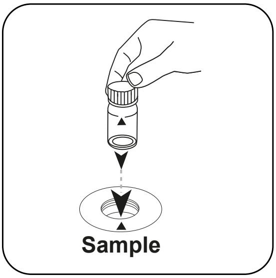
Ejecución de la determinación Sulfato con sobres de polvos Vario

Seleccionar el método en el aparato.

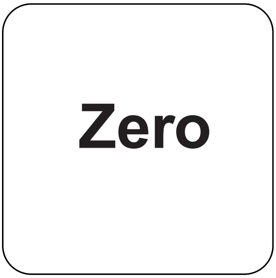
Llenar la cubeta de 24 mm con **10 mL de muestra** .



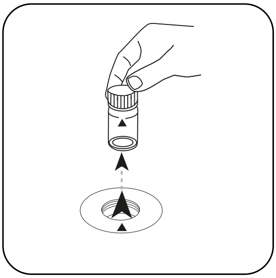
Cerrar la(s) cubeta(s).



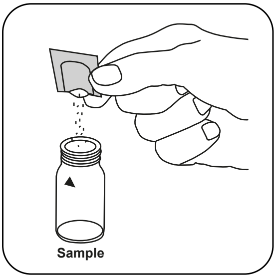
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



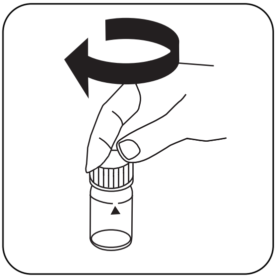
Pulsar la tecla **ZERO**.



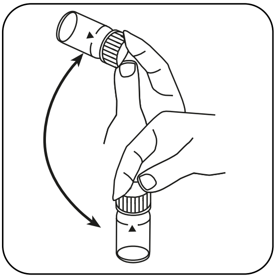
Extraer la cubeta del compartimiento de medición.



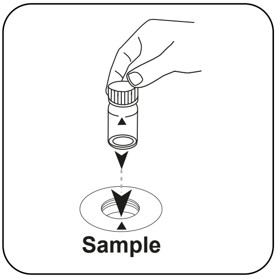
Añadir un **sobre de polvos Vario Sulpha 4/ F10** .



Cerrar la(s) cubeta(s).



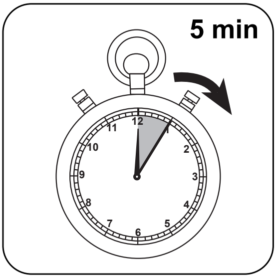
Mezclar el contenido girando.



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

Test

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



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

Finalizado el periodo de reacción se realizará la determinación automáticamente.

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

Método químico

Sulfato bárico-turbidez

Apéndice

De acuerdo a

Método estándar 4500-SO42 E
US EPA 375.4

Derivado de

DIN ISO 15923-1 D49

Triazol PP M388

1 - 16 mg/L Benzotriazole or Tolyltriazole tri

Digestión UV catalizada

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Powder Pack triazol RGT F25 VARIO	Polvos / 100 Cantidad	532200
Solución salina Rochelle VARIO, 30 ml $^{h)}$	30 mL	530640

Se requieren los siguientes accesorios.

Accesorios	Unidad de embalaje	No. de referencia
Lámpara UV 254nm	1 Cantidad	400740
Gafas de protección UV, color naranja	1 Cantidad	400755

Hazard Notes

Mientras esté funcionando la lámpara UV deberán llevarse puestas unas gafas de protección contra rayos UV.

Muestreo

1. Medir la muestra acuosa lo antes posible después de la toma de la muestra.

Preparación

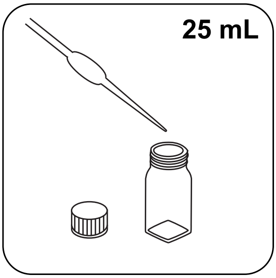
1. Para conseguir resultados de análisis exactos, la muestra acuosa deberá tener una temperatura entre 20 °C y 25 °C.
2. Las aguas que contienen nitrito o borax deben neutralizarse antes de la determinación en un rango de pH entre 4 y 6 (con 1N ácido sulfúrico).
3. Si la muestra contiene más de 500 mg/L de dureza de $CaCO_3$, se añaden 10 gotas de solución salina Rochelle.

Notas

1. Sobres de polvos de reactivo de triazoles y lámpara UV suministrables por solicitud.
2. Para el manejo de la lámpara UV deberán seguirse las instrucciones del fabricante. No tocar la superficie de la lámpara UV. Las huellas dactilares caustican el vidrio. Entre las mediciones, limpiar la lámpara UV con un paño suave y limpio.
3. La prueba no diferencia entre toliltriazoles y benzotriazoles.

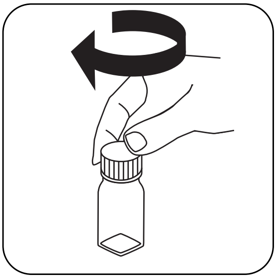
Ejecución de la determinación Benzotriazoles / Toliltriazoles con sobres de polvos Vario

Seleccionar el método en el aparato.

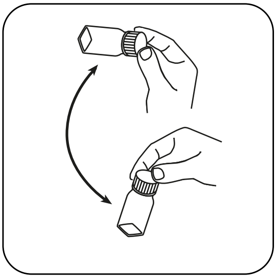


Llenar recipientes de digestión con **25 mL** de muestra.

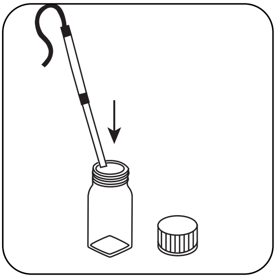
Añadir un **sobre de polvos** .



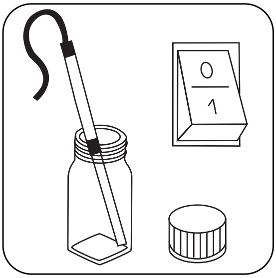
Cerrar la recipiente de disgregación.



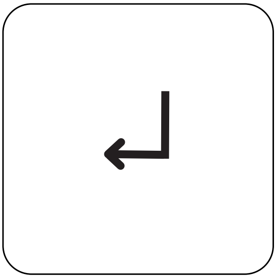
Disolver los polvos girando.



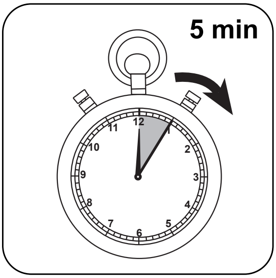
Mantener la lámpara ultravioleta en la muestra. **Atención: ¡Usar gafas de protección contra rayos UV!**



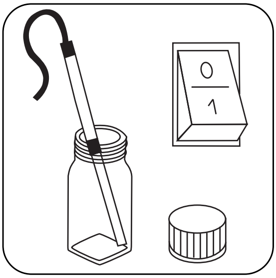
Encender la lámpara UV.



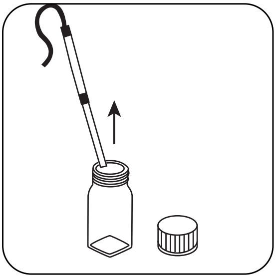
Pulsar la tecla **ENTER**.



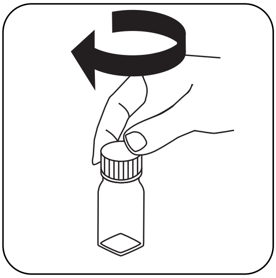
Esperar **5 minutos como periodo de reacción**.



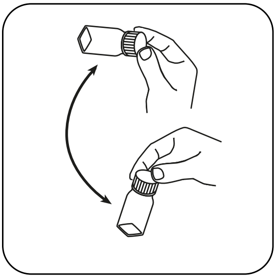
Cuando se haya terminado el Count-Down, apagar la lámpara UV.



Extraer la lámpara UV de la muestra.

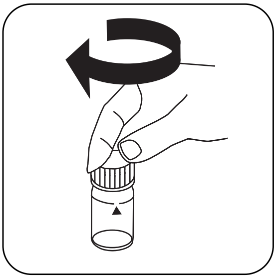


Cerrar la recipiente de disgregación.

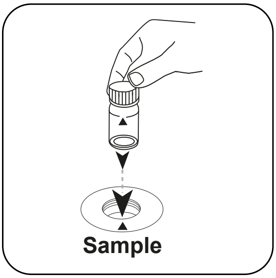


Mezclar el contenido girando.

Llenar la cubeta de 24 mm con **10 mL de agua desionizada**.



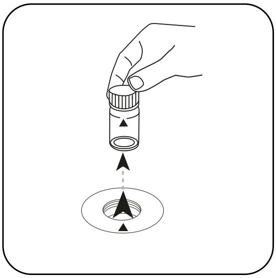
Cerrar la(s) cubeta(s).



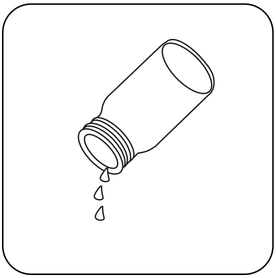
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

Zero

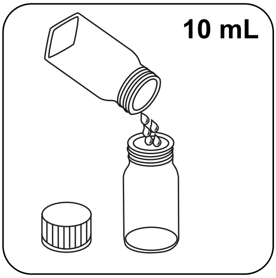
Pulsar la tecla **ZERO**.



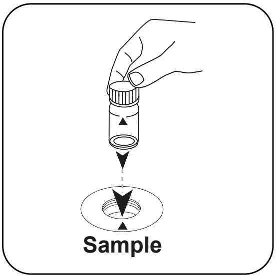
Extraer la cubeta del compartimiento de medición.



Vaciar la cubeta.



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



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

Test

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

A continuación se visualizará el resultado en mg/L Benzotriazole o Tolyltriazole (Cambia entre las formas de citación pulsando la flecha arriba/abajo.).

Evaluación

La siguiente tabla muestra cómo los valores de salida se pueden convertir a otros formularios de citas.

Unidad	Conversión	Factor de conversión
mg/l	Benzotriazole	1
mg/l	Tolyltriazole	1.1177

Método químico

Digestión UV catalizada

Apéndice

Interferencia

Interferencias persistentes

- Si se realiza la fotólisis durante más o menos de 5 minutos puede producir resultados menores.

Bibliografía

Harp, D., Proceedings 45th International Water Conference, 299 (October 22-24, 1984)

[h] Utilización para análisis con dureza mayor a 300 mg/l $CaCO_3$

Cinc L M405

0.1 - 2.5 mg/L Zn Zn

Cincon / EDTA

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
KS 89 - Supresor catiónico	65 mL	56L008965
Zinc LR Reagent Set	1 Cantidad	56R023965
Tampón de zinc Z1B	65 mL	56L024365
KP244-Reactivo para cinc 2	Polvos / 20 g	56P024420

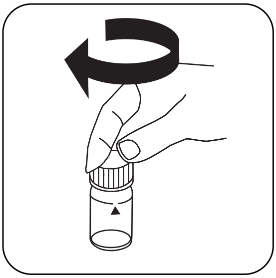
Notas

1. Para la dosificación correcta debe usarse la cuchara graduada suministrada con los reactivos.
2. Esta prueba es apropiada para la determinación del cinc soluble libre. El cinc que está ligado a un complejante fuerte no se detecta.

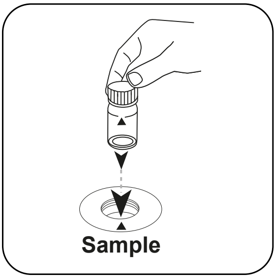
Ejecución de la determinación Cinc con reactivo líquido y polvo

Seleccionar el método en el aparato.

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



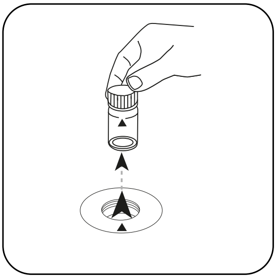
Cerrar la(s) cubeta(s).



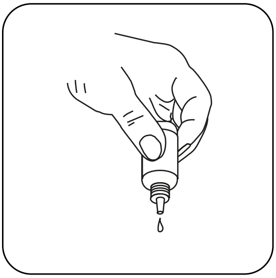
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

Zero

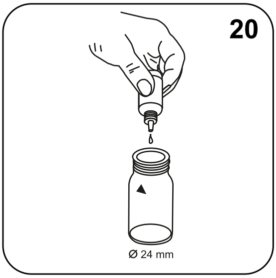
Pulsar la tecla **ZERO**.



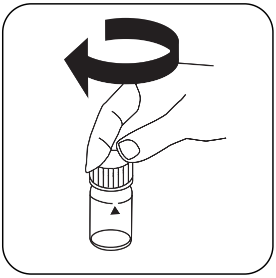
Extraer la cubeta del compartimiento de medición.



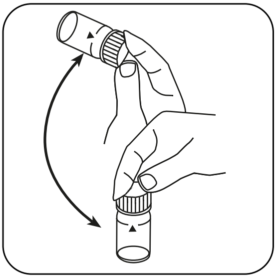
Mantener la botella cuentagotas vertical y añadir gotas del mismo tamaño presionando lentamente.



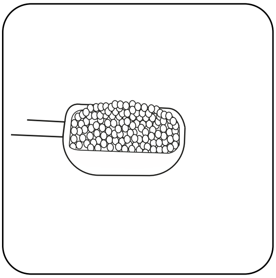
Añadir **20 gotas de Zinc Buffer Z1B**.



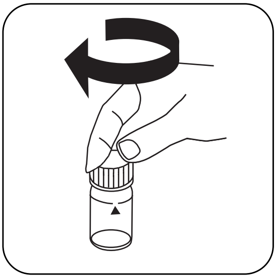
Cerrar la(s) cubeta(s).



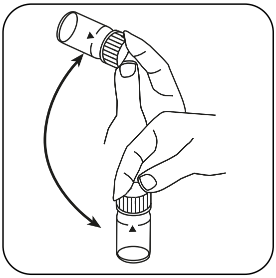
Mezclar el contenido girando.



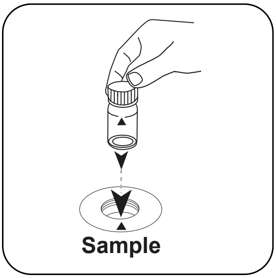
Añadir **una cuchara de Zinc Indicator Z4P**.



Cerrar la(s) cubeta(s).



Disolver los polvos girando.



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

Test

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

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

Método químico

Cincon / EDTA

Apéndice

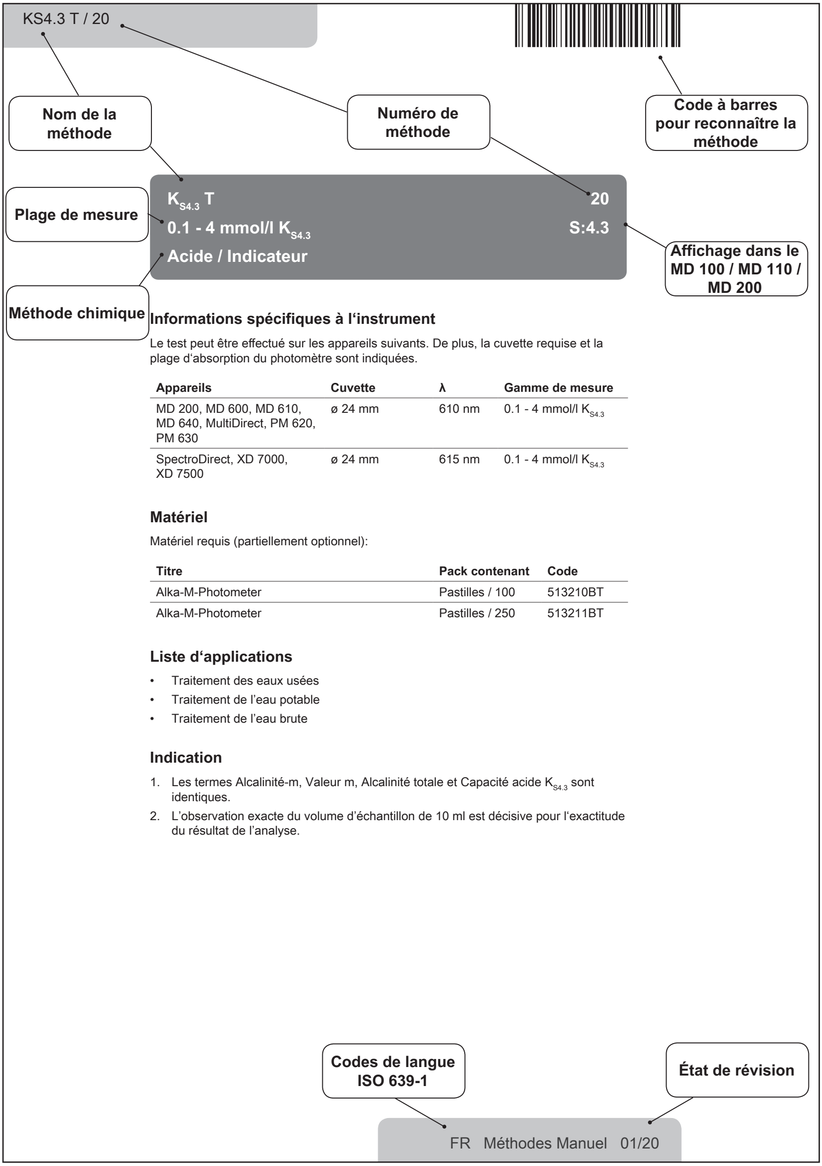
Interferencia

Interferencias extraibles

- Los cationes, como los compuestos de amonio cuaternarios, causan una modificación del color del rojo rosáceo al violeta, dependiendo de la concentración de cobre existente. En este caso, añadir a la muestra gota a gota KS89 (supresor catiónico) hasta que se aprecie un color naranja/azul. Atención: Después de añadir cada gota girar la muestra.

Bibliografía

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989
S.M. Khopkar, Basic Concepts of Analytical Chemistry (2004), New Age International Ltd. Publishers, New Dheli, p. 75



KS4.3 T / 20

$K_{S4.3}$ T **20**

0.1 - 4 mmol/l $K_{S4.3}$ **S:4.3**

Acide / Indicateur

Informations spécifiques à l‘instrument

Le test peut être effectué sur les appareils suivants. De plus, la cuvette requise et la plage d‘absorption du photomètre sont indiquées.

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

Matériel

Matériel requis (partiellement optionnel):

Titre	Pack contenant	Code
Alka-M-Photometer	Pastilles / 100	513210BT
Alka-M-Photometer	Pastilles / 250	513211BT

Liste d‘applications

- Traitement des eaux usées
- Traitement de l’eau potable
- Traitement de l’eau brute

Indication

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

FR Méthodes Manuel 01/20

Procédure du test

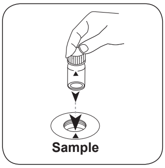
Réalisation de la quantification Capacité acide $K_{S4.3}$ avec pastille

Sélectionnez la méthode sur l’appareil.

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

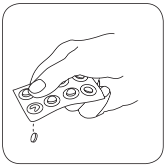
Remplissez une cuvette de 24 mm de **10 ml d’échantillon**.

Fermez la(les) cuvette(s).

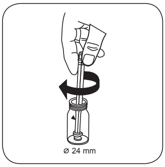


Placez la **cuvette réservée à l’échantillon** dans la chambre de mesure. Attention à la positionner correctement.

• • •



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



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

Fermez la(les) cuvette(s).

Aluminium PP M50

0.01 - 0.25 mg/L Al AL

Eriochrome cyanine R

Matériel

Matériel requis (partiellement optionnel):

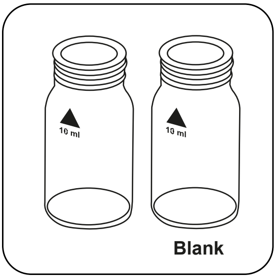
Réactifs	Pack contenant	Code
VARIO kit aluminium 20 ml	1 Pièces	535000

Préparation

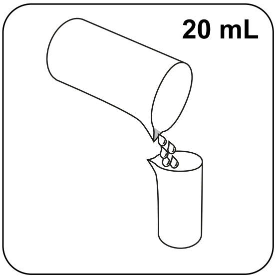
1. Pour obtenir des résultats exacts, la température de l’échantillon sera comprise entre 20 °C et 25 °C.
2. Pour éviter les erreurs causées par des impuretés, lavez la cuvette et les accessoires avant l’analyse en utilisant une solution d’acide chlorhydrique (à 20% env.) puis rincez à l’eau déminéralisée.

Réalisation de la quantification Aluminium avec sachet de poudre Vario

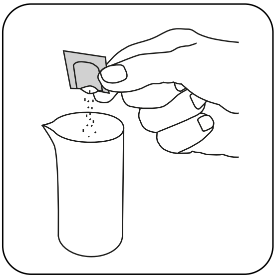
Sélectionnez la méthode sur l'appareil.



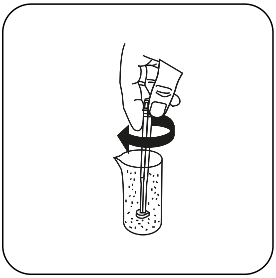
Préparez deux cuvettes propres de 24 mm. L'une des deux cuvettes sera la cuvette du blanc. Étiquetez-la.



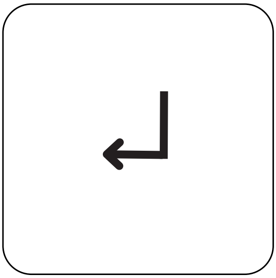
Versez **20 mL d'échantillon** dans un bécher de mesure de 100 mL.



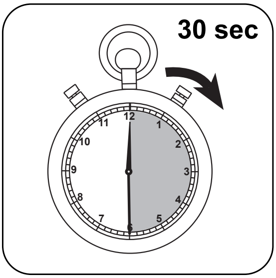
Ajoutez un **sachet de poudre Vario ALUMINIUM ECR F20**.



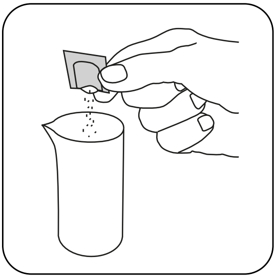
Dissolvez la poudre en mélangeant.



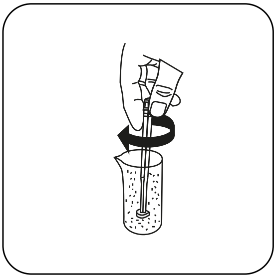
Appuyez sur la touche **ENTER**.



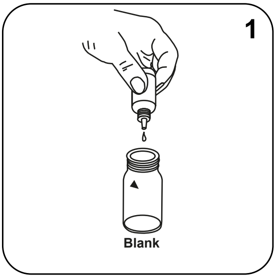
Attendez la fin du **temps de réaction de 30 secondes** .



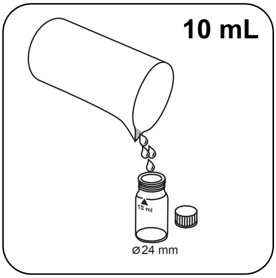
Ajoutez un **sachet de poudre Vario HEXAMINE F20**.



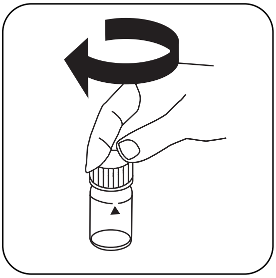
Dissolvez la poudre en mélangeant.



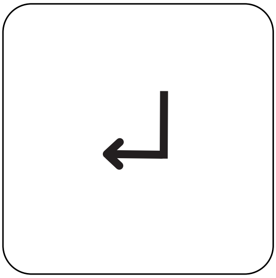
Ajoutez **1 gouttes de Vario ALUMINIUM ECR Masking Reagent** dans la cuvette du blanc.



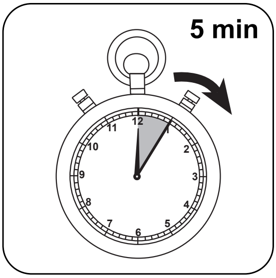
Dans chaque cuvette, versez **10 mL d'échantillon préparé**.



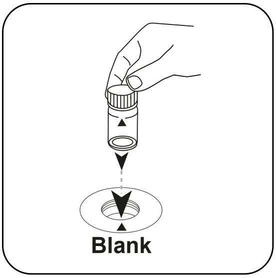
Fermez la(les) cuvette(s).



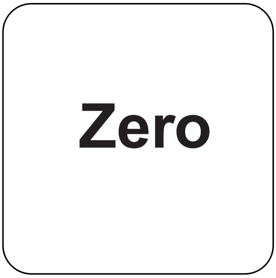
Appuyez sur la touche **ENTER**.



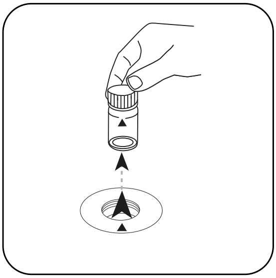
Attendez la fin du **temps de réaction de 5 minute(s)** .



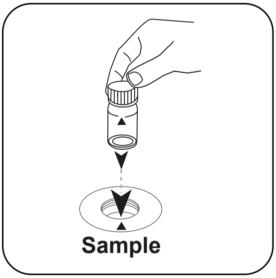
Placez la **cuvette du blanc** dans la chambre de mesure. Attention à la positionner correctement.



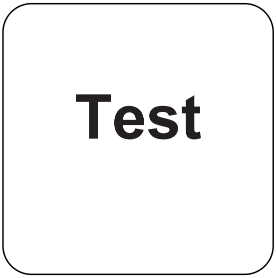
Appuyez sur la touche **ZERO**.



Retirez la cuvette de la chambre de mesure.



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



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

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

Analyses

Le tableau suivant identifie les valeurs de sortie qui peuvent être converties en d'autres formes de citation.

Unité	Formes de citation	Facteur de conversion
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Méthode chimique

Eriochrome cyanine R

Appendice

Interférences

Interférences exclues

- La présence de fluorures et de polyphosphates peut donner des résultats inférieurs à l’analyse. En général, ceci n'est pas véritablement important sauf si l'eau est fluorée artificiellement. Dans ce cas, le tableau ci-dessous sera utilisé pour quantifier la concentration réelle d’aluminium.

Fluorure	**Valeur affichée : Aluminium [mg/L]**					
[mg/L F]	**0,05**	**0,10**	**0,15**	**0,20**	**0,25**	**0,30**
0,2	0,05	0,11	0,16	0,21	0,27	0,32
0,4	0,06	0,11	0,17	0,23	0,28	0,34
0,6	0,06	0,12	0,18	0,24	0,30	0,37
0,8	0,06	0,13	0,20	0,26	0,32	0,40
1,0	0,07	0,13	0,21	0,28	0,36	0,45
1,5	0,09	0,20	0,29	0,37	0,48	---

Bibliographie

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

Selon

Méthode APHA 3500-Al B

Brome T M80

0.05 - 13 mg/L Br_2 Br

DPD

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
DPD N°1	Pastilles / 100	511050BT
DPD N° 1	Pastilles / 250	511051BT
DPD N° 1	Pastilles / 500	511052BT
DPD N° 1 High Calcium [e)]	Pastilles / 100	515740BT
DPD N° 1 High Calcium [e)]	Pastilles / 250	515741BT
DPD N° 1 High Calcium [e)]	Pastilles / 500	515742BT

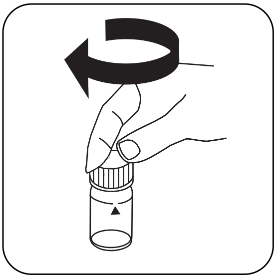
Préparation

1. Nettoyage des cuvettes :
   Beaucoup de produits de nettoyage domestiques (par ex. liquide vaisselle) contenant des agents réducteurs, il est possible que lors de la quantification suivante des agents oxydants (par ex. ozone, chlore), les résultats soient plus bas. Pour exclure ces erreurs, les instruments en verre utilisés devraient être insensibles aux effets du chlore. Pour ce faire, il convient de laisser les instruments en verre pendant une heure dans une solution d’hypochlorite de sodium (0,1 g/L) et de bien les rincer ensuite à l'eau déminéralisée.
2. Lors de la préparation de l’échantillon, il faudra éviter le dégazage du brome, par ex. par pipetage ou agitation. L'analyse devra avoir lieu immédiatement après le prélèvement de l'échantillon.
3. Avant l’analyse, les eaux fortement alcalines ou acides devraient être ajustées sur un pH compris entre 6 et 7 (avec 0,5 mol/l d'acide sulfurique ou 1 mol/l de soude caustique).

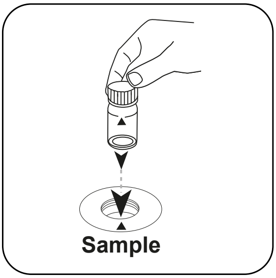
Réalisation de la quantification Brome avec pastille

Sélectionnez la méthode sur l'appareil.

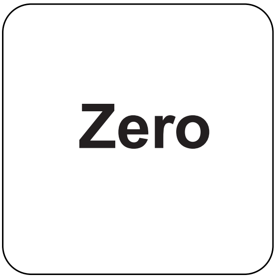
Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



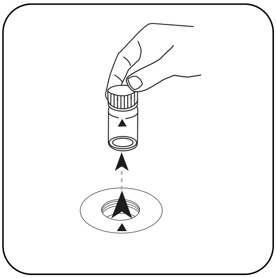
Fermez la(les) cuvette(s).



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

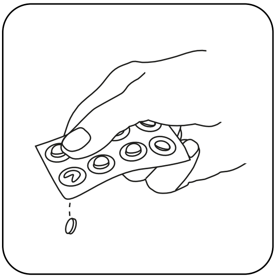


Appuyez sur la touche **ZERO**.

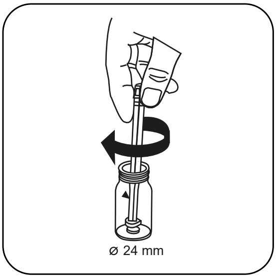


Retirez la cuvette de la chambre de mesure.

Videz pratiquement la cuvette en y laissant quelques gouttes.

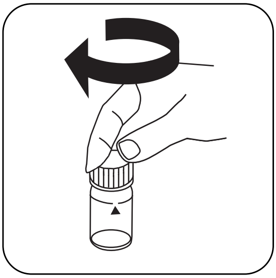


Ajoutez une **pastille de DPD No. 1**.

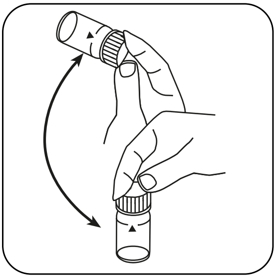


Écrasez la(les) pastille(s) en la(les) tournant un peu.

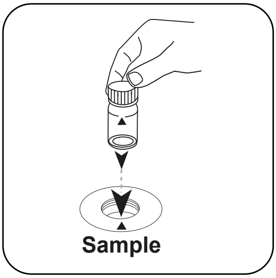
Remplissez la cuvette jusqu'au **repère de 10 mL** en y versant l'**échantillon**.



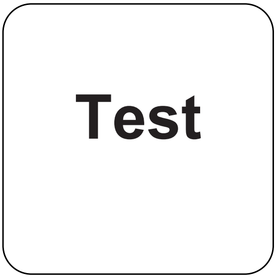
Fermez la(les) cuvette(s).



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



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



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

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

Méthode chimique

DPD

Appendice

Interférences

Interférences persistantes

1. Les agents oxydants contenus dans les échantillons réagissent tous comme le brome, ce qui entraîne des résultats plus élevés.
2. Les concentrations de brome supérieures à 22 mg/L peuvent provoquer des résultats dans la plage de mesure allant jusqu'à 0 mg/L. Dans ce cas, diluez l'échantillon d'eau. Le réactif est ajouté à 10 ml d'échantillon dilué. Ensuite, la mesure est répétée (test de plausibilité).

Dérivé de

US EPA 330.5 (1983)
Méthode APHA 4500 Cl-G

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

Chlore T M100

0.01 - 6.0 mg/L Cl_2 a) CL6

DPD

Matériel

Matériel requis (partiellement optionnel):

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

Standards disponibles

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

Échantillonnage

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

Préparation

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

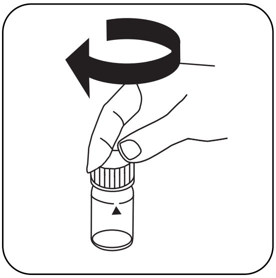
Indication

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

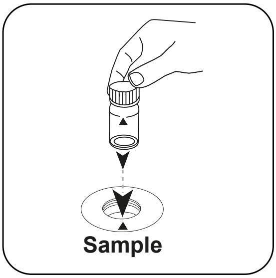
Réalisation de la quantification Chlore libre avec pastilles

Sélectionnez la méthode sur l’appareil.

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



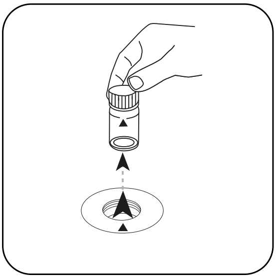
Fermez la(les) cuvette(s).



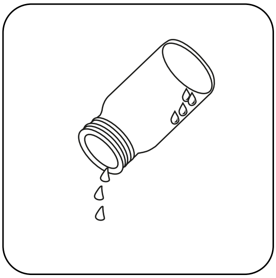
Placez la **cuvette réservée à l’échantillon** dans la chambre de mesure. Attention à la positionner correctement.

Zero

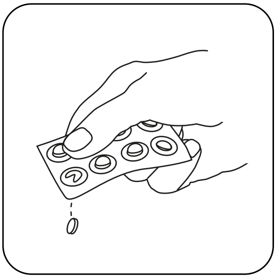
Appuyez sur la touche **ZERO**.



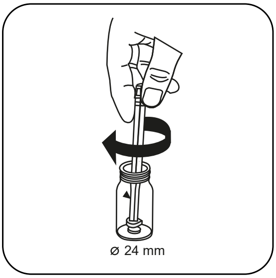
Retirez la cuvette de la chambre de mesure.



Videz pratiquement la cuvette en y laissant quelques gouttes.

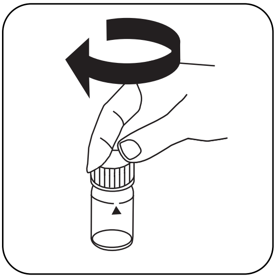


Ajoutez une **pastille de DPD No. 1**.

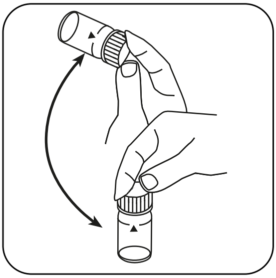


Écrasez la(les) pastille(s) en la(les) tournant un peu.

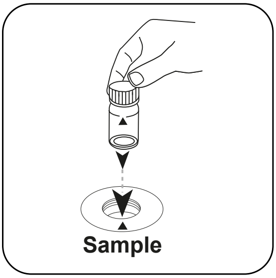
Remplissez la cuvette jusqu’au **repère de 10 mL** en y versant l’**échantillon**.



Fermez la(les) cuvette(s).



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



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

Test

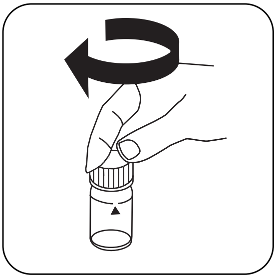
Appuyez sur la touche **TEST** (XD: **START**).

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

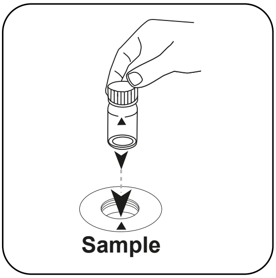
Réalisation de la quantification Chlore total avec pastilles

Sélectionnez la méthode sur l'appareil.

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



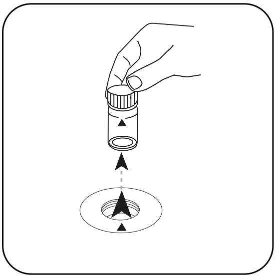
Fermez la(les) cuvette(s).



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

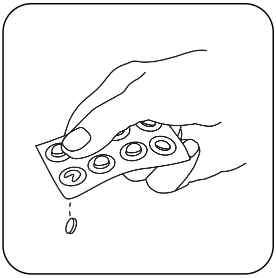
Zero

Appuyez sur la touche **ZERO**.

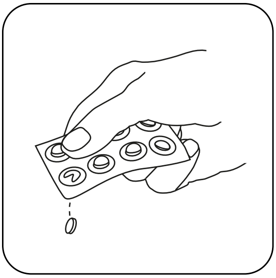


Retirez la cuvette de la chambre de mesure.

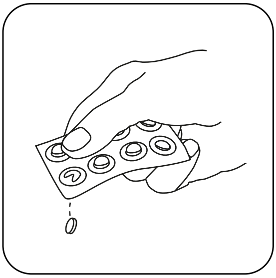
Videz pratiquement la cuvette en y laissant quelques gouttes.



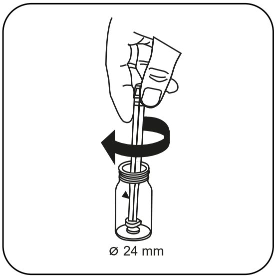
Ajoutez une **pastille de DPD No. 1**.



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

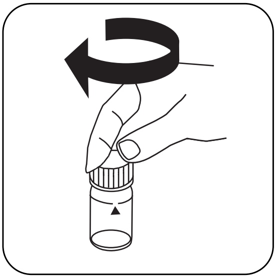


En alternative aux comprimés DPD n ° 1 et n ° 3, un comprimé DPD n ° 4 peut être ajouté.

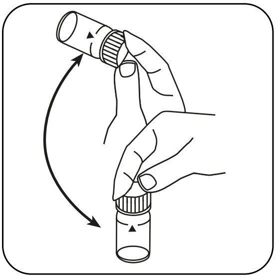


Écrasez la(les) pastille(s) en la(les) tournant un peu.

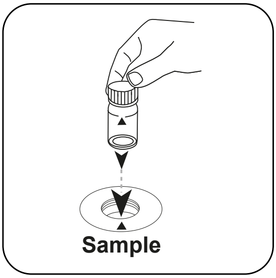
Remplissez la cuvette jusqu'au **repère de 10 mL** en y versant l'**échantillon**.



Fermez la(les) cuvette(s).



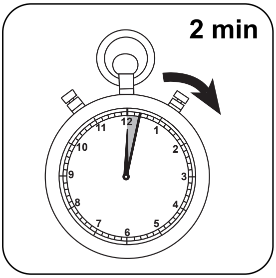
Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



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

Test

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



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

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

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

Méthode chimique

DPD

Appendice

Interférences

Interférences persistantes

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

Interférences exclues

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

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

Méthode Validation

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

Conformité

EN ISO 7393-2

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

Chlore L M101

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

DPD

Matériel

Matériel requis (partiellement optionnel):

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

Standards disponibles

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

Échantillonnage

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

Préparation

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

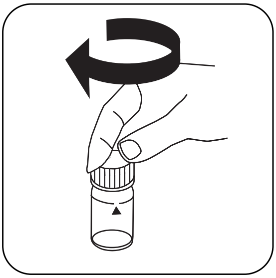
Indication

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

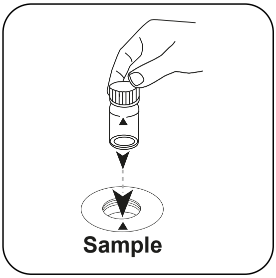
Réalisation de la quantification Chlore libre avec réactifs liquides

Sélectionnez la méthode sur l’appareil.

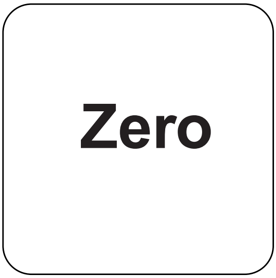
Remplissez une cuvette de 24 mm de **10 mL d’échantillon**.



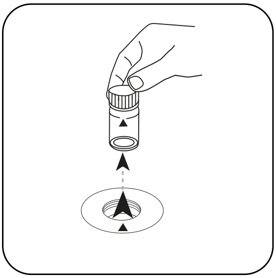
Fermez la(les) cuvette(s).



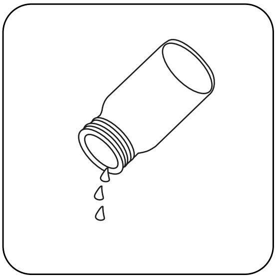
Placez la **cuvette réservée à l’échantillon** dans la chambre de mesure. Attention à la positionner correctement.



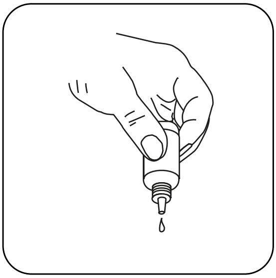
Appuyez sur la touche **ZERO**.



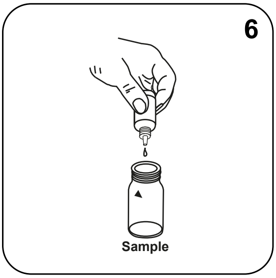
Retirez la cuvette de la chambre de mesure.



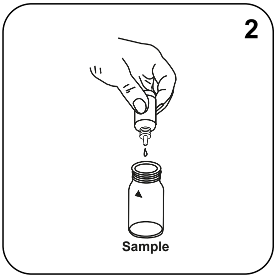
Videz la cuvette.



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

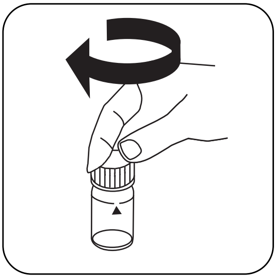


Ajoutez **6 gouttes de DPD 1 Buffer Solution** dans la cuvette réservée à l’échantillon.

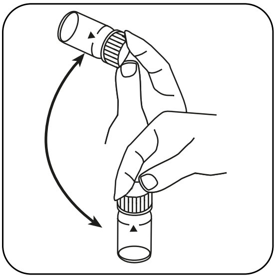


Ajoutez **2 gouttes de DPD 1 Reagent Solution** dans la cuvette réservée à l’échantillon.

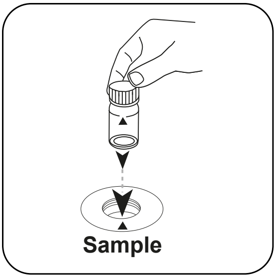
Remplissez la cuvette jusqu’au **repère de 10 mL** en y versant l’**échantillon**.



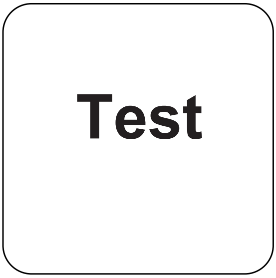
Fermez la(les) cuvette(s).



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



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



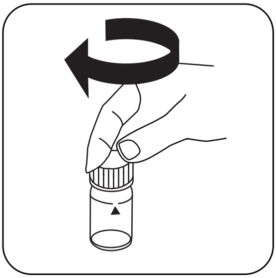
Appuyez sur la touche **TEST** (XD: **START**).

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

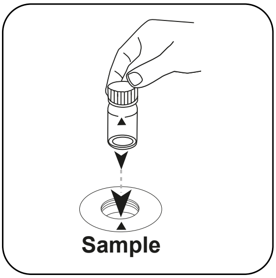
Réalisation de la quantification Chlore total avec réactifs liquides

Sélectionnez la méthode sur l’appareil.

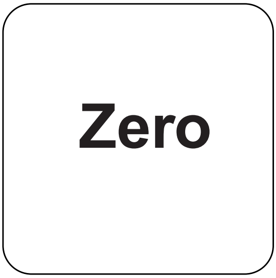
Remplissez une cuvette de 24 mm de **10 mL d’échantillon**.



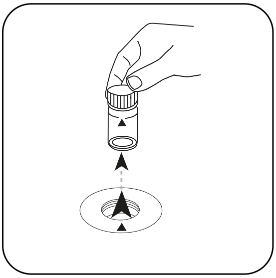
Fermez la(les) cuvette(s).



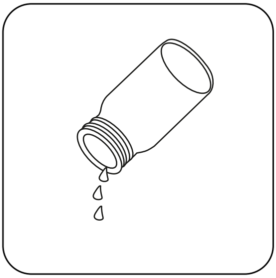
Placez la **cuvette réservée à l’échantillon** dans la chambre de mesure. Attention à la positionner correctement.



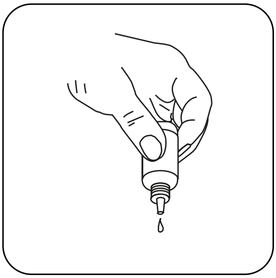
Appuyez sur la touche **ZERO**.



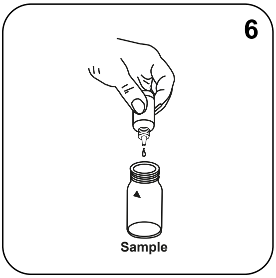
Retirez la cuvette de la chambre de mesure.



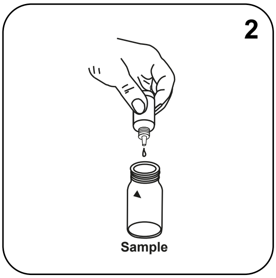
Videz la cuvette.



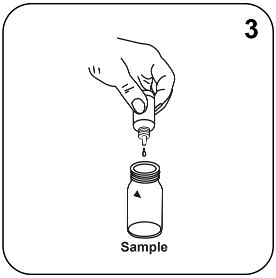
Tenez les flacons compte-goutte à la verticale et ajoutez des gouttes uniformes en appuyant lentement.



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

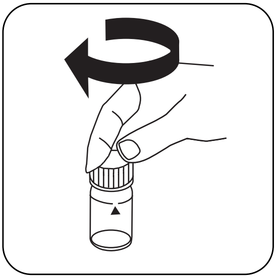


Ajoutez **2 gouttes de DPD 1 Reagent Solution** dans la cuvette réservée à l’échantillon.

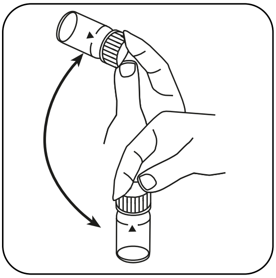


Ajoutez **3 gouttes de DPD 3 Solution** dans la cuvette réservée à l’échantillon.

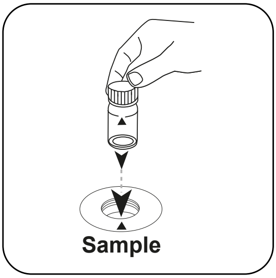
Remplissez la cuvette jusqu’au **repère de 10 mL** en y versant l’**échantillon**.



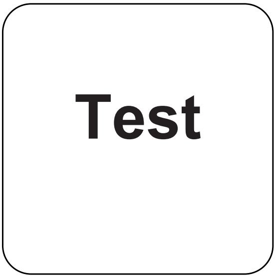
Fermez la(les) cuvette(s).



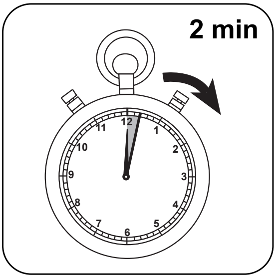
Mélangez le contenu en mettant le tube plusieurs fois à l’envers puis à l’endroit.



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



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



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

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

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

Méthode chimique

DPD

Appendice

Interférences

Interférences persistantes

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

Interférences exclues

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

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

Conformité

EN ISO 7393-2

[a] Détermination du libre, combiné et total

Chlore HR (KI) T M105

5 - 200 mg/L Cl_2 CLHr

KI / Acide

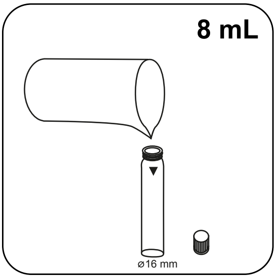
Matériel

Matériel requis (partiellement optionnel):

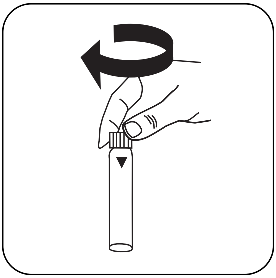
Réactifs	Pack contenant	Code
Chlore HR (KI)	Pastilles / 100	513000BT
Chlore HR (KI)	Pastilles / 250	513001BT
Acidifiants PT	Pastilles / 100	515480BT
Acidifiants PT	Pastilles / 250	515481BT
Kit chlore HR (KI)/acidifiant GP#	100 chacun	517721BT
Kit chlore HR (KI)/acidifiant GP#	250 chacun	517722BT
Chlore HR (KI)	Pastilles / 100	501210
Chlore HR (KI)	Pastilles / 250	501211

Réalisation de la quantification Chlore HR (KI) avec pastille

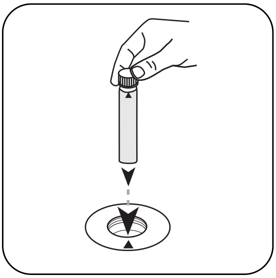
Sélectionnez la méthode sur l'appareil.



Remplissez une cuvette de 16 mm de **8 mL d'échantillon**.



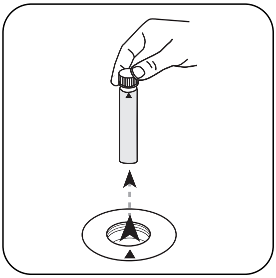
Fermez la(les) cuvette(s).



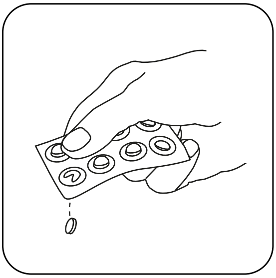
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.

Zero

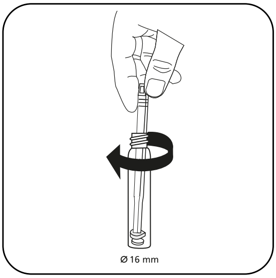
Appuyez sur la touche **ZERO**.



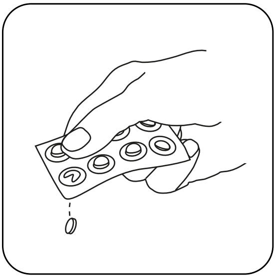
Retirez la **cuvette** de la chambre de mesure.



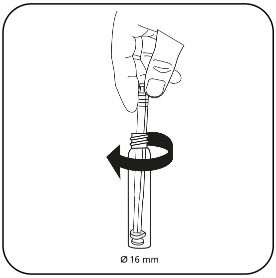
Ajoutez une **pastille de Chlorine HR (KI)**.



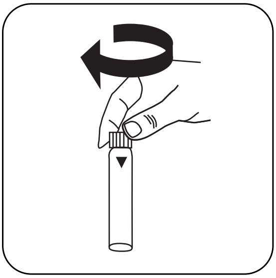
Écrasez la(les) pastille(s) en la(les) tournant un peu.



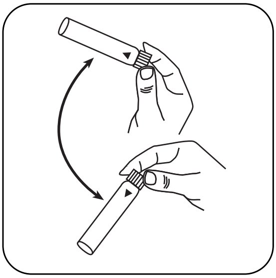
Ajoutez une **pastille de ACIDIFYING GP**.



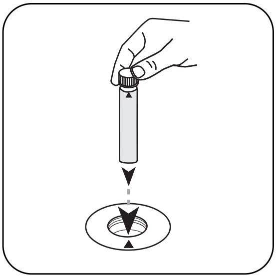
Écrasez la(les) pastille(s) en la(les) tournant un peu.



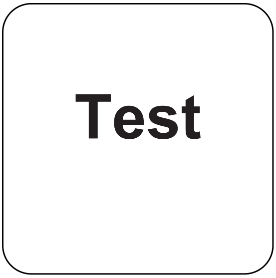
Fermez la(les) cuvette(s).



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



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



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

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

Méthode chimique

KI / Acide

Appendice

Interférences

Interférences persistantes

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

Méthode Validation

Limite de détection	1.29 mg/L
Limite de détermination	3.86 mg/L
Fin de la gamme de mesure	200 mg/L
Sensibilité	83.96 mg/L / Abs
Intervalle de confiance	1.14 mg/L
Déviation standard	0.45 mg/L
Coefficient de variation	0.45 %

Dérivé de

EN ISO 7393-3

j) # agitateur inclus

Dioxyde de chlore T M120

0.02 - 11 mg/L ClO_2 CLO2

DPD / Glycine

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
DPD N°1	Pastilles / 100	511050BT
DPD N° 1	Pastilles / 250	511051BT
DPD N° 1	Pastilles / 500	511052BT
DPD N° 3	Pastilles / 100	511080BT
DPD N° 3	Pastilles / 250	511081BT
DPD N° 3	Pastilles / 500	511082BT
Glycine f)	Pastilles / 100	512170BT
Glycine f)	Pastilles / 250	512171BT
DPD N° 3 High Calcium e)	Pastilles / 100	515730BT
DPD N° 3 High Calcium e)	Pastilles / 250	515731BT
DPD N° 3 High Calcium e)	Pastilles / 500	515732BT
DPD N° 1 High Calcium e)	Pastilles / 100	515740BT
DPD N° 1 High Calcium e)	Pastilles / 250	515741BT
DPD N° 1 High Calcium e)	Pastilles / 500	515742BT
Kit DPD N° 1/N° 3#	100 chacun	517711BT
Kit DPD N° 1/N° 3#	250 chacun	517712BT
Kit DPD N° 1/Glycine #	100 chacun	517731BT
Kit DPD N° 1/Glycine #	250 chacun	517732BT
Kit DPD N° 1/N° 3 High Calcium#	100 chacun	517781BT
Kit DPD N° 1/N° 3 High Calcium#	250 chacun	517782BT
DPD N° 3 Evo	Pastilles / 100	511420BT
DPD N° 3 Evo	Pastilles / 250	511421BT
DPD N° 3 Evo	Pastilles / 500	511422BT

Échantillonnage

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

Préparation

1. Nettoyage des cuvettes :
   Beaucoup de produits de nettoyage domestiques (par ex. liquide vaisselle) contenant des agents réducteurs, il est possible que lors de la quantification du Dioxyde de chlore, les résultats soient plus bas. Pour exclure ces erreurs, les instruments en verre utilisés devraient être insensibles aux effets du chlore. Pour ce faire, il convient de laisser les instruments en verre pendant une heure dans une solution d'hypochlorite de sodium (0,1 g/L) et de bien les rincer ensuite à l'eau déminéralisée (eau entièrement dessalée).
2. Avant l'analyse, les eaux fortement alcalines ou acides devraient être ajustées sur un pH compris entre 6 et 7 (avec 0,5 mol/l d'acide sulfurique ou 1 mol/l de soude caustique).

Indication

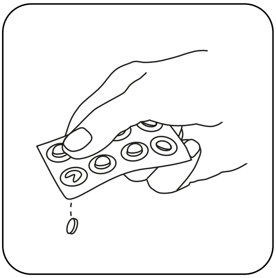
1. Les pastilles EVO peuvent être utilisées en remplacement de la pastille standard correspondante (par exemple, DPD n° 3 EVO au lieu de DPD n° 3).

Réalisation de la quantification Dioxyde de chlore, en présence de chlore avec pastille

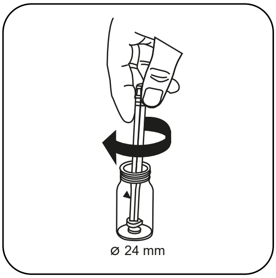
Sélectionnez la méthode sur l’appareil.

Sélectionnez également la quantification : en présence de chlore

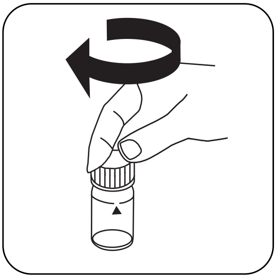
Remplissez une cuvette de 24 mm de **10 mL d’échantillon**.



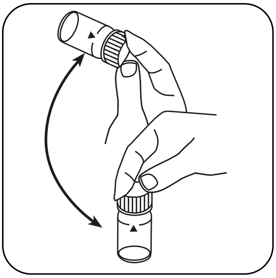
Ajoutez une **pastille de GLYCINE**.



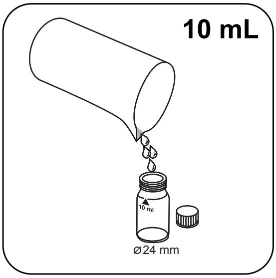
Écrasez la(les) pastille(s) en la(les) tournant un peu.



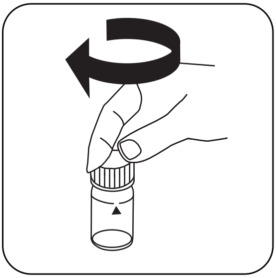
Fermez la(les) cuvette(s).



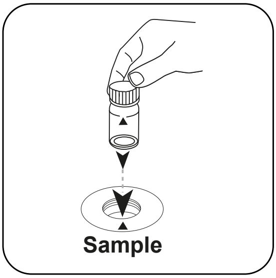
Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



Remplissez une **deuxième cuvette** de **10 mL d’échantillon**.



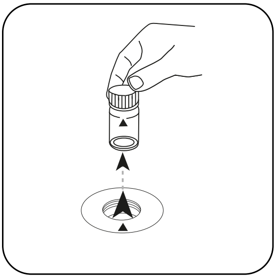
Fermez la(les) cuvette(s).



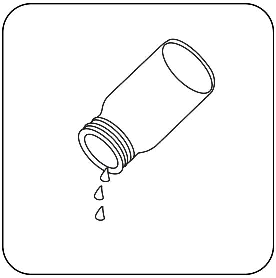
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.

Zero

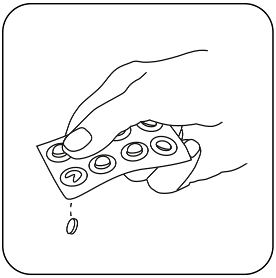
Appuyez sur la touche **ZERO**.



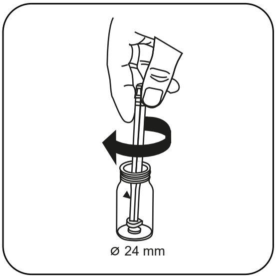
Retirez la cuvette de la chambre de mesure.



Videz la cuvette.

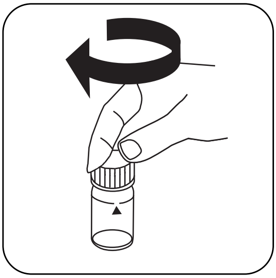


Ajoutez une **pastille de DPD No. 1**.

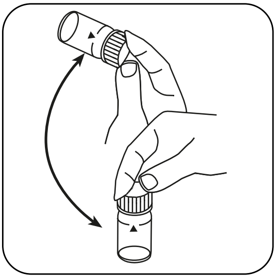


Écrasez la(les) pastille(s) en la(les) tournant un peu.

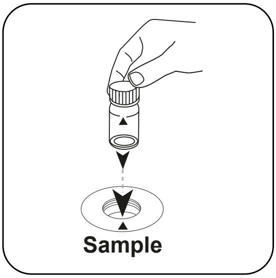
Versez la **solution de Glycine** préparée dans la cuvette préparée.



Fermez la(les) cuvette(s).



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



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

Test

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

Le résultat s'affiche à l’écran en mg/L dioxyde de chlore.

Analyses

Le tableau suivant identifie les valeurs de sortie qui peuvent être converties en d'autres formes de citation.

Unité	Formes de citation	Facteur de conversion
mg/l	ClO_2	1
mg/l	Cl_2 frei	0.525
mg/l	Cl_2 geb.	0.525
mg/l	ges. Cl_2	0.525

Méthode chimique

DPD / Glycine

Appendice

Interférences

Interférences persistantes

1. Les agents oxydants contenus dans les échantillons entraînent tous des résultats plus élevés.

Interférences exclues

1. Les concentrations de dioxyde de chlore supérieures à 19 mg/L peuvent donner des résultats dans la plage de mesure allant jusqu’à 0 mg/L. Dans ce cas, diluez l’échantillon d'eau en utilisant de l'eau exempte de dioxyde de chlore. Le réactif est ajouté à 10 ml d’échantillon dilué. Ensuite, la mesure est répétée.

Dérivé de

DIN 38408, 5è partie

e)autre réactif, utilisé à la place de DPD No.1/3 en cas de turbidité dans l‘échantillon d‘eau due à une concentration élevée de calcium et/ou une conductivité élevée | f)nécessaire pour la détermination de brome, dioxyde de chlore et ozone en présence de chlore | j) # agitateur inclus

Cuivre T M150

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

Biquinoline

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
Cuivre N° 1	Pastilles / 100	513550BT
Cuivre N° 1	Pastilles / 250	513551BT
Cuivre N° 2	Pastilles / 100	513560BT
Cuivre N° 2	Pastilles / 250	513561BT
Kit cuivre N° 1/N° 2#	100 chacun	517691BT
Kit cuivre N° 1/N° 2#	250 chacun	517692BT
ValidCheck Cuivre 2 mg/l	1 Pièces	48141525

Préparation

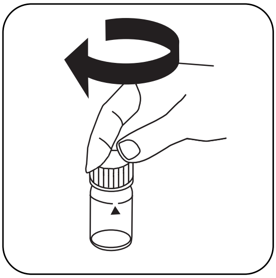
1. Avant l'analyse, les eaux fortement alcalines ou acides devraient être ajustées sur un pH 4 à 6.

Réalisation de la quantification Cuivre, libre avec pastille

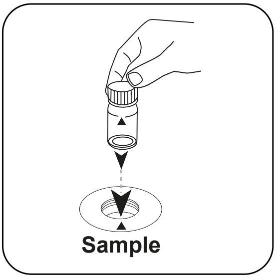
Sélectionnez la méthode sur l’appareil.

Sélectionnez également la quantification : libre

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



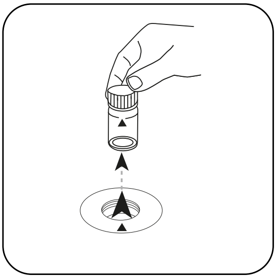
Fermez la(les) cuvette(s).



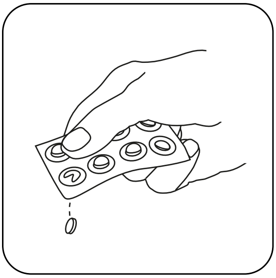
Placez la **cuvette réservée à l’échantillon** dans la chambre de mesure. Attention à la positionner correctement.

Zero

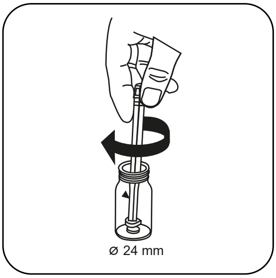
Appuyez sur la touche **ZERO**.



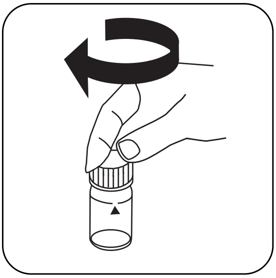
Retirez la cuvette de la chambre de mesure.



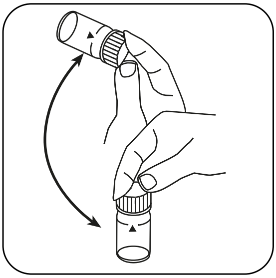
Ajoutez une **pastille de COPPER No. 1**.



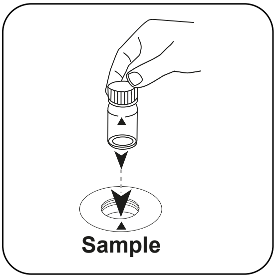
Écrasez la(les) pastille(s) en la(les) tournant un peu.



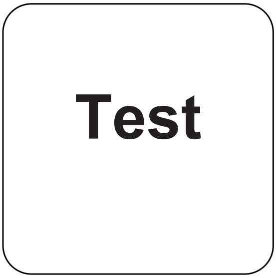
Fermez la(les) cuvette(s).



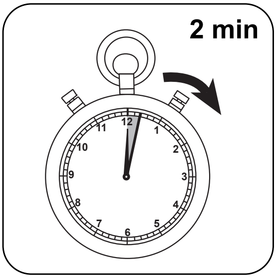
Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



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



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



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

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

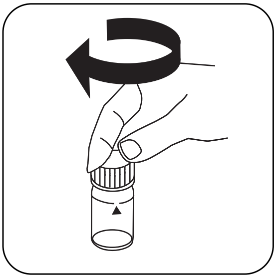
Le résultat s'affiche à l’écran en mg/L Cuivre, libre.

Réalisation de la quantification Cuivre, total avec pastille

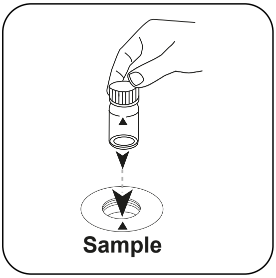
Sélectionnez la méthode sur l’appareil.

Sélectionnez également la quantification : total

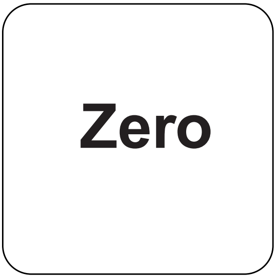
Remplissez une cuvette de 24 mm de **10 mL d’échantillon**.



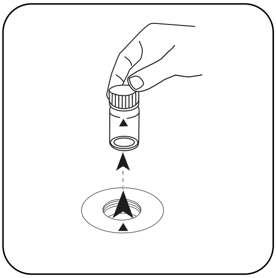
Fermez la(les) cuvette(s).



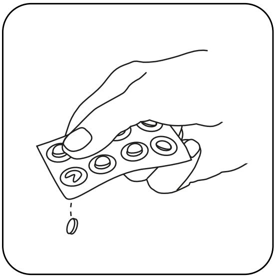
Placez la **cuvette réservée à l’échantillon** dans la chambre de mesure. Attention à la positionner correctement.



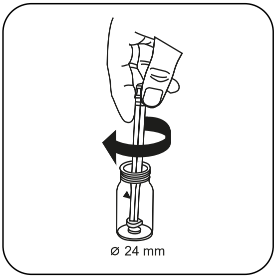
Appuyez sur la touche **ZERO**.



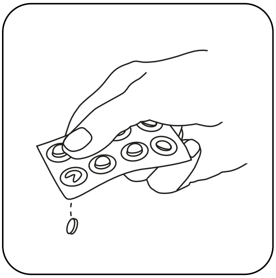
Retirez la cuvette de la chambre de mesure.



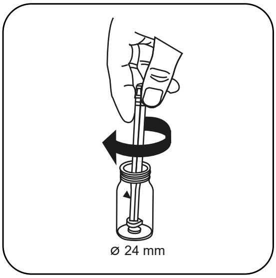
Ajoutez une **pastille de COPPER No. 1**.



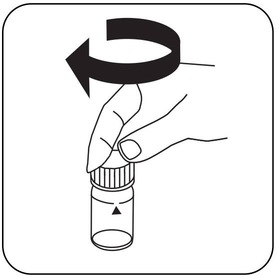
Écrasez et dissolvez la(les) pastille(s) en la(les) tournant un peu.



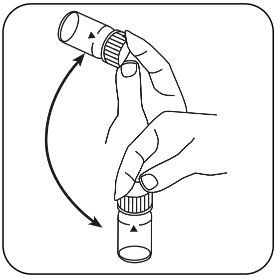
Ajoutez une **pastille de COPPER No. 2**.



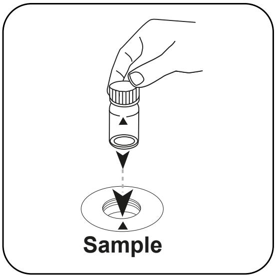
Écrasez la(les) pastille(s) en la(les) tournant un peu.



Fermez la(les) cuvette(s).



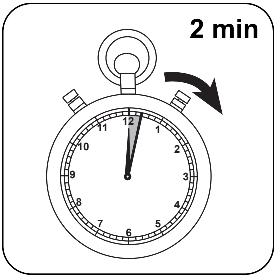
Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



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

Test

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



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

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

Le résultat s'affiche à l’écran en mg/L Cuivre, total.

Méthode chimique

Biquinoline

Appendice

Interférences

Interférences persistantes

1. Cyanure CN^- et Argent Ag^+ perturbent la quantification.

Méthode Validation

Limite de détection	0.05 mg/L
Limite de détermination	0.15 mg/L
Fin de la gamme de mesure	5 mg/L
Sensibilité	3.8 mg/L / Abs
Intervalle de confiance	0.026 mg/L
Déviation standard	0.011 mg/L
Coefficient de variation	0.42 %

Bibliographie

Photometrische Analyse, Lange/Vedjelek, Verlag Chemie 1980

[a)] Détermination du libre, combiné et total | [j)] # agitateur inclus

Fer dans Mo PP M224

0.01 - 1.8 mg/L Fe FEM

TPTZ

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
VARIO Fe dans MO, kit de réactif	1 Kit	536010

Échantillonnage

1. Prélevez l’échantillon dans des flacons en verre ou en matière plastique nettoyés. Ils auront été nettoyés à l’acide chlorydrique 6 N (1:1) puis rincés à l’eau déminéralisée.
2. Pour conserver l’échantillon en vue des analyses futures, le pH devra être rabaissé à une valeur inférieure à 2. Ajoutez alors env. 2 ml d’acide chlorhydrique concentré par litre d’échantillon. L’apport n'est pas nécessaire si l’échantillon est analysé directement.
3. Pour quantifier le fer dissous, l’échantillon devra être filtré dans un filtre de 0,45µm ou comparable directement après le prélèvement ou avant l'acidification.
4. Stockez les échantillons conservés à température ambiante pendant 6 mois maximum.
5. Avant l’analyse, le pH devra être ajusté sur une valeur de 3 - 5 par ajout de soude caustique 5N. Ne pas dépasser un pH de 5 pour empêcher les précipités de fer.
6. En raison de l’apport de volume, le résultat devra être corrigé.

Préparation

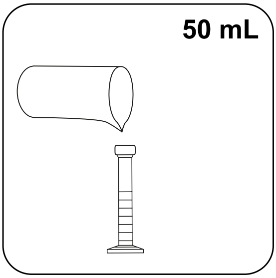
1. Nettoyez tous les instruments en verre avec un produit nettoyant puis rincez-les à l’eau du robinet. Ensuite, répétez le nettoyage en utilisant de l'acide chlorhydrique (1:1) et de l’eau déminéralisée. Ces opérations permettent d’éliminer les dépôts susceptibles d'augmenter légèrement les résultats.
2. Si l’échantillon contient 100 mg/L ou plus de molybdate (MoO_4^{2-}), la mesure devra être effectuée directement après le mesure du blanc.
3. Pour obtenir des résultats plus exacts, il est possible de quantifier une valeur à blanc du réactif pour chaque nouveau lot de réactifs. Procédez comme décrit auparavant, mais en utilisant de l'eau déminéralisée au lieu de l’échantillon. La valeur mesurée obtenue est déduite des valeurs déterminées avec ce lot.

Indication

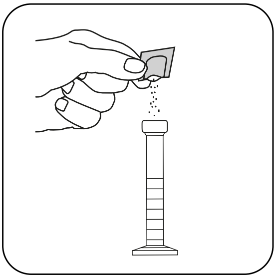
1. En présence de fer, il se forme une couleur bleue. Une petite quantité de poudre non dissoute n’a aucune influence sur le résultat.

Réalisation de la quantification Fer, total (Fe dans Mo) avec part de molybdate, avec sachet de poudre Vario

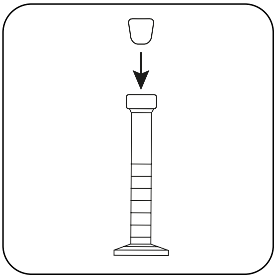
Sélectionnez la méthode sur l'appareil.



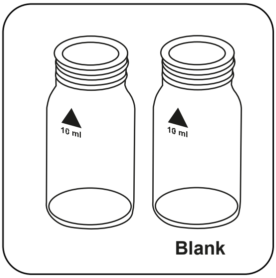
Versez **50 mL d'échantillon** dans une fiole volumétrique de 50 mL.



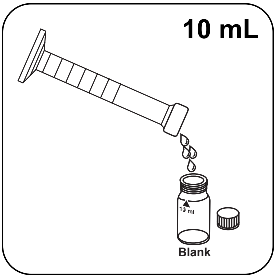
Ajoutez un **sachet de poudre Vario (Fe in Mo) Rgt 1**.



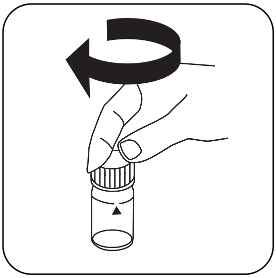
Fermez la fiole volumétrique avec un bouchon. Dissolvez la poudre en mettant la fiole à l'envers.



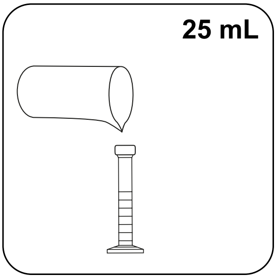
Préparez deux cuvettes propres de 24 mm. L'une des deux cuvettes sera la cuvette du blanc. Étiquetez-la.



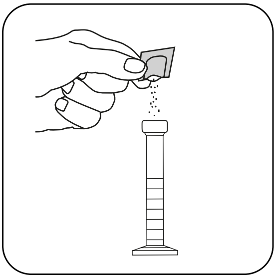
Versez **10 mL d'échantillon préparé** dans la cuvette du blanc.



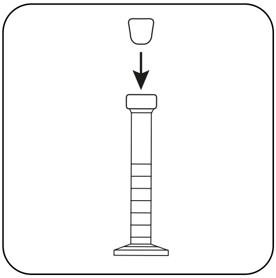
Fermez la(les) cuvette(s).



Versez **25 mL d'échantillon préparé** dans une fiole volumétrique de 25 mL.



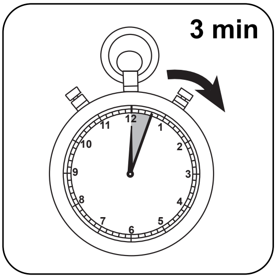
Ajoutez un **sachet de poudre Vario (Fe in Mo) Rgt 2**.



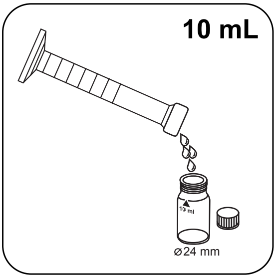
Fermez la fiole volumétrique avec un bouchon. Dissolvez la poudre en mettant la fiole à l'envers.

↵

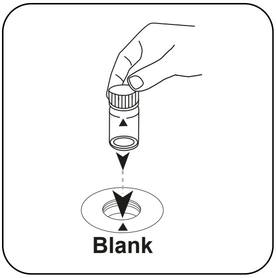
Appuyez sur la touche **ENTER**.



Attendez la fin du **temps de réaction de 3 minute(s)** .



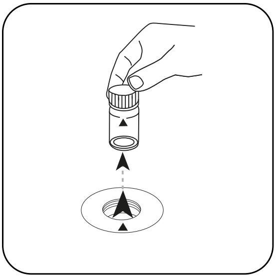
Versez **10 mL d'échantillon** dans la cuvette réservée à l'échantillon.



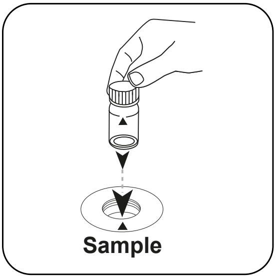
Placez la **cuvette du blanc** dans la chambre de mesure. Attention à la positionner correctement.

Zero

Appuyez sur la touche **ZERO**.



Retirez la cuvette de la chambre de mesure.



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

Test

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

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

Méthode chimique

TPTZ

Appendice

Interférences

Interférences exclues

1. Perturbation du pH : Le pH d’un échantillon inférieur à 3 ou supérieur à 4 après l’apport du réactif peut empêcher la coloration, car la couleur obtenue pâlit trop rapidement ou il se forme une turbidité. C'est pourquoi, le pH devra être ajusté sur une valeur de 3 - 5 dans la fiole volumétrique, avant l’apport de réactif :
   Ajoutez au goutte-à-goutte une quantité adéquate d'acide exempt de fer ou de base de type acide sulfurique 1N ou soude caustique 1N.
   Le volume devra être corrigé si une grande quantité d'acide ou de base a été ajoutée.

Bibliographie

G. Frederic Smith Chemical Co., The Iron Reagents, 3rd ed. (1980)

Fer LR L (A) M225

0.03 - 2 mg/L Fe FE

Ferrozine / Thioglycolate

Matériel

Matériel requis (partiellement optionnel):

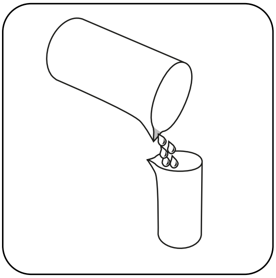
Réactifs	Pack contenant	Code
Acidité / Alcalinité P Indicateur PA1	65 mL	56L013565
Dureté du calcium tampon CH2	65 mL	56L014465
KP962 Poudre persulphate d'ammonium	Poudre / 40 g	56P096240
KS63-FE6-Thioglycolate/Molybdate HR RGT	30 mL	56L006330
KS63-FE6-Thioglycolate/Molybdate HR RGT	65 mL	56L006365
KS61-FE5-Ferrozine/Thioglycolate	65 mL	56L006165

Préparation

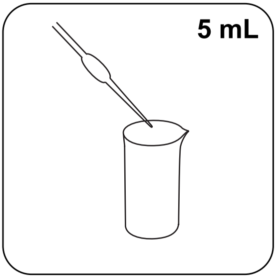
1. En présence de puissants séquestrants dans l'échantillon, il faudra augmenter le temps de réaction jusqu'à ce qu'il n'y ait plus aucune autre coloration visible. Les complexes du fer très forts ne sont pas pris en compte dans la mesure. Dans ce cas, les séquestrants doivent être détruits par oxydation à l'acide/persulfate. Le pH de l'échantillon sera ensuite ajusté à 6 - 9 par neutralisation.
2. Pour quantifier le fer total dissous et en suspension, l'échantillon doit être amené à ébullition avec apport d'acide/persulfate. Ensuite, neutralisez pour obtenir un pH compris entre 6 - 9 et faites l'appoint d'eau déminéralisée pour avoir le volume d'origine.

Fractionnement

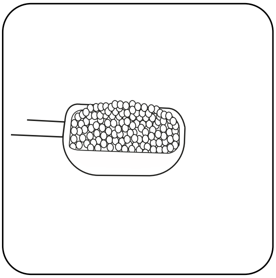
Le fer total est constitué de fer soluble, d'un complexe ferreux et de fer en suspension. Ne pas filtrer l'échantillon avant la mesure. Pour assurer l'homogénéisation de l'échantillon, les particules déposées devront être réparties uniformément directement avant le prélèvement en agitant fortement le flacon. Pour quantifier le fer total soluble (y compris les composés ferreux complexes), il est nécessaire de filtrer l'échantillon.Les appareils et réactifs nécessaires à la quantification ne sont pas compris dans la fourniture standard.



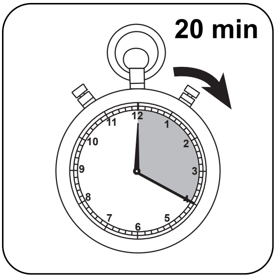
Versez **50 mL d'échantillon homogénéisé** dans un tube de fractionnement adéquat.



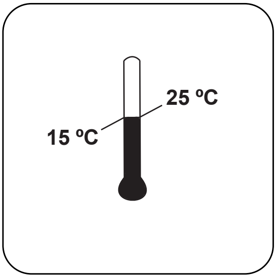
Ajoutez **5 mL de 1:1 d'acide chlorhydrique** .



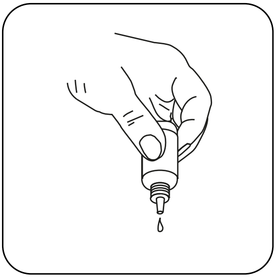
Ajoutez **une cuiller de mesure rase de KP 962 (Ammonium Persulfat Powder)**.



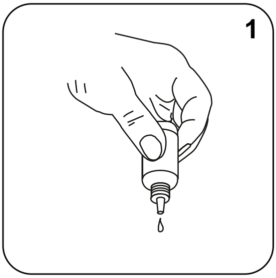
Mettez l'échantillon à ébullition et **maintenez la température pendant 20 minutes** . Il est recommandé de conserver un volume d'échantillon de 25 mL ; faites éventuellement l'appoint avec de l'eau déminéralisée.



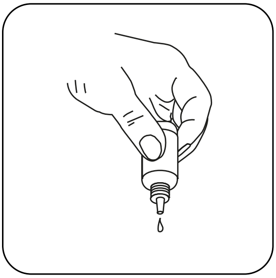
Laissez refroidir l'échantillon à **température ambiante**.



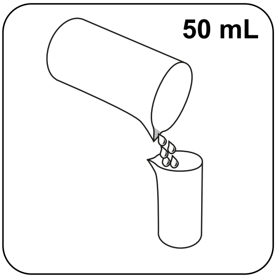
Tenez les flacons compte-goutte à la verticale et ajoutez des gouttes uniformes en appuyant lentement.



Ajoutez **1 gouttes de Acidity / Alkalinity P Indicator PA1**.



Ajoutez au goutte à goutte **Hardness Calcium Buffer CH2** au même échantillon jusqu'à obtention d'une coloration rosée à rouge. **(Attention : agitez l'échantillon après chaque goutte ajoutée !)**



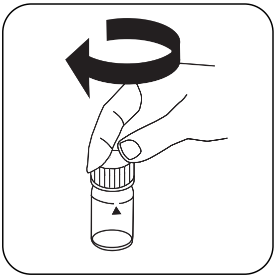
Complétez l'échantillon en ajoutant **d'eau déminéralisée pour obtenir 50 mL** .

Réalisation de la quantification Fer, LR total (A) avec réactif liquide

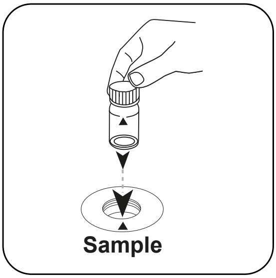
Sélectionnez la méthode sur l'appareil.

Pour la quantification de **Fer, LR total, procédez au fractionnement** décrit .

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



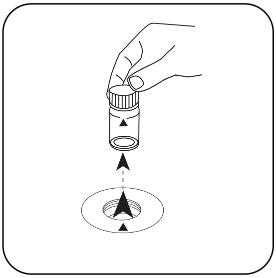
Fermez la(les) cuvette(s).



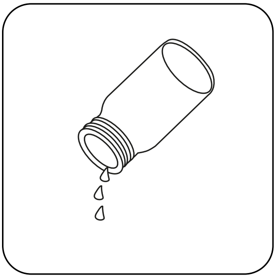
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.

Zero

Appuyez sur la touche **ZERO**.

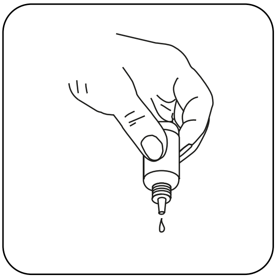


Retirez la cuvette de la chambre de mesure.

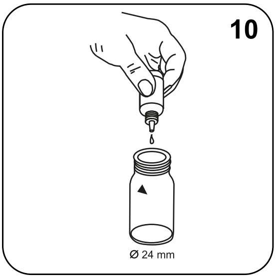


Videz la cuvette.

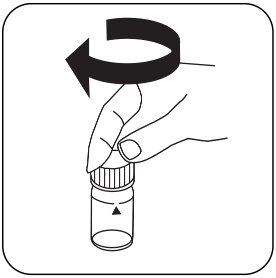
Remplissez une cuvette de 24 mm de **10 mL d’échantillon préparé**.



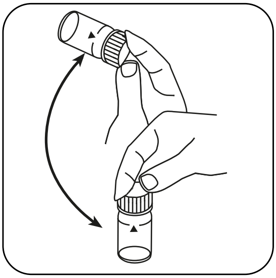
Tenez les flacons compte-goutte à la verticale et ajoutez des gouttes uniformes en appuyant lentement.



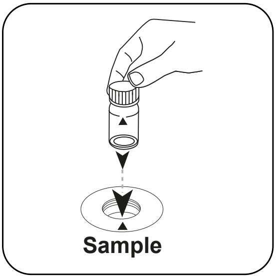
Ajoutez **10 gouttes de Iron Reagent FE5**.



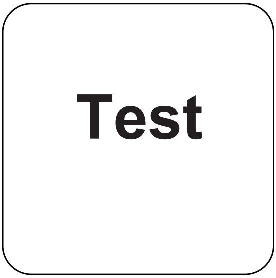
Fermez la(les) cuvette(s).



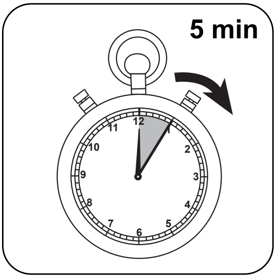
Mélangez le contenu en mettant le tube plusieurs fois à l’envers puis à l’endroit.



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



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



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

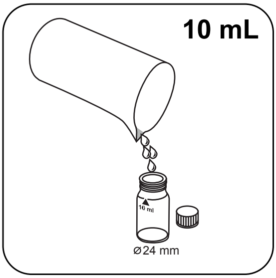
À l’issue du temps de réaction, la mesure est effectuée automatiquement.

Le résultat s'affiche à l’écran en mg/L Fer total ou avec un échantillon filtré, fer total résolu en mg/l.

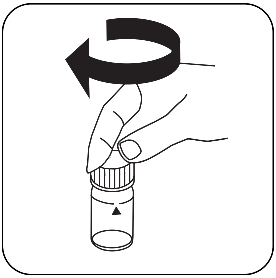
Réalisation de la quantification Fer, LR (A) avec réactif liquide

Sélectionnez la méthode sur l’appareil.

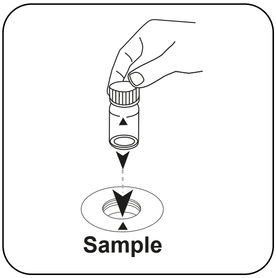
Pour la quantification du fer total dissous, l’échantillon doit être filtré avant la quantification (taille des pores 0,45 µm). Sinon, les particules de fer et le fer en suspension seront également quantifiés.



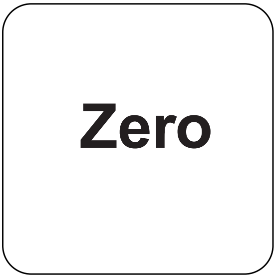
Remplissez une cuvette de 24 mm de **10 mL d’échantillon préparé**.



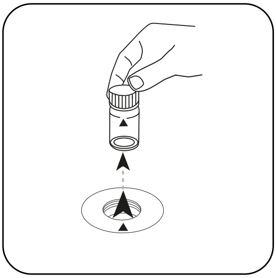
Fermez la(les) cuvette(s).



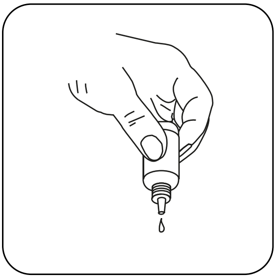
Placez la **cuvette réservée à l’échantillon** dans la chambre de mesure. Attention à la positionner correctement.



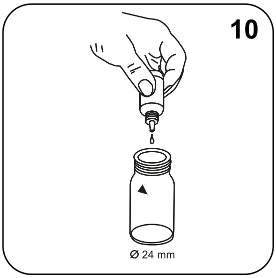
Appuyez sur la touche **ZERO**.



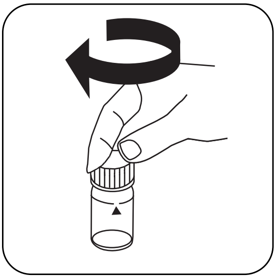
Retirez la cuvette de la chambre de mesure.



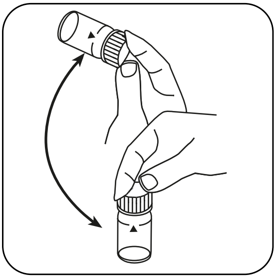
Tenez les flacons compte-goutte à la verticale et ajoutez des gouttes uniformes en appuyant lentement.



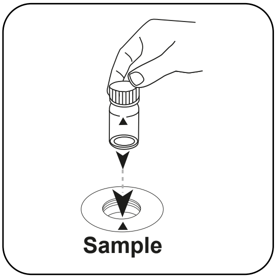
Ajoutez **10 gouttes de Iron Reagent FE5**.



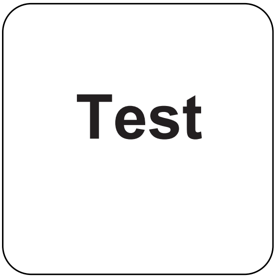
Fermez la(les) cuvette(s).



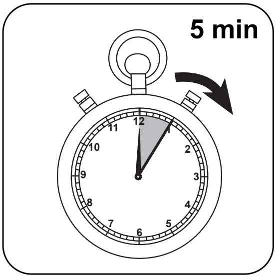
Mélangez le contenu en mettant le tube plusieurs fois à l’envers puis à l’endroit.



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



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



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

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

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

Méthode chimique

Ferrozine / Thioglycolate

Appendice

Interférences

Interférences exclues

1. L'utilisation de KS61 (ferrozine/thioglycolate) entraîne, en liaison avec une concentration élevée de molybdate, une coloration jaune intensive. Dans ce cas, une valeur à blanc des produits chimiques est nécessaire:
    - Préparez deux **cuvettes de 24 mm** propres.
    - L'une des deux cuvettes sera la cuvette du blanc. Étiquetez-la.
    - Dans une cuvette propre de 24 mm, ajoutez **10 ml d'échantillon** (cuvette du blanc).
    - Dans la cuvette, ajoutez **10 gouttes de KS63 (thioglycolate)**.
    - Refermez la cuvette à l'aide du couvercle et mélangez son contenu en la mettant plusieurs fois à l'envers.
    - Déposez la cuvette du blanc dans la chambre de mesure. Attention à la positionner correctement.
    - Appuyez sur la touche **ZERO** .
    - Retirez la cuvette de la chambre de mesure.
    - Dans une deuxième cuvette propre de 24 mm, ajoutez **10 ml d'échantillon** (cuvette réservée à l'échantillon).
    - Ajoutez **10 gouttes de KS61 (ferrozine/thioglycolate)** et continuez comme décrit dans la méthode.

Interférences	de / [mg/L]
Co	8
Cu	2
Oxalat	500
CN^-	10
NO_2^-	

Bibliographie

D. F. Boltz and J. A. Howell, eds., Colorimetric Determination of Nonmetals, 2nd ed., Vol. 8, p. 304 (1978). Carpenter, J.F. « A New Field Method for Determining the Levels of Iron Contamination in Oilfield Completion Brine », SPE International Symposium (2004)

Molybdate LR PP M251

0.03 - 3 mg/L Mo Mo1

Complexe Ternaire

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
VARIO molybdène LR, kit	1 Pièces	535450

Les accessoires suivants sont requis.

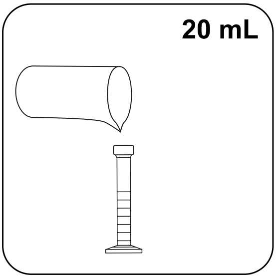
Accessoires	Pack contenant	Code
Tube gradué à bouchon, accessoires nécessaires à déterminer le molybdène LR avec MD 100 (276140)	1 Pièces	19802650

Préparation

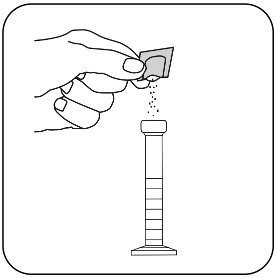
1. Avant l’analyse, les eaux fortement alcalines ou acides devraient être ajustées sur un pH compris entre 3 et 5 (avec 0,5 mol/l d'acide sulfurique ou 1 mol/l de soude caustique).
2. Pour éviter les erreurs causées par les dépôts, lavez les instruments en verre avant l’analyse en utilisant une solution d’acide chlorhydrique (à 20% env.) puis rincez à l’eau déminéralisée.

Réalisation de la quantification Molybdate LR avec sachet de poudre Vario

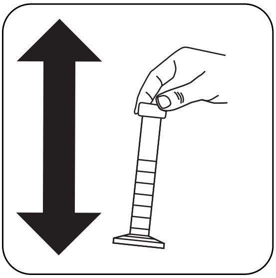
Sélectionnez la méthode sur l’appareil.



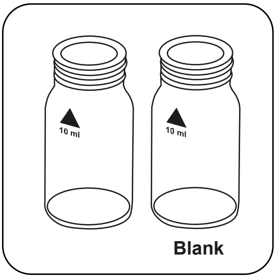
Versez **20 mL d’échantillon** dans une fiole volumétrique de 25 mL.



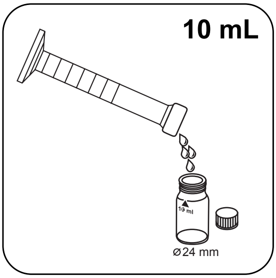
Ajoutez un **sachet de poudre Vario Molybdenum 1 LR F20**.



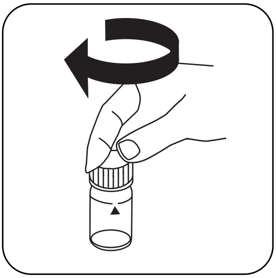
Fermez la fiole volumétrique avec un bouchon. Dissolvez la poudre en agitant.



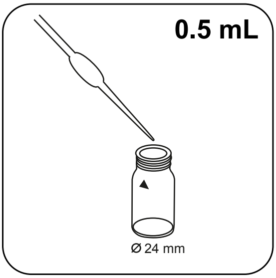
Préparez deux cuvettes propres de 24 mm. L’une des deux cuvettes sera la cuvette du blanc. Étiquetez-la.



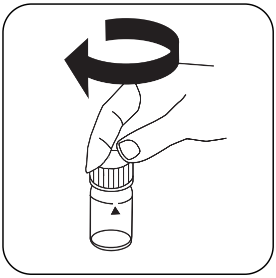
Dans chaque cuvette, versez **10 mL d’échantillon**.



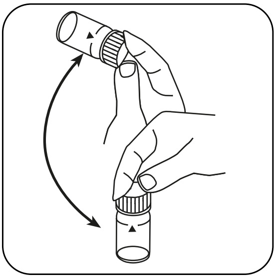
Obturez à fond la **cuvette du blanc**.



Ajoutez **0.5 mL de solution Molybdenum 2 LR** dans la cuvette réservée à l’échantillon.



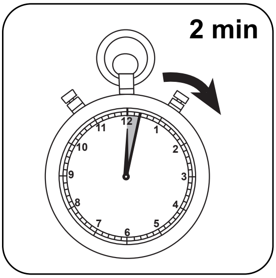
Fermez la(les) cuvette(s).



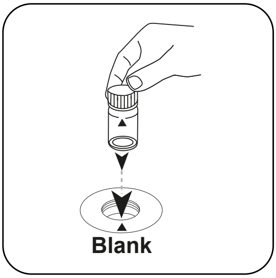
Mélangez le contenu en mettant le tube plusieurs fois à l’envers puis à l’endroit.

↵

Appuyez sur la touche **ENTER**.



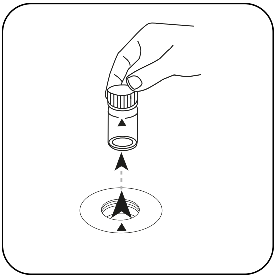
Attendez la fin du **temps de réaction de 2 minute(s)** .



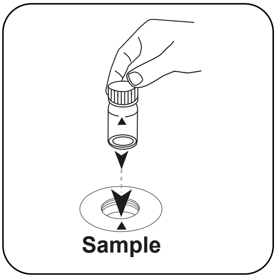
Placez la **cuvette du blanc** dans la chambre de mesure. Attention à la positionner correctement.

Zero

Appuyez sur la touche **ZERO**.



Retirez la cuvette de la chambre de mesure.



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

Test

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

Le résultat s'affiche à l’écran en mg/L Molybdate/ Molybdenum.

Analyses

Le tableau suivant identifie les valeurs de sortie qui peuvent être converties en d'autres formes de citation.

Unité	Formes de citation	Facteur de conversion
mg/l	MoO_4	1
mg/l	Mo	0.6
mg/l	Na_2MoO_4	1.29

Méthode chimique

Complexe Ternaire

Appendice

Interférences

Interférences	de / [mg/L]	Influence
Al	50	
Cr	1000	
Fe	50	
Ni	50	
NO_2^-	en toutes les quantités	
Cu	10	Entraîne des valeurs plus élevées avec un temps de réponse supérieur à 5 minutes

Bibliographie

Analytical Chemistry, 25(9) 1363 (1953)

Molybdate HR L M254

1 - 100 mg/L MoO_4 Mo2

Thioglycolate

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
KS63-FE6-Thioglycolate/Molybdate HR RGT	65 mL	56L006365

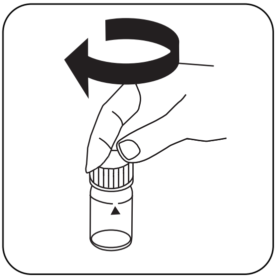
Échantillonnage

1. Le test devra avoir lieu directement après le prélèvement de l'échantillon. Le molybdate se dépose sur les parois du tube utilisé pour le prélèvement de l'échantillon, ce qui donne des résultats plus bas.

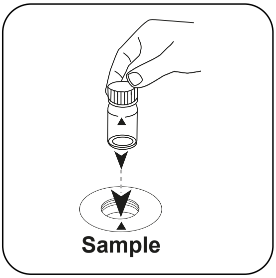
Réalisation de la quantification Molybdate HR avec réactif liquide

Sélectionnez la méthode sur l'appareil.

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



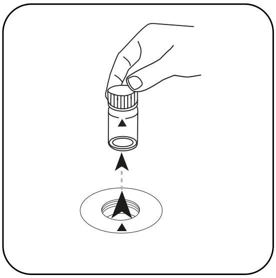
Fermez la(les) cuvette(s).



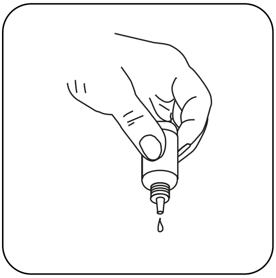
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.

Zero

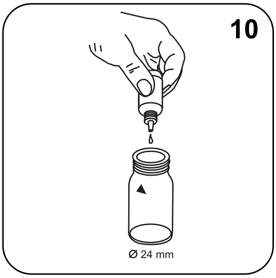
Appuyez sur la touche **ZERO**.



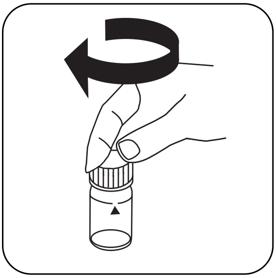
Retirez la cuvette de la chambre de mesure.



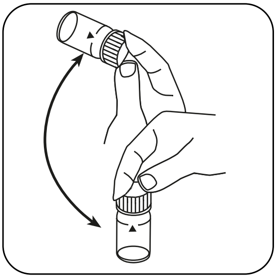
Tenez les flacons compte-goutte à la verticale et ajoutez des gouttes uniformes en appuyant lentement.



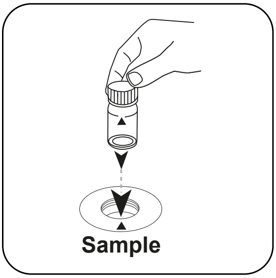
Ajoutez **10 gouttes de Iron Reagent FE6**.



Fermez la(les) cuvette(s).



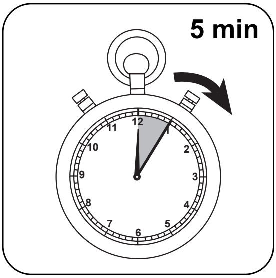
Mélangez le contenu en mettant le tube plusieurs fois à l’envers puis à l’endroit.



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

Test

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



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

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

Le résultat s'affiche à l’écran en mg/L Molybdate/ Molybdenum.

Analyses

Le tableau suivant identifie les valeurs de sortie qui peuvent être converties en d'autres formes de citation.

Unité	Formes de citation	Facteur de conversion
mg/l	MoO_4	1
mg/l	Mo	0.6
mg/l	Na_2MoO_4	1.29

Méthode chimique

Thioglycolate

Appendice

Interférences

Interférences exclues

1. La perturbation du niobium, tantale, titane et du zirconium est masquée avec de l’acide citrique.
2. La perturbation du vanadium (V) est masquée avec du fluorure de potassium.

Bibliographie

Photometrische Analyse, Lange/ Vjedelek, Verlag Chemie 1980

Ozone T M300

0.02 - 2 mg/L O_3 O3

DPD / Glycine

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
DPD N°1	Pastilles / 100	511050BT
DPD N° 1	Pastilles / 250	511051BT
DPD N° 1	Pastilles / 500	511052BT
DPD N° 3	Pastilles / 100	511080BT
DPD N° 3	Pastilles / 250	511081BT
DPD N° 3	Pastilles / 500	511082BT
DPD N° 1 High Calcium [e)]	Pastilles / 100	515740BT
DPD N° 1 High Calcium [e)]	Pastilles / 250	515741BT
DPD N° 1 High Calcium [e)]	Pastilles / 500	515742BT
DPD N° 3 High Calcium [e)]	Pastilles / 100	515730BT
DPD N° 3 High Calcium [e)]	Pastilles / 250	515731BT
DPD N° 3 High Calcium [e)]	Pastilles / 500	515732BT
Glycine [f)]	Pastilles / 100	512170BT
Glycine [f)]	Pastilles / 250	512171BT
Kit DPD N° 1/N° 3[#]	100 chacun	517711BT
Kit DPD N° 1/N° 3[#]	250 chacun	517712BT
Kit DPD N° 1/N° 3 High Calcium[#]	100 chacun	517781BT
Kit DPD N° 1/N° 3 High Calcium[#]	250 chacun	517782BT
Kit DPD N° 1/Glycine [#]	100 chacun	517731BT
Kit DPD N° 1/Glycine [#]	250 chacun	517732BT

Préparation

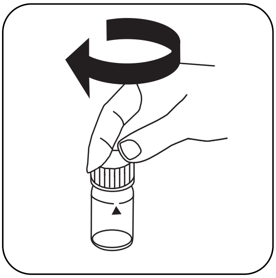
1. Nettoyage des cuvettes :
   Beaucoup de produits de nettoyage domestiques (par ex. liquide vaisselle) contenant des agents réducteurs, il est possible que lors de la quantification suivante des agents oxydants (par ex. ozone, chlore), les résultats soient plus bas. Pour exclure ces erreurs, les instruments en verre utilisés devraient être insensibles aux effets du chlore. Il est recommandé de laisser les instruments en verre pendant une heure dans une solution d'hypochlorite de sodium (0,1 g/L) et de bien les rincer ensuite à l'eau déminéralisée.
2. Lors de la préparation de l'échantillon, il faudra éviter le dégazage de l'ozone, par ex. par pipetage ou agitation. L'analyse devra avoir lieu immédiatement après le prélèvement de l'échantillon.
3. Avant l'analyse, les eaux fortement alcalines ou acides doivent être ajustées sur un pH compris entre 6 et 7 (avec 0,5 mol/l d'acide sulfurique ou 1 mol/l de soude caustique).

Réalisation de la quantification Ozone, en présence de chlore avec pastille

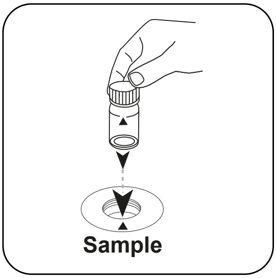
Sélectionnez la méthode sur l’appareil.

Sélectionnez également la quantification : en présence de chlore

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



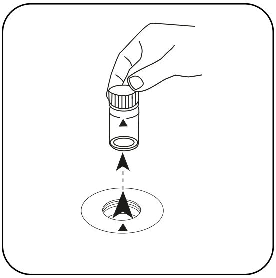
Fermez la(les) cuvette(s).



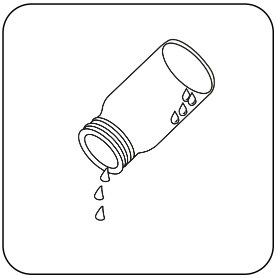
Placez la **cuvette réservée à l’échantillon** dans la chambre de mesure. Attention à la positionner correctement.

Zero

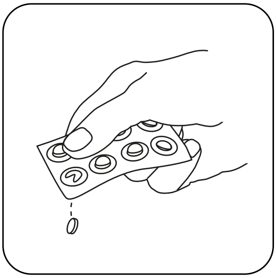
Appuyez sur la touche **ZERO**.



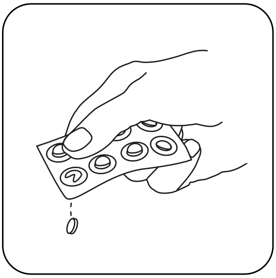
Retirez la cuvette de la chambre de mesure.



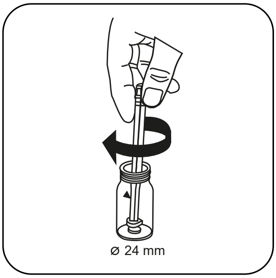
Videz pratiquement la cuvette en y laissant quelques gouttes.



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

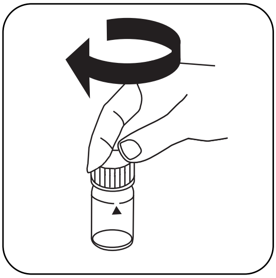


Ajoutez une **pastille de DPD No. 3**.

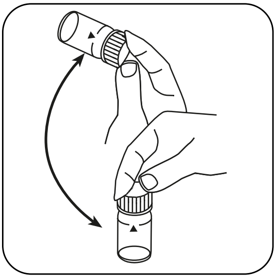


Écrasez la(les) pastille(s) en la(les) tournant un peu.

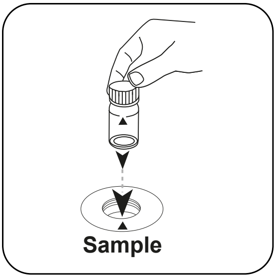
Remplissez la cuvette jusqu’au **repère de 10 mL** en y versant l’**échantillon**.



Fermez la(les) cuvette(s).



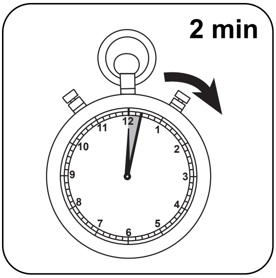
Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



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

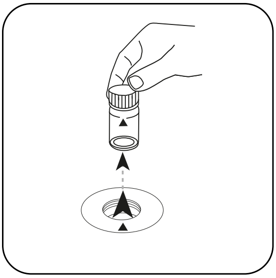
Test

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

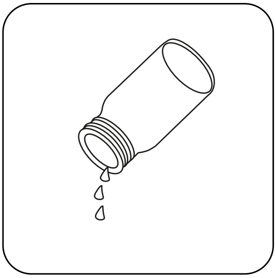


Attendez la fin du **temps de réaction de 2 minute(s)** .

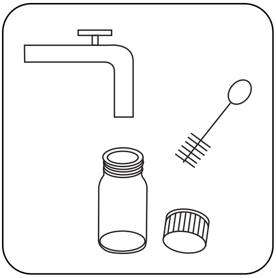
À l’issue du temps de réaction, la mesure est effectuée automatiquement.



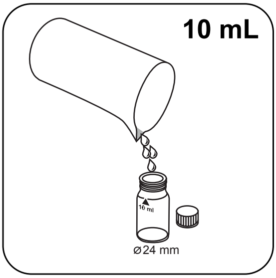
Retirez la cuvette de la chambre de mesure.



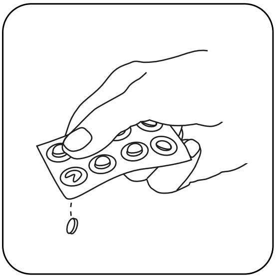
Videz la cuvette.



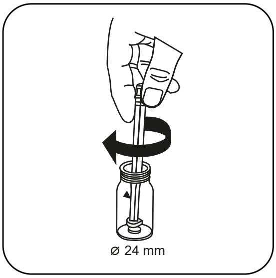
Nettoyez à fond la cuvette et le couvercle de la cuvette.



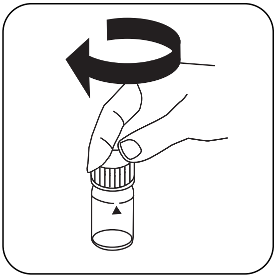
Remplissez une **deuxième cuvette** de **10 mL d'échantillon**.



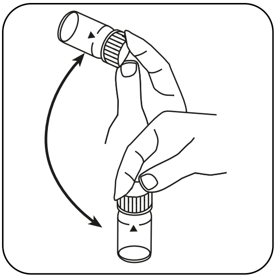
Ajoutez une **pastille de GLYCINE**.



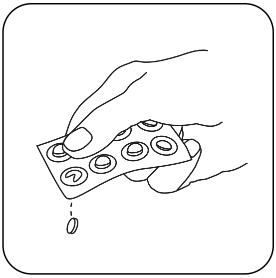
Écrasez la(les) pastille(s) en la(les) tournant un peu.



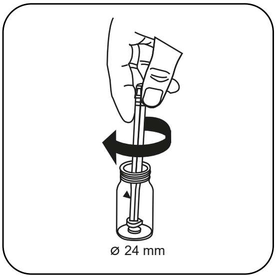
Fermez la(les) cuvette(s).



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

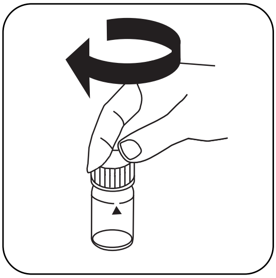


Déposez une pastille de DPD No. 1 et **une pastille de DPD No. 3** immédiatement après l'avoir déballée, dans la première cuvette.

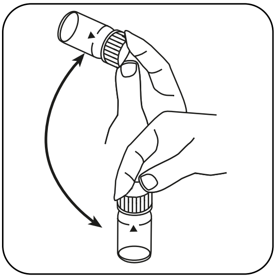


Écrasez la(les) pastille(s) en la(les) tournant un peu.

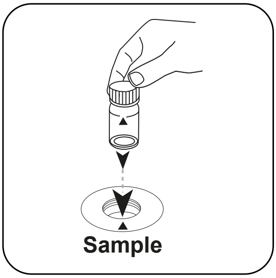
Versez la **solution de Glycine** préparée dans la cuvette préparée.



Fermez la(les) cuvette(s).



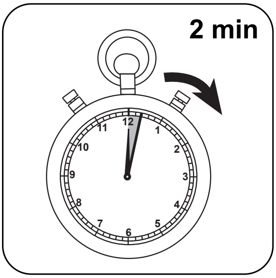
Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



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

Test

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



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

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

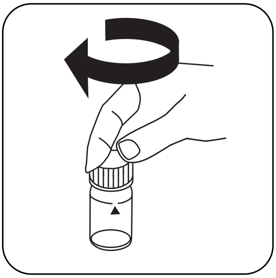
Le résultat s'affiche à l'écran en mg/L Ozone; chlore total mg/l.

Réalisation de la quantification Ozone, en l'absence de chlore avec pastille

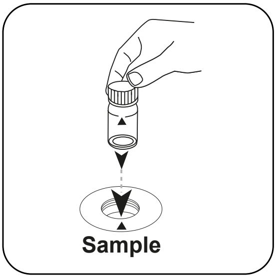
Sélectionnez la méthode sur l'appareil.

Sélectionnez également la quantification : sans chlore

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



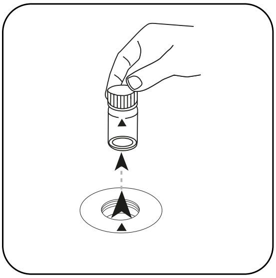
Fermez la(les) cuvette(s).



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

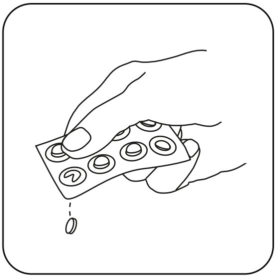
Zero

Appuyez sur la touche **ZERO**.

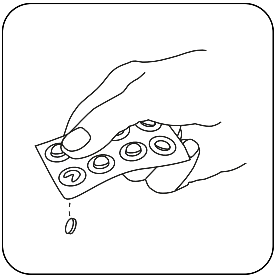


Retirez la cuvette de la chambre de mesure.

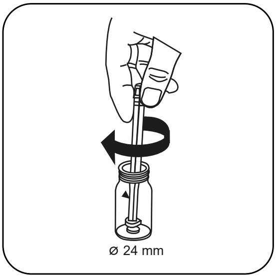
Videz pratiquement la cuvette en y laissant quelques gouttes.



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

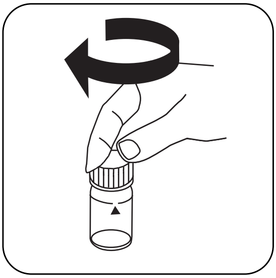


Ajoutez une **pastille de DPD No. 3**.

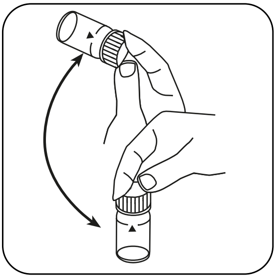


Écrasez la(les) pastille(s) en la(les) tournant un peu.

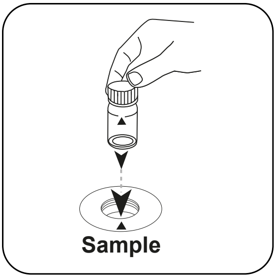
Remplissez la cuvette jusqu’au **repère de 10 mL** en y versant l’**échantillon**.



Fermez la(les) cuvette(s).



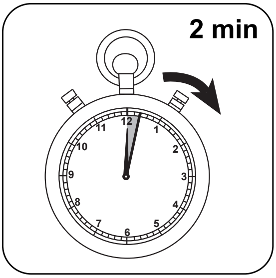
Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



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

Test

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



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

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

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

Analyses

Le tableau suivant identifie les valeurs de sortie qui peuvent être converties en d'autres formes de citation.

Unité	Formes de citation	Facteur de conversion
mg/l	O_3	1
mg/l	Cl_2	1.4771

Méthode chimique

DPD / Glycine

Appendice

Interférences

Interférences persistantes

1. Les agents oxydants contenus dans les échantillons réagissent tous comme le chlore, ce qui entraîne des résultats plus élevés.
2. Les concentrations d’ozone supérieures à 6 mg/L peuvent provoquer des résultats dans la plage de mesure allant jusqu’à 0 mg/L. Dans ce cas, diluez l’échantillon d'eau. Le réactif est ajouté à 10 ml d’échantillon dilué. Ensuite, la mesure est répétée (test de plausibilité).

Bibliographie

Colorimetric Chemical Analytical Methods, 9th Edition, Lovibond

Dérivé de

DIN 38408-3:2011-04

[e)] autre réactif, utilisé à la place de DPD No.1/3 en cas de turbidité dans l‘échantillon d‘eau due à une concentration élevée de calcium et/ou une conductivité élevée | [f)] nécessaire pour la détermination de brome, dioxyde de chlore et ozone en présence de chlore | [j) #] agitateur inclus

Polyacrylates L M338

1 - 30 mg/L Polyacryl POLY

Turbidité

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
Cartouche C18	1 Pièces	56A020101
KS173-P2-Indicateur de 2,4-dinitrophénol	65 mL	56L017365
KS183-QA2-MO1-P3-Acide nitrique	65 mL	56L018365
Polyacrylate L Reagent Set	1 Pièces	56R019165
KS336-Propan-2-ol, 65 mL	65 mL	56L033665

Les accessoires suivants sont requis.

Accessoires	Pack contenant	Code
Pipette, 1000 µl	1 Pièces	365045
Pointes de pipette, 0,1-1 ml (bleu) 1000 pièces	1 Pièces	419073

Préparation

- **Préparation de la cartouche :**

1. Retirez le piston d’une seringue adéquate. Fixez la cartouche C18 sur le cylindre de la seringue.
2. Ajoutez 5 ml de KS336 (Propane-2-ol) dans le cylindre de la seringue.
3. À l’aide du piston, pressez le solvant au goutte à goutte dans la cartouche.
4. Éliminez le solvant passé.
5. Retirez à nouveau le piston. Remplissez le cylindre de la seringue de 20 ml d’eau déminéralisée.
6. À l’aide du piston, pressez le contenu au goutte à goutte dans la cartouche.
7. Éliminez l'eau déminéralisée passée.
8. La cartouche est maintenant prête à l’emploi.

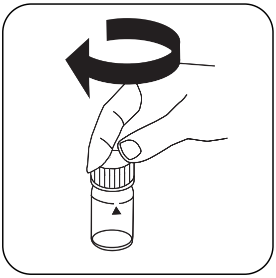
Indication

1. Si, malgré le dosage correct des échantillons et réactifs, il ne se forme pas de turbidité ou uniquement une turbidité infime, il est nécessaire d'augmenter la concentration de l'échantillon pour la détection des polyacrylates/polymères.
2. On peut avoir différents résultats si des constituants de l'échantillon ou des impuretés causent des perturbations. Dans ce cas, il est nécessaire d'éliminer les perturbations.
3. Cette méthode a été enregistrée en utilisant de l'acide polyacrylique 2100 sel sodique dans la plage de 1-30 mg/L. Les autres polyacrylates / polymères fournissent différents résultats, si bien que la plage de mesure peut varier.

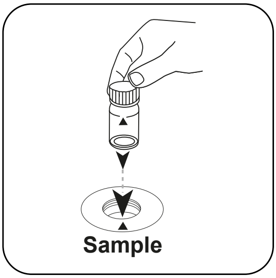
Réalisation de la quantification Polyacrylates avec réactif liquide

Sélectionnez la méthode sur l’appareil.

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



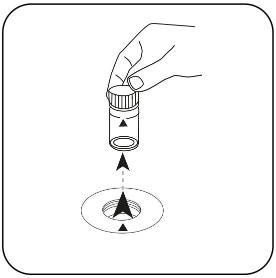
Fermez la(les) cuvette(s).



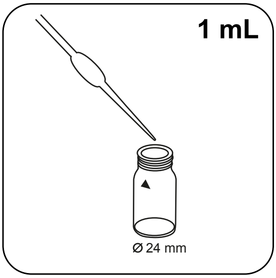
Placez la **cuvette réservée à l’échantillon** dans la chambre de mesure. Attention à la positionner correctement.

Zero

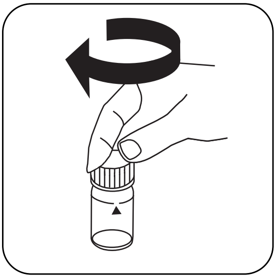
Appuyez sur la touche **ZERO**.



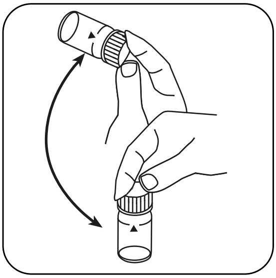
Retirez la cuvette de la chambre de mesure.



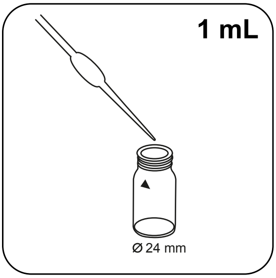
Ajoutez **1 mL de solution (25 drops) Polyacrylate Buffer A1** dans la cuvette réservée à l’échantillon.



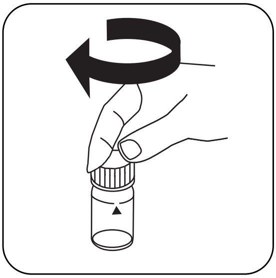
Fermez la(les) cuvette(s).



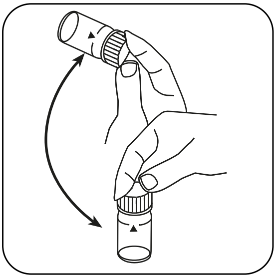
Mélangez le contenu en mettant le tube plusieurs fois à l’envers puis à l’endroit.



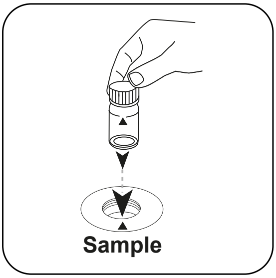
Ajoutez **1 mL de solution (25 drops) Polyacrylate Precipitant A2** dans la cuvette réservée à l’échantillon.



Fermez la(les) cuvette(s).



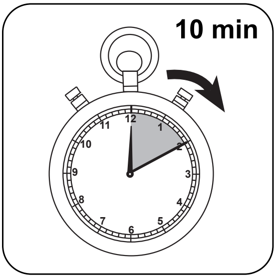
Mélangez le contenu en mettant le tube plusieurs fois à l’envers puis à l’endroit.



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

Test

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



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

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

Le résultat s'affiche à l’écran en mg/L Acide polyacrylique 2100 sel de sodium.

Méthode chimique

Turbidité

Appendice

Bibliographie

W.B. Crummett, R.A. Hummel (1963), The Determination of Polyacrylamides in Water, American Water Works Association, 55 (2), pp. 209-219

Sulfate PP M360

5 - 100 mg/L SO_4^{2-} SO4

Sulfate de baryum - turbidité

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
VARIO Sulfa 4 F10	Poudre / 100 Pièces	532160
ValidCheck Sulfate 75 mg/l	1 Pièces	48311325

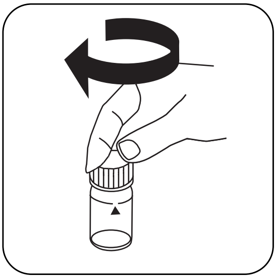
Indication

1. Le sulfate cause une fine turbidité répartie.

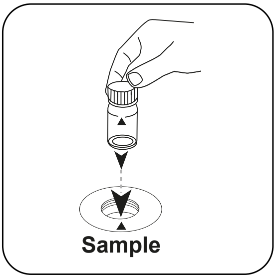
Réalisation de la quantification Sulfate avec sachet de poudre Vario

Sélectionnez la méthode sur l’appareil.

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



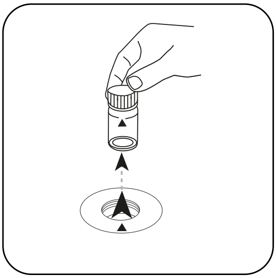
Fermez la(les) cuvette(s).



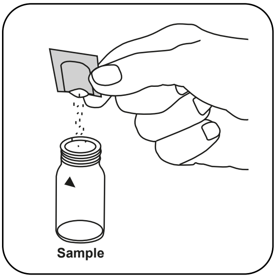
Placez la **cuvette réservée à l’échantillon** dans la chambre de mesure. Attention à la positionner correctement.

Zero

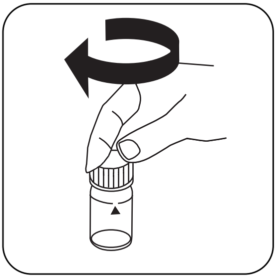
Appuyez sur la touche **ZERO**.



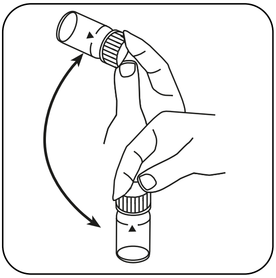
Retirez la cuvette de la chambre de mesure.



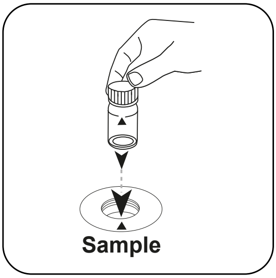
Ajoutez un **sachet de poudre Vario Sulpha 4/ F10**.



Fermez la(les) cuvette(s).



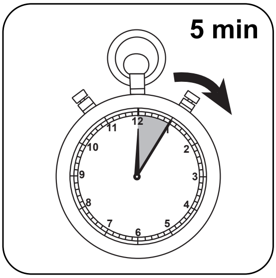
Mélangez le contenu en mettant le tube plusieurs fois à l’envers puis à l’endroit.



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

Test

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



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

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

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

Méthode chimique

Sulfate de baryum - turbidité

Appendice

Selon

Standard Method 4500-SO42- E
US EPA 375.4

Dérivé de

DIN ISO 15923-1 D49

Triazole PP M388

1 - 16 mg/L Benzotriazole or Tolyltriazole tri

Révélation UV par catalyse

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
VARIO Triazole RGT, Sachet de poudre F25	Poudre / 100 Pièces	532200
VARIO Solution saline Rochelle, 30 ml [h)]	30 mL	530640

Les accessoires suivants sont requis.

Accessoires	Pack contenant	Code
Illuminants	1 Pièces	400740
Lunettes de protection contre les UV, orange	1 Pièces	400755

Avertissements

Tant que la lampe UV est allumée, portez des lunettes de protection anti-UV.

Échantillonnage

1. Mesurez l’échantillon d'eau le plus rapidement possible après le prélèvement.

Préparation

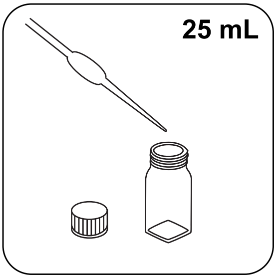
1. Pour obtenir des résultats exacts, la température de l’échantillon sera comprise entre 20 °C et 25 °C.
2. Avant l’analyse, les eaux contenant du nitrite ou du borax devraient être ajustées sur un pH compris entre 4 et 6 (avec de l'aide sulfurique 1N).
3. Si l’échantillon a une dureté supérieure à 500 mg/L $CaCO_3$, ajoutez 10 gouttes d’une solution saline Rochelle.

Indication

1. Sachet de poudre de triazole réactif et lampe UV disponibles sur demande.
2. Avant de manipuler la lampe UV, veuillez lire la notice du fabricant. Ne pas toucher à la surface de la lampe UV. Les traces de doigt attaquent le verre. Nettoyez la lampe UV entre les mesures avec un chiffon doux et propre.
3. Le test ne différencie pas entre les tolytriazoles et les benzotriazoles.

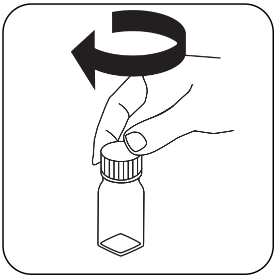
Réalisation de la quantification Benzotriazoles/tolytriazoles avec sachet de poudre Vario

Sélectionnez la méthode sur l’appareil.

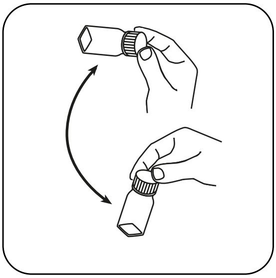


Remplissez un récipient de digestion de **25 mL** d'échantillon.

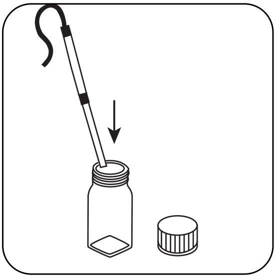
Ajoutez un **sachet de poudre** .



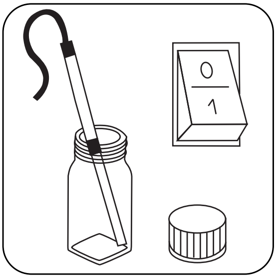
Fermez la récipient de digestion.



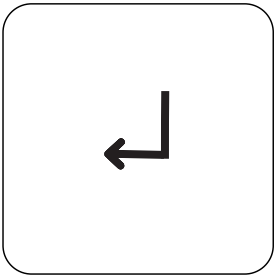
Dissolvez la poudre en mettant plusieurs fois le tube à l'envers puis à l'endroit.



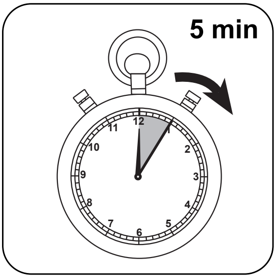
Tenez la lampe UV dans l’échantillon. **Attention : Portez des lunettes de protection UV !**



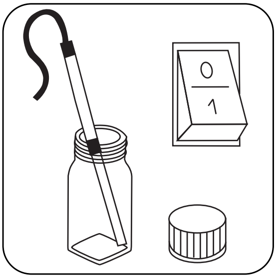
Enclenchez la lampe UV.



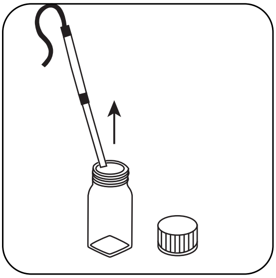
Appuyez sur la touche **ENTER**.



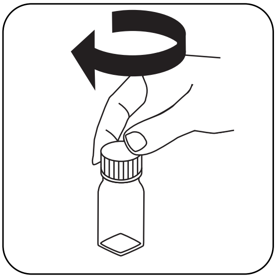
Attendez la fin du **temps de réaction de 5 minute(s)** .



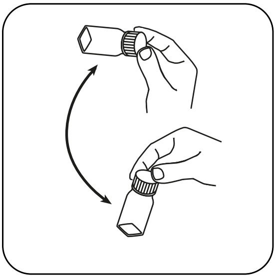
Arrêtez la lampe UV à la fin du compte à rebours .



Retirez la lampe UV de l'échantillon.

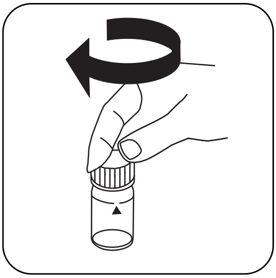


Fermez la récipient de digestion.

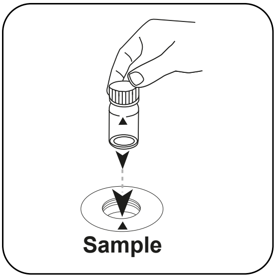


Mélangez le contenu en mettant le tube plusieurs fois à l'envers puis à l'endroit.

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



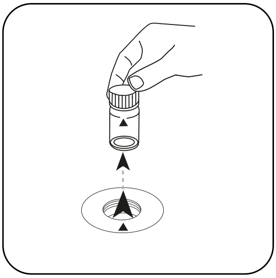
Fermez la(les) cuvette(s).



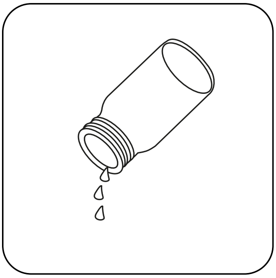
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.

Zero

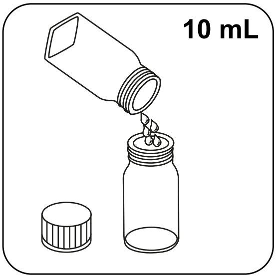
Appuyez sur la touche **ZERO**.



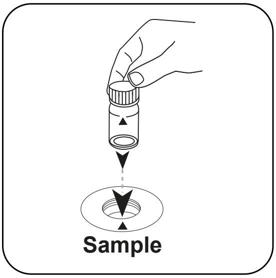
Retirez la cuvette de la chambre de mesure.



Videz la cuvette.



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



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

Test

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

Le résultat s'affiche à l’écran en mg/L Benzotriazole / tolyltriazole (Passez d'une forme de citation à l'autre en appuyant sur la flèche haut/bas.).

Analyses

Le tableau suivant identifie les valeurs de sortie qui peuvent être converties en d'autres formes de citation.

Unité	Formes de citation	Facteur de conversion
mg/l	Benzotriazole	1
mg/l	Tolyltriazole	1.1177

Méthode chimique

Révélation UV par catalyse

Appendice

Interférences

Interférences persistantes

- Si la photolyse est réalisée pendant plus ou moins de 5 minutes, ceci peut rabaisser les résultats.

Bibliographie

Harp, D., Proceedings 45th International Water Conference, 299 (October 22-24, 1984)

[h)] Utilisation pour des échantillons d'une dureté supérieure à 300 mg/l $CaCO_3$

Zinc L M405

0.1 - 2.5 mg/L Zn Zn

Zincon / EDTA

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
KS 89 - Inhibiteur cationique	65 mL	56L008965
Zinc LR Reagent Set	1 Pièces	56R023965
Tampon de zinc Z1B	65 mL	56L024365
KP244 Réactif de zinc 2	Poudre / 20 g	56P024420

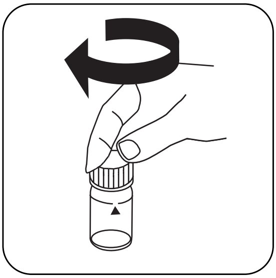
Indication

1. Pour assurer la justesse du dosage, utilisez la cuiller de mesure fournie avec les réactifs.
2. Ce test permet de quantifier le zinc libre, soluble. Le zinc qui est lié à de puissants séquestrants, n'est pas détecté.

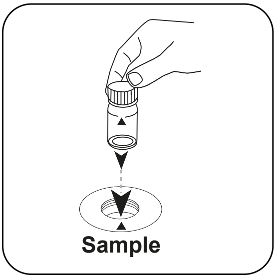
Réalisation de la quantification Zinc avec réactif liquide et poudre

Sélectionnez la méthode sur l’appareil.

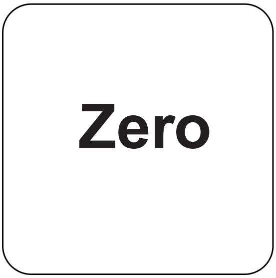
Remplissez une cuvette de 24 mm de **10 mL d’échantillon**.



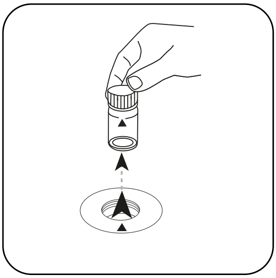
Fermez la(les) cuvette(s).



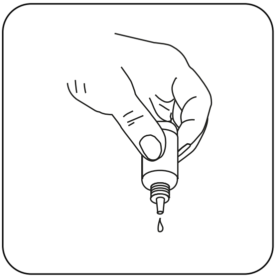
Placez la **cuvette réservée à l’échantillon** dans la chambre de mesure. Attention à la positionner correctement.



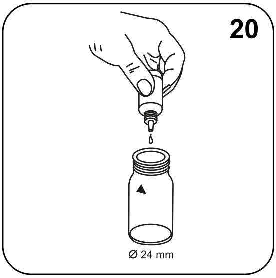
Appuyez sur la touche **ZERO**.



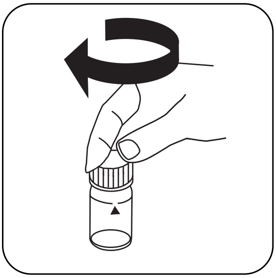
Retirez la cuvette de la chambre de mesure.



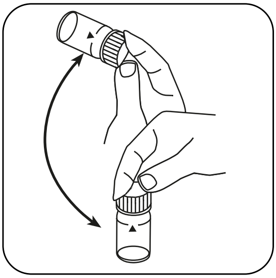
Tenez les flacons compte-goutte à la verticale et ajoutez des gouttes uniformes en appuyant lentement.



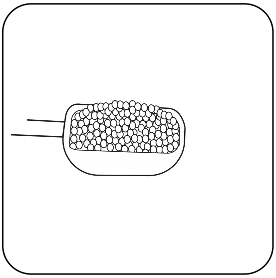
Ajoutez **20 gouttes de Zinc Buffer Z1B**.



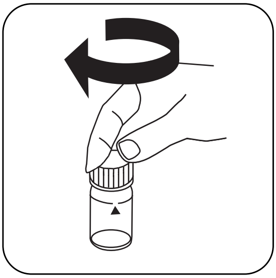
Fermez la(les) cuvette(s).



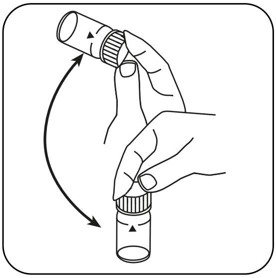
Mélangez le contenu en mettant le tube plusieurs fois à l’envers puis à l’endroit.



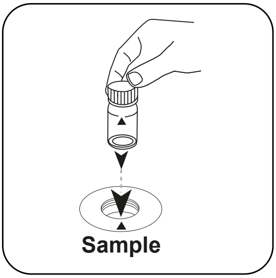
Ajoutez **une cuiller de mesure rase de Zinc Indicator Z4P**.



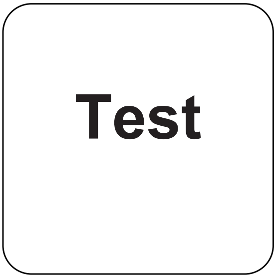
Fermez la(les) cuvette(s).



Dissolvez la poudre en mettant plusieurs fois le tube à l'envers puis à l'endroit.



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



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

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

Méthode chimique

Zincon / EDTA

Appendice

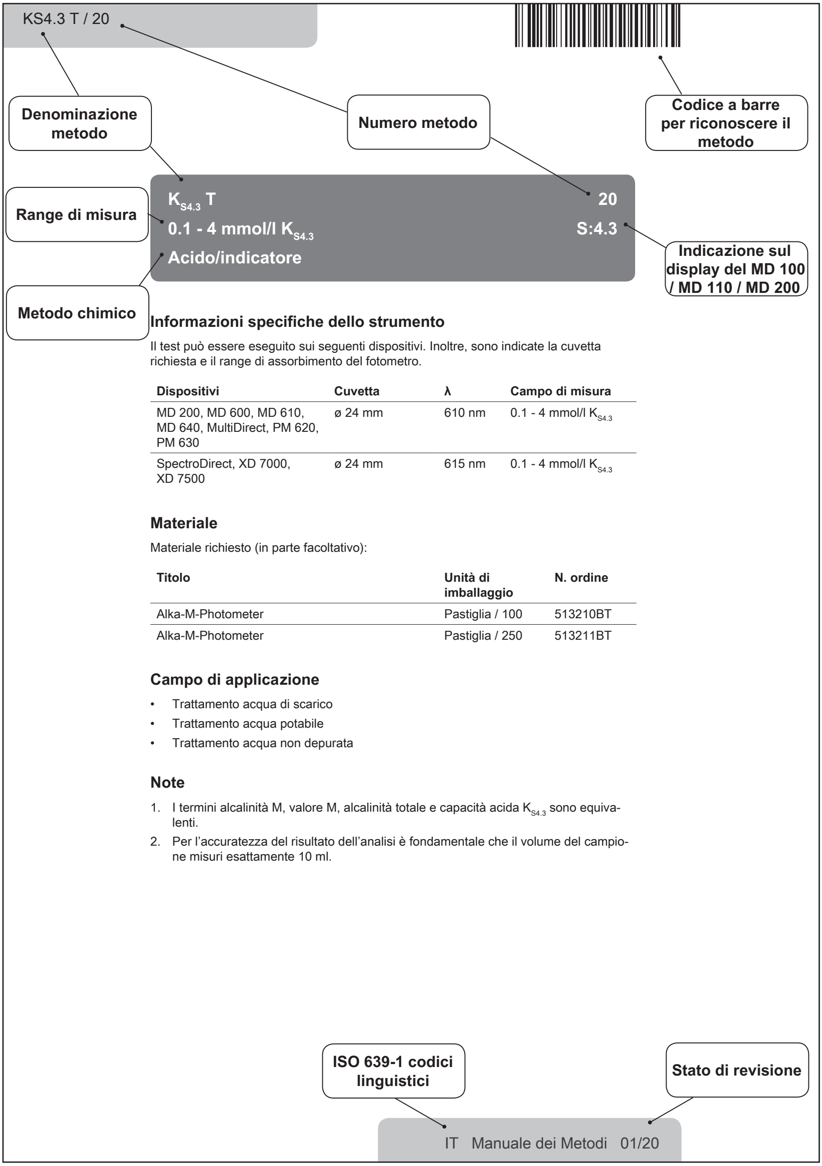
Interférences

Interférences exclues

- Les cations, de type composés d'ammonium quaternaires, entraînent une coloration allant du rose et au violet, suivant la concentration de cuivre existante. Ajoutez du KS89 (inhibiteur cationique) au goutte à goutte jusqu'à ce qu'une couleur orange/ bleue soit visible. Attention : Mettez le tube l'échantillon à l'envers puis à l'endroit après chaque goutte ajoutée.

Bibliographie

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989
S.M. Khopkar, Basic Concepts of Analytical Chemistry (2004), New Age International Ltd. Publishers, New Dheli, p. 75



KS4.3 T / 20

$K_{S4.3}$ T **20**

0.1 - 4 mmol/l $K_{S4.3}$ **S:4.3**

Acido/indicatore

Informazioni specifiche dello strumento

Il test può essere eseguito sui seguenti dispositivi. Inoltre, sono indicate la cuvetta richiesta e il range di assorbimento del fotometro.

Dispositivi	Cuvetta	λ	Campo di misura
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630	ø 24 mm	610 nm	0.1 - 4 mmol/l $K_{S4.3}$
SpectroDirect, XD 7000, XD 7500	ø 24 mm	615 nm	0.1 - 4 mmol/l $K_{S4.3}$

Materiale

Materiale richiesto (in parte facoltativo):

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

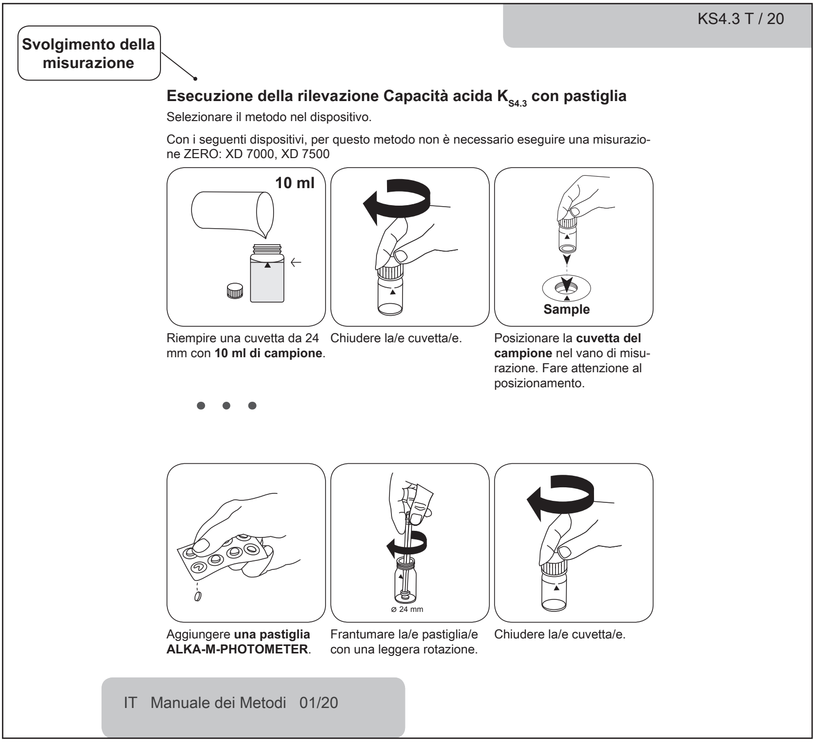
Campo di applicazione

- Trattamento acqua di scarico
- Trattamento acqua potabile
- Trattamento acqua non depurata

Note

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

IT Manuale dei Metodi 01/20



KS4.3 T / 20

Svolgimento della misurazione

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

Selezionare il metodo nel dispositivo.

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

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

Chiudere la/e cuvetta/e.

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

• • •

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

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

Chiudere la/e cuvetta/e.

IT Manuale dei Metodi 01/20

Alluminio PP M50

0.01 - 0.25 mg/L Al AL

Eriocromocianina R

Materiale

Materiale richiesto (in parte facoltativo):

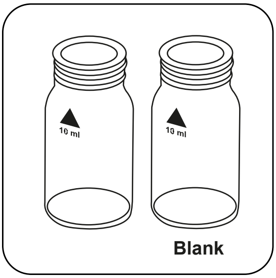
Reagenti	Unità di imballaggio	N. ordine
VARIO Aluminium Set 20 ml	1 pz.	535000

Preparazione

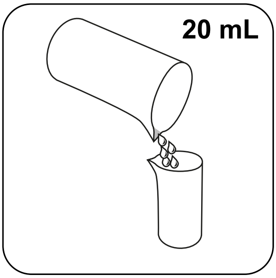
1. Perché i risultati dell’analisi siano accurati è necessario che il campione abbia una temperatura compresa tra 20 °C e 25 °C.
2. Per evitare errori dovuti alla presenza di impurità, prima dell’analisi sciacquare la cuvetta e gli accessori con una soluzione di acido cloridrico (al 20% circa) e successivamente con acqua demineralizzata.

Esecuzione della rilevazione Alluminio con polvere in bustine Vario

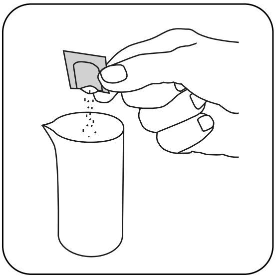
Selezionare il metodo nel dispositivo.



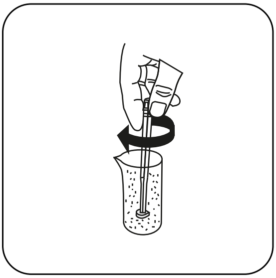
Preparare due cuvette pulite da 24 mm. Contrassegnare una cuvetta come cuvetta zero.



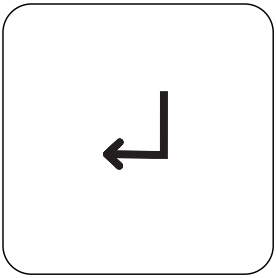
Immettere **20 mL di campione** in un misurino da 100 mL.



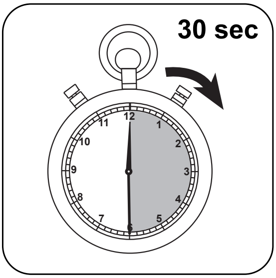
Aggiungere **una bustina di polvere Vario ALUMINIUM ECR F20**.



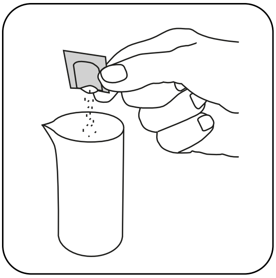
Far sciogliere la polvere agitando.



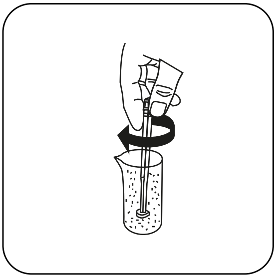
Premere il tasto **ENTER**.



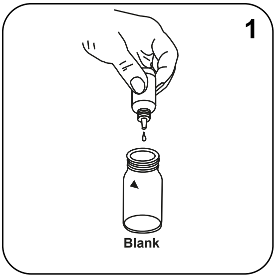
Attendere un **tempo di reazione di 30 secondi** .



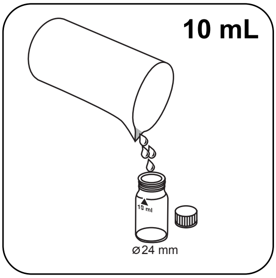
Aggiungere **una bustina di polvere Vario HEXAMINE F20**.



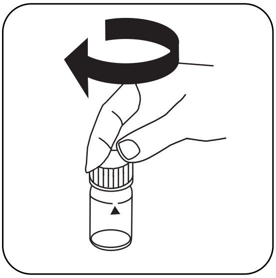
Far sciogliere la polvere agitando.



Introdurre **1 gocce di Vario ALUMINIUM ECR Masking Reagent** nella cuvetta zero.



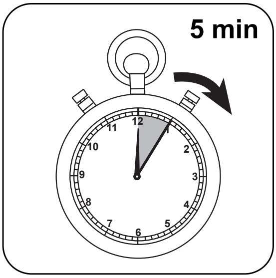
Immettere **10 mL di campione pretrattato** in ogni cuvetta.



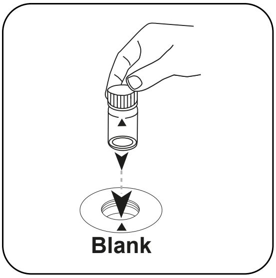
Chiudere la/e cuvetta/e.

↵

Premere il tasto **ENTER**.



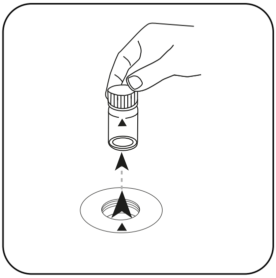
Attendere un **tempo di reazione di 5 minuto/i** .



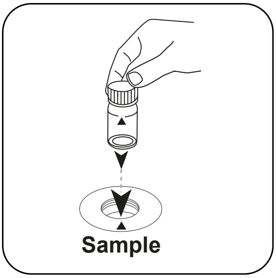
Posizionare la **cuvetta zero** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

Premere il tasto **ZERO**.



Prelevare la cuvetta dal vano di misurazione.



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

Test

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

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

Valutazione

La seguente tabella identifica i valori di output che possono essere convertiti in altre forme di citazione.

Unità di misura	Forma di citazione	Fattore di conversione
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Metodo chimico

Eriocromocianina R

Appendice

Interferenze

Interferenze escludibili

- L’eventuale presenza di fluoruri e polifosfati può far sì che l’analisi dia risultati troppo bassi. In generale tale effetto non è rilevante, a meno che l’acqua non venga fluorurata artificialmente. In questo caso è possibile determinare la concentrazione effettiva di alluminio utilizzando la tabella sottostante.

Fluoruro	**Valore sul display: Alluminio [mg/L]**					
[mg/L F]	**0,05**	**0,10**	**0,15**	**0,20**	**0,25**	**0,30**
0,2	0,05	0,11	0,16	0,21	0,27	0,32
0,4	0,06	0,11	0,17	0,23	0,28	0,34
0,6	0,06	0,12	0,18	0,24	0,30	0,37
0,8	0,06	0,13	0,20	0,26	0,32	0,40
1,0	0,07	0,13	0,21	0,28	0,36	0,45
1,5	0,09	0,20	0,29	0,37	0,48	---

Riferimenti bibliografici

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

Secondo

APHA Method 3500-Al B

Bromo T M80

0.05 - 13 mg/L Br_2 Br

DPD

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
DPD No.1	Pastiglia / 100	511050BT
DPD No. 1	Pastiglia / 250	511051BT
DPD No. 1	Pastiglia / 500	511052BT
DPD No. 1 Alto Calcio $^{e)}$	Pastiglia / 100	515740BT
DPD No. 1 Alto Calcio $^{e)}$	Pastiglia / 250	515741BT
DPD No. 1 Alto Calcio $^{e)}$	Pastiglia / 500	515742BT

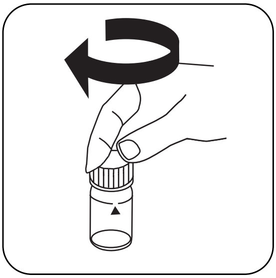
Preparazione

1. Pulizia delle cuvette:
   Poiché molti detergenti ad uso domestico (ad es. detersivo per piatti) contengono sostanze riducenti, nella successiva rilevazione di ossidanti (ad es. ozono, cloro) si potrebbero ottenere risultati troppo bassi. Per escludere tali errori di misura è necessario che i dispositivi in vetro siano esenti dal consumo di cloro. I dispositivi in vetro inoltre vengono conservati in una soluzione di ipoclorito di sodio (0,1 g/L) per un'ora e successivamente vengono risciacquati abbondantemente con acqua demineralizzata.
2. Nella preparazione del campione occorre evitare la degassificazione del bromo, ad es. utilizzando pipette e agitando. L'analisi deve essere eseguita subito dopo il prelievo del campione.
3. Le acque fortemente alcaline o acide devono essere portate prima dell'analisi entro un range di pH compreso tra 6 e 7 (con 0,5 mol/l di acido solforico o 1 mol/l di liscivia).

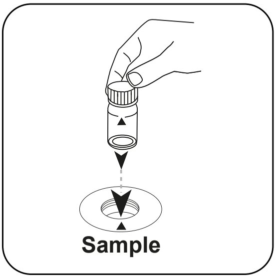
Esecuzione della rilevazione Bromo con pastiglia

Selezionare il metodo nel dispositivo.

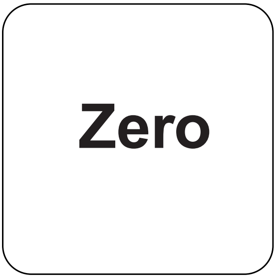
Riempire una cuvetta da 24 mm con **10 mL di campione**.



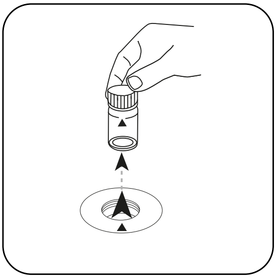
Chiudere la/e cuvetta/e.



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

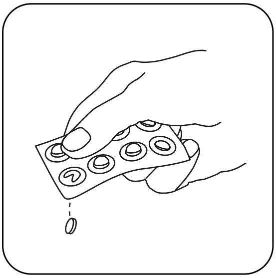


Premere il tasto **ZERO**.

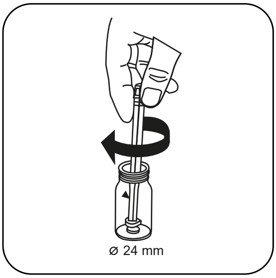


Prelevare la cuvetta dal vano di misurazione.

Svuotare la cuvetta finché non rimangono alcune gocce.

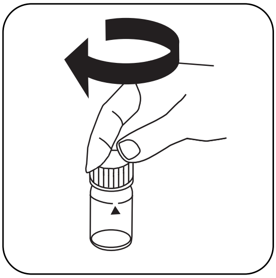


Aggiungere **una pastiglia DPD No. 1**.

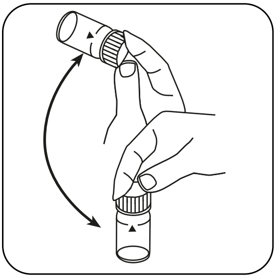


Frantumare la/e pastiglia/e con una leggera rotazione.

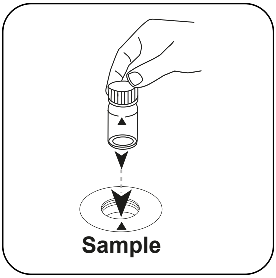
Immettere il **campione** nella cuvetta fino a raggiungere **la tacca dei 10 mL** .



Chiudere la/e cuvetta/e.



Far sciogliere la/e pastiglia/e agitando.



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

Test

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

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

Metodo chimico

DPD

Appendice

Interferenze

Interferenze permanenti

1. Tutti gli ossidanti presenti nei campioni reagiscono come il bromo dando risultati troppo elevati.
2. Le concentrazioni maggiori di 22 mg/L possono dare risultati entro il range di misura fino a 0 mg/L. In questo caso il campione di acqua deve essere diluito. 10 ml del campione diluito vengono addizionati con il reagente e la misurazione viene ripetuta (test di plausibilità).

Derivato di

US EPA 330.5 (1983)
APHA Method 4500 Cl-G

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

Cloro T

M100

0.01 - 6.0 mg/L Cl_2 a)

CL6

DPD

Materiale

Materiale richiesto (in parte facoltativo):

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

Standards disponibles

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

Prelievo del campione

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

Preparazione

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

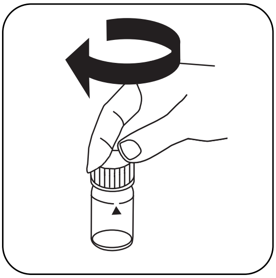
Note

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

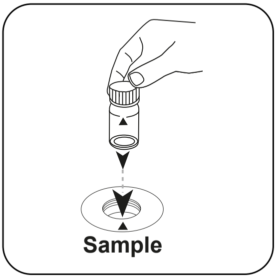
Esecuzione della rilevazione Cloro, libero con compressa

Selezionare il metodo nel dispositivo.

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



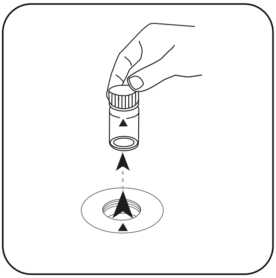
Chiudere la/e cuvetta/e.



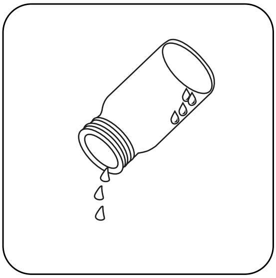
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

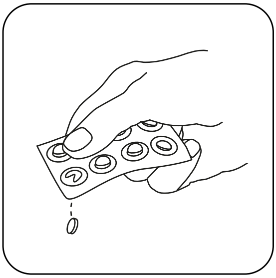
Premere il tasto **ZERO**.



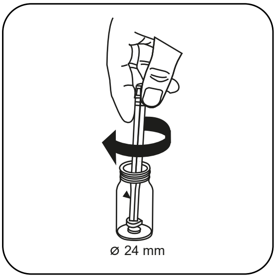
Prelevare la cuvetta dal vano di misurazione.



Svuotare la cuvetta finché non rimangono alcune gocce.

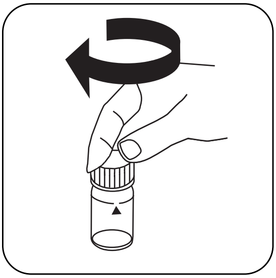


Aggiungere **una pastiglia DPD No. 1**.

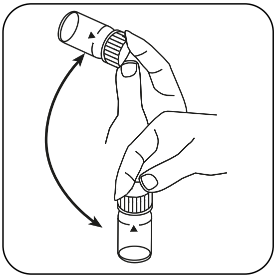


Frantumare la/e pastiglia/e con una leggera rotazione.

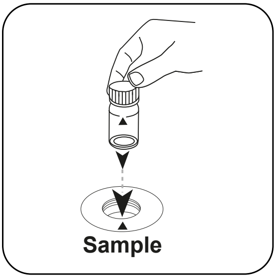
Immettere il **campione** nella cuvetta fino a raggiungere **la tacca dei 10 mL** .



Chiudere la/e cuvetta/e.



Far sciogliere la/e pastiglia/e agitando.



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

Test

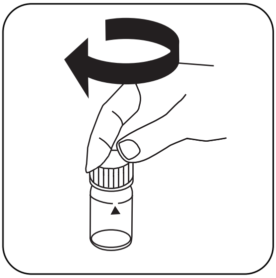
Premere il tasto **TEST** (XD: **START**).

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

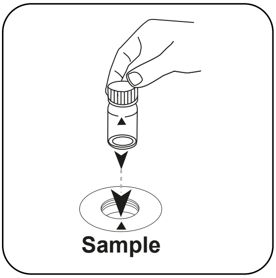
Esecuzione della rilevazione Cloro, totale con compressa

Selezionare il metodo nel dispositivo.

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



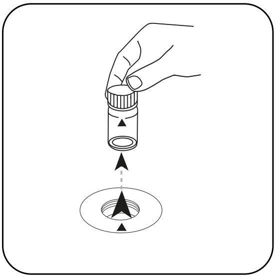
Chiudere la/e cuvetta/e.



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

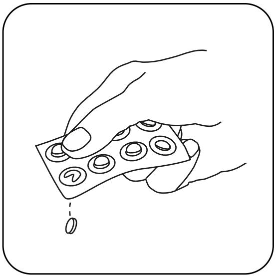
Zero

Premere il tasto **ZERO**.

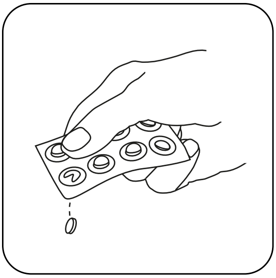


Prelevare la cuvetta dal vano di misurazione.

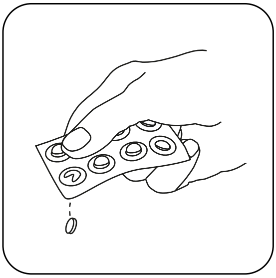
Svuotare la cuvetta finché non rimangono alcune gocce.



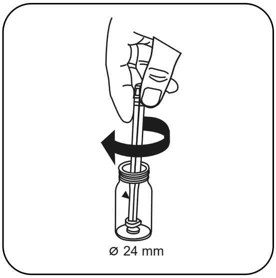
Aggiungere **una pastiglia DPD No. 1**.



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

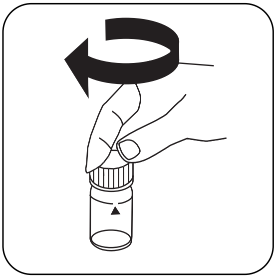


In alternativa al DPD No. 1 e No. 3 tablet, un DPD No. 4 tablet può essere aggiunto.

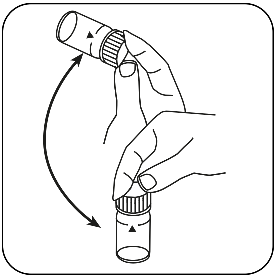


Frantumare la/e pastiglia/e con una leggera rotazione.

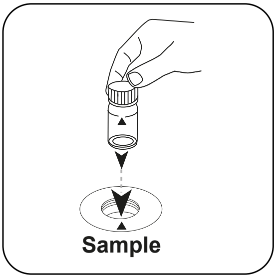
Immettere il **campione** nella cuvetta fino a raggiungere **la tacca dei 10 mL** .



Chiudere la/e cuvetta/e.



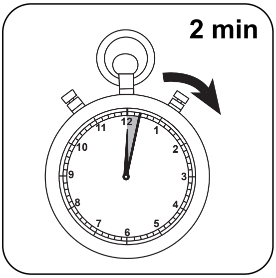
Far sciogliere la/e pastiglia/e agitando.



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

Test

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



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

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

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

Metodo chimico

DPD

Appendice

Interferenze

Interferenze permanenti

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

Interferenze escludibili

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

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

Validazione metodo

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

Conforme

EN ISO 7393-2

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

Cloro L M101

0.02 - 4.0 mg/L Cl_2 a) CL6

DPD

Materiale

Materiale richiesto (in parte facoltativo):

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

Standards disponibles

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

Prelievo del campione

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

Preparazione

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

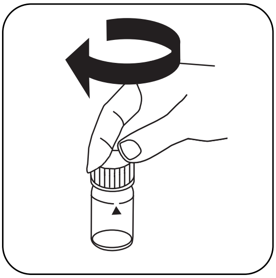
Note

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

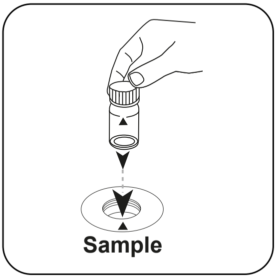
Esecuzione della rilevazione Cloro, libero con reagente liquido

Selezionare il metodo nel dispositivo.

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



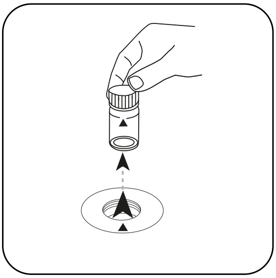
Chiudere la/e cuvetta/e.



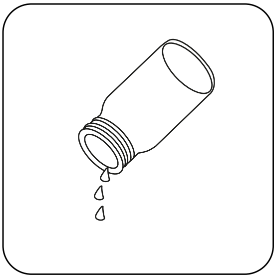
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

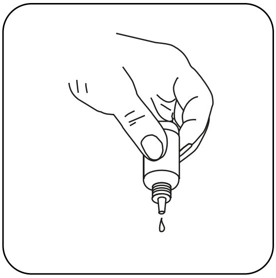
Premere il tasto **ZERO**.



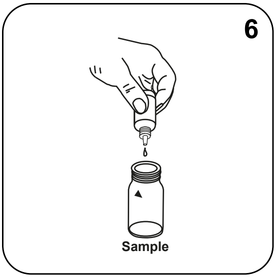
Prelevare la cuvetta dal vano di misurazione.



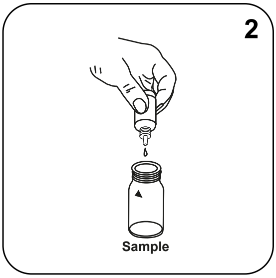
Svuotare la cuvetta.



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

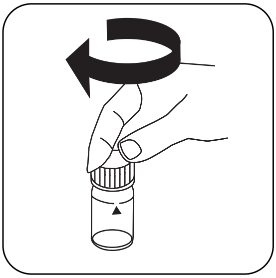


Introdurre **6 gocce di DPD 1 Buffer Solution** nella cuvetta del campione.

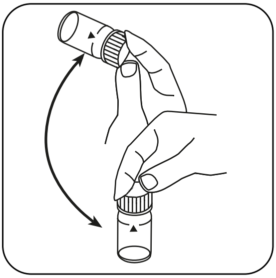


Introdurre **2 gocce di DPD 1 Reagent Solution** nella cuvetta del campione.

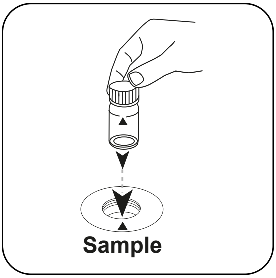
Immettere il **campione** nella cuvetta fino a raggiungere **la tacca dei 10 mL** .



Chiudere la/e cuvetta/e.



Miscelare il contenuto capovolgendo.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Test

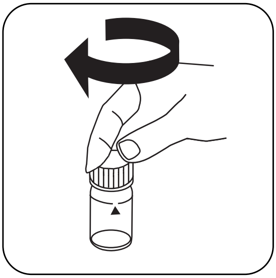
Premere il tasto **TEST** (XD: **START**).

Sul display compare il risultato in mg/L di Cloro libero.

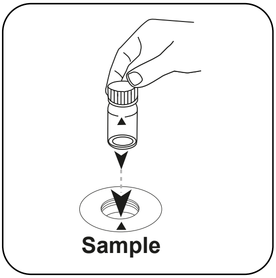
Esecuzione della rilevazione Cloro, totale con reagente liquido

Selezionare il metodo nel dispositivo.

Riempire una cuvetta da 24 mm con **10 mL di campione**.



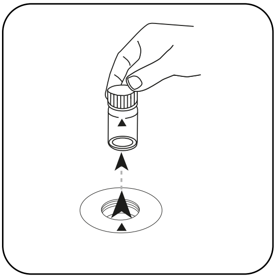
Chiudere la/e cuvetta/e.



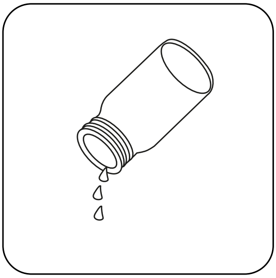
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

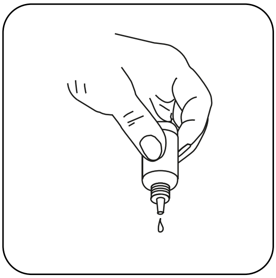
Premere il tasto **ZERO**.



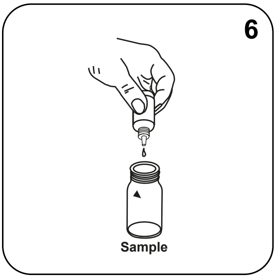
Prelevare la cuvetta dal vano di misurazione.



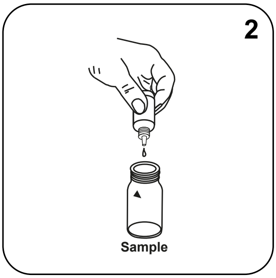
Svuotare la cuvetta.



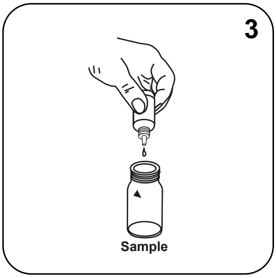
Tenere le boccette contagocce in posizione verticale e introdurre, premendo lentamente, gocce della stessa dimensione nella cuvetta.



Introdurre **6 gocce di DPD 1 Buffer Solution** nella cuvetta del campione.

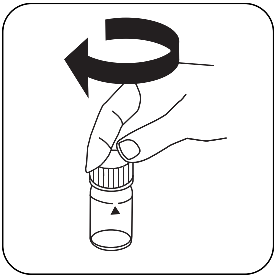


Introdurre **2 gocce di DPD 1 Reagent Solution** nella cuvetta del campione.

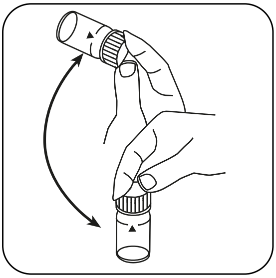


Introdurre **3 gocce di DPD 3 Solution** nella cuvetta del campione.

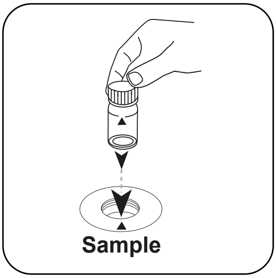
Immettere il **campione** nella cuvetta fino a raggiungere **la tacca dei 10 mL** .



Chiudere la/e cuvetta/e.



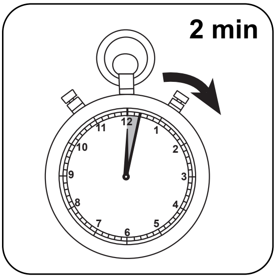
Miscelare il contenuto capovolgendo.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Test

Premere il tasto **TEST** (XD: **START**).



Attendere un **tempo di reazione di 2 minuto/i** .

Allo scadere del tempo di reazione viene effettuata automaticamente la misurazione.

Sul display compare il risultato in mg/L di Cloro totale.

Metodo chimico

DPD

Appendice

Interferenze

Interferenze permanenti

- Tutti gli ossidanti presenti nei campioni reagiscono come il cloro dando risultati troppo elevati.

Interferenze escludibili

- Le interferenze da parte di rame e ferro(III) devono essere eliminate con EDTA.
- Se si utilizzano reagenti liquidi, le concentrazioni di cloro maggiori di 4 mg/L possono dare risultati entro il range di misura fino a 0 mg/L. In questo caso il campione deve essere diluito con acqua priva di cloro. 10 ml del campione diluito vengono addizionati con il reagente e la misurazione viene ripetuta (test di plausibilità).

Interferenze	da / [mg/L]
CrO_4^{2-}	0,01
MnO_2	0,01

Conforme

EN ISO 7393-2

[a] Determinazione di libero, vincolato, totale possibile

Cloro HR (KI) T M105

5 - 200 mg/L Cl_2 CLHr

KI/acido

IT

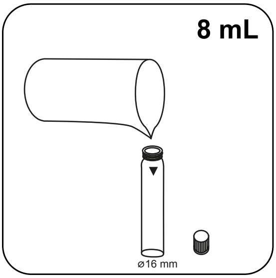
Materiale

Materiale richiesto (in parte facoltativo):

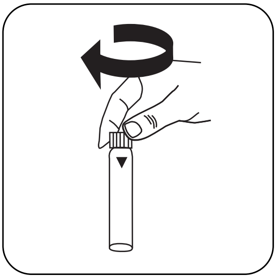
Reagenti	Unità di imballaggio	N. ordine
Cloro HR (KI)	Pastiglia / 100	513000BT
Cloro HR (KI)	Pastiglia / 250	513001BT
Acidificante GP	Pastiglia / 100	515480BT
Acidificante GP	Pastiglia / 250	515481BT
Set Cloro HR (KI)/Acidificante GP#	ciascuna 100	517721BT
Set Cloro HR (KI)/Acidificante GP#	ciascuna 250	517722BT
Cloro HR (KI)	Pastiglia / 100	501210
Cloro HR (KI)	Pastiglia / 250	501211

Esecuzione della rilevazione Cloro HR (KI) con pastiglia

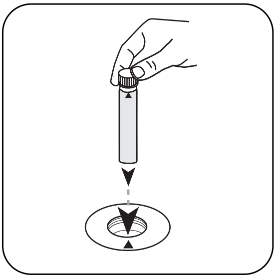
Selezionare il metodo nel dispositivo.



Riempire una cuvetta da 16 mm con **8 mL di campione**.



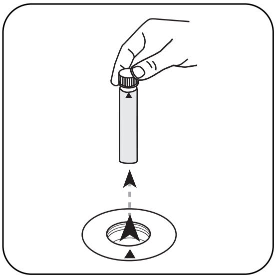
Chiudere la/e cuvetta/e.



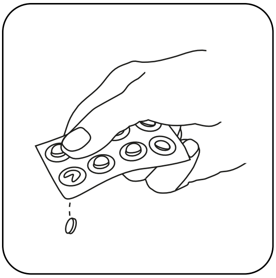
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

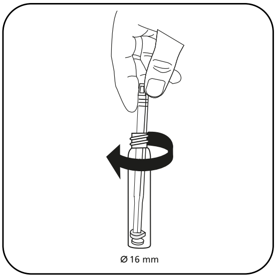
Premere il tasto **ZERO**.



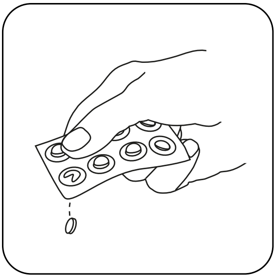
Prelevare la **cuvetta** dal vano di misurazione.



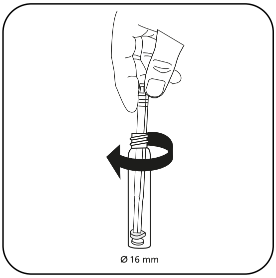
Aggiungere **una pastiglia Chlorine HR (KI)**.



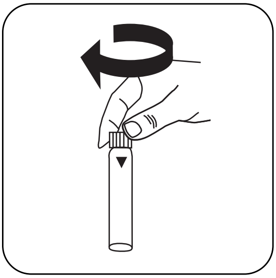
Frantumare la/e pastiglia/e con una leggera rotazione.



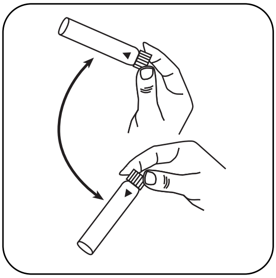
Aggiungere **una pastiglia ACIDIFYING GP**.



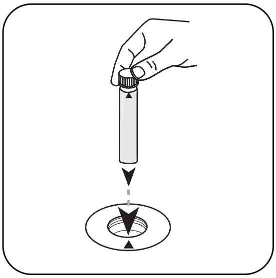
Frantumare la/e pastiglia/e con una leggera rotazione.



Chiudere la/e cuvetta/e.



Far sciogliere la/e pastiglia/e agitando.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Test

Premere il tasto **TEST** (XD: **START**).

Sul display compare il risultato in mg/L di Cloro.

Metodo chimico

KI/acido

Appendice

Interferenze

Interferenze permanenti

- Tutti gli ossidanti presenti nei campioni reagiscono come il cloro dando risultati troppo elevati.

Validazione metodo

Limite di rilevabilità	1.29 mg/L
Limite di quantificazione	3.86 mg/L
Estremità campo di misura	200 mg/L
Sensibilità	83.96 mg/L / Abs
Intervallo di confidenza	1.14 mg/L
Deviazione standard della procedura	0.45 mg/L
Coefficiente di variazione della procedura	0.45 %

Derivato di

EN ISO 7393-3

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j) #Bacchetta compresa

Biossido di cloro T M120

0.02 - 11 mg/L ClO_2 CLO2

DPD/glicina

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
DPD No.1	Pastiglia / 100	511050BT
DPD No. 1	Pastiglia / 250	511051BT
DPD No. 1	Pastiglia / 500	511052BT
DPD No. 3	Pastiglia / 100	511080BT
DPD No. 3	Pastiglia / 250	511081BT
DPD No. 3	Pastiglia / 500	511082BT
Glicina f)	Pastiglia / 100	512170BT
Glicina f)	Pastiglia / 250	512171BT
DPD No. 3 High Calcium e)	Pastiglia / 100	515730BT
DPD No. 3 High Calcium e)	Pastiglia / 250	515731BT
DPD No. 3 High Calcium e)	Pastiglia / 500	515732BT
DPD No. 1 Alto Calcio e)	Pastiglia / 100	515740BT
DPD No. 1 Alto Calcio e)	Pastiglia / 250	515741BT
DPD No. 1 Alto Calcio e)	Pastiglia / 500	515742BT
Set DPD No. 1/no. 3#	ciascuna 100	517711BT
Set DPD No. 1/no. 3#	ciascuna 250	517712BT
Set DPD No. 1/glicina #	ciascuna 100	517731BT
Set DPD No. 1/glicina #	ciascuna 250	517732BT
Set DPD No. 1/no. 3 High Calcium#	ciascuna 100	517781BT
Set DPD No. 1/no. 3 High Calcium#	ciascuna 250	517782BT
DPD No. 3 Evo	Pastiglia / 100	511420BT
DPD No. 3 Evo	Pastiglia / 250	511421BT
DPD No. 3 Evo	Pastiglia / 500	511422BT

Prelievo del campione

1. Nella preparazione del campione occorre evitare la degassificazione, ad es. utilizzando pipette e agitando.
2. L’analisi deve essere eseguita subito dopo il prelievo del campione.

Preparazione

1. Pulizia delle cuvette:
   Poiché molti detergenti ad uso domestico (ad es. detersivo per piatti) contengono sostanze riducenti, nella rilevazione del Biossido di cloro si potrebbero ottenere risultati troppo bassi. Per escludere tali errori di misura è necessario che i dispositivi in vetro siano esenti dal consumo di cloro. I dispositivi in vetro inoltre vengono conservati in una soluzione di ipoclorito di sodio (0,1 g/L) per un’ora e successivamente vengono risciacquati abbondantemente con acqua demineralizzata.
2. Le acque fortemente alcaline o acide devono essere portate prima dell’analisi entro un range di pH compreso tra 6 e 7 (con 0,5 mol/l di acido solforico o 1 mol/l di liscivia).

Note

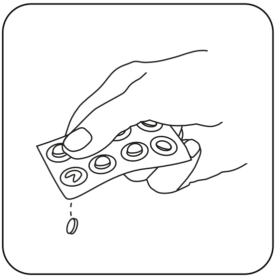
1. Le compresse EVO possono essere utilizzate come alternativa alla corrispondente compressa standard (ad esempio DPD No. 3 EVO invece di DPD No. 3).

Esecuzione della rilevazione Biossido di cloro, in presenza di cloro con pastiglia

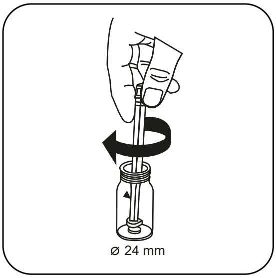
Selezionare il metodo nel dispositivo.

Selezionare inoltre la determinazione: in presenza di Cloro

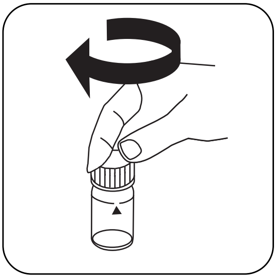
Riempire una cuvetta da 24 mm con **10 mL di campione**.



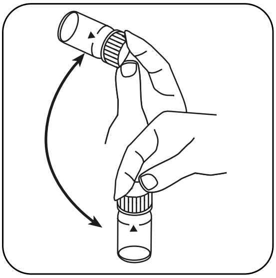
Aggiungere **una pastiglia GLYCINE**.



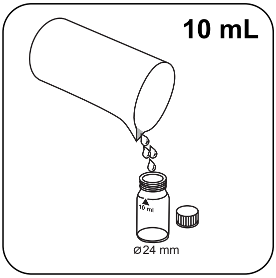
Frantumare la/e pastiglia/e con una leggera rotazione.



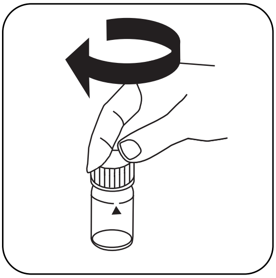
Chiudere la/e cuvetta/e.



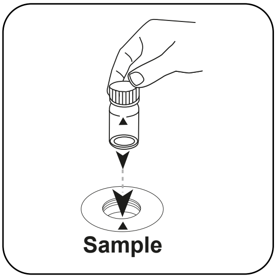
Far sciogliere la/e pastiglia/e agitando.



Riempire una **seconda cuvetta** con **10 mL di campione**.



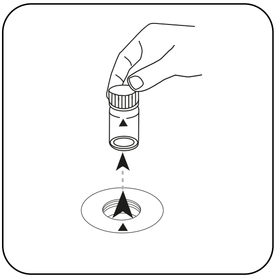
Chiudere la/e cuvetta/e.



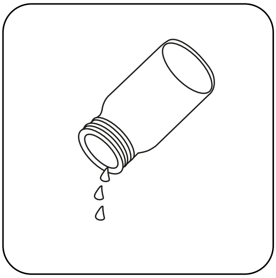
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

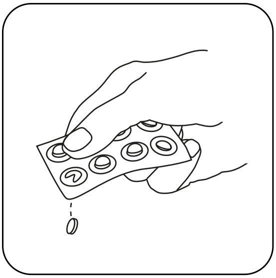
Premere il tasto **ZERO**.



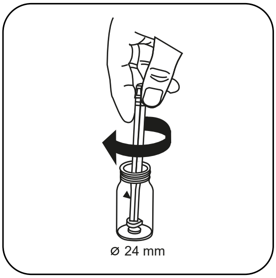
Prelevare la cuvetta dal vano di misurazione.



Svuotare la cuvetta.

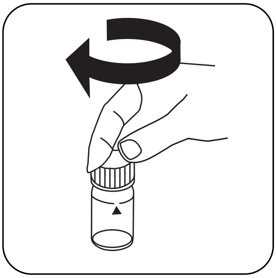


Aggiungere **una pastiglia DPD No. 1**.

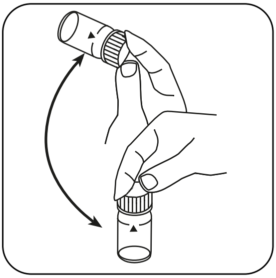


Frantumare la/e pastiglia/e con una leggera rotazione.

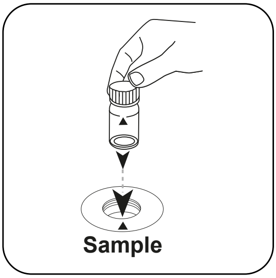
Immettere la **soluzione di glicina** preparata nella cuvetta preparata.



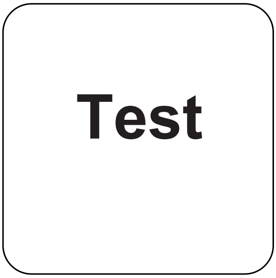
Chiudere la/e cuvetta/e.



Far sciogliere la/e pastiglia/e agitando.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



Premere il tasto **TEST** (XD: **START**).

Sul display compare il risultato in mg/L di Biossido di cloro.

Valutazione

La seguente tabella identifica i valori di output che possono essere convertiti in altre forme di citazione.

Unità di misura	Forma di citazione	Fattore di conversione
mg/l	ClO_2	1
mg/l	Cl_2 frei	0.525
mg/l	Cl_2 geb.	0.525
mg/l	ges. Cl_2	0.525

Metodo chimico

DPD/glicina

Appendice

Interferenze

Interferenze permanenti

1. Tutti gli ossidanti presenti nei campioni danno risultati troppo elevati.

Interferenze escludibili

1. Le concentrazioni di biossido di cloro maggiori di 19 mg/L possono dare risultati entro il range di misura fino a 0 mg/L. In questo caso il campione di acqua deve essere diluito con acqua priva di biossido di cloro. 10 ml del campione diluito vengono addizionati con il reagente e la misurazione viene ripetuta.

Derivato di

DIN 38408, parte 5

[e)]Reagente ausiliario, in alternativa a DPD n. 1 / no 3 in caso di torbidità del campione a causa di alto contenuto di ioni di calcio e / o alta conduttività | [f)]Reagente ausiliario, è inoltre necessario per la determinazione di bromo, biossido di cloro o ozono in presenza di cloro | [j)]#Bacchetta compresa

Rame T M150

0.05 - 5 mg/L Cu[a)] Cu

Bichinolina

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
Rame No. 1	Pastiglia / 100	513550BT
Rame No. 1	Pastiglia / 250	513551BT
Rame No. 2	Pastiglia / 100	513560BT
Rame No. 2	Pastiglia / 250	513561BT
Set Rame No. 1/no. 2#	ciascuna 100	517691BT
Set Rame No. 1/no. 2#	ciascuna 250	517692BT
ValidCheck Rame 2 mg/l	1 pz.	48141525

Preparazione

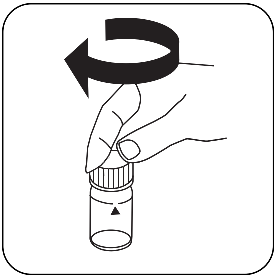
1. Le acque fortemente alcaline o acide dovrebbero essere regolate prima dell’analisi su un valore di pH da 4 a 6.

Esecuzione della rilevazione Rame, libero con pastiglia

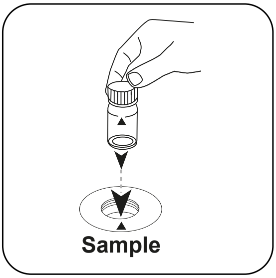
Selezionare il metodo nel dispositivo.

Selezionare inoltre la determinazione: libero

Riempire una cuvetta da 24 mm con **10 mL di campione**.



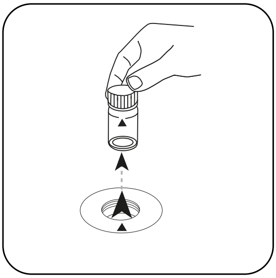
Chiudere la/e cuvetta/e.



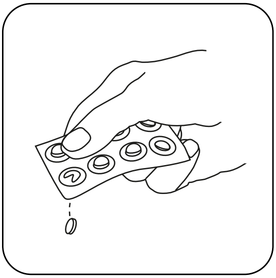
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

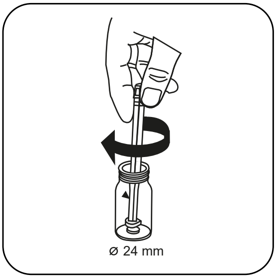
Premere il tasto **ZERO**.



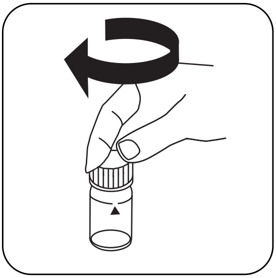
Prelevare la cuvetta dal vano di misurazione.



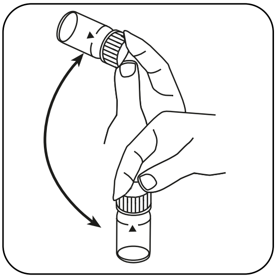
Aggiungere **una pastiglia COPPER No. 1**.



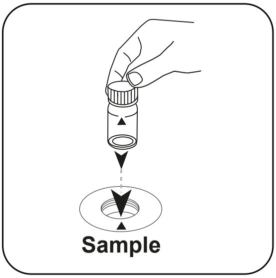
Frantumare la/e pastiglia/e con una leggera rotazione.



Chiudere la/e cuvetta/e.



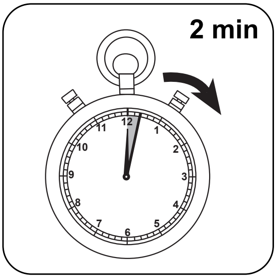
Far sciogliere la/e pastiglia/e agitando.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Test

Premere il tasto **TEST** (XD: **START**).



Attendere un **tempo di reazione di 2 minuto/i** .

Allo scadere del tempo di reazione viene effettuata automaticamente la misurazione.

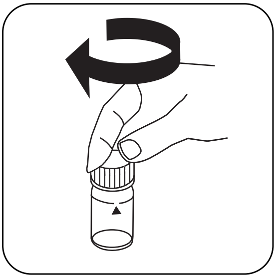
Sul display compare il risultato in mg/L di Rame libero.

Esecuzione della rilevazione Rame, totale con pastiglia

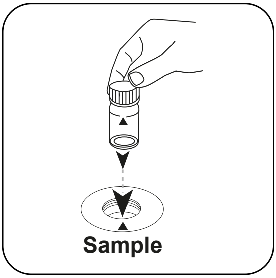
Selezionare il metodo nel dispositivo.

Selezionare inoltre la determinazione: totale

Riempire una cuvetta da 24 mm con **10 mL di campione**.



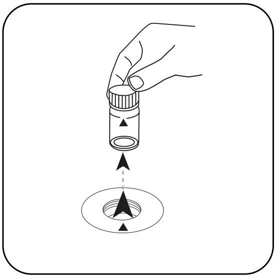
Chiudere la/e cuvetta/e.



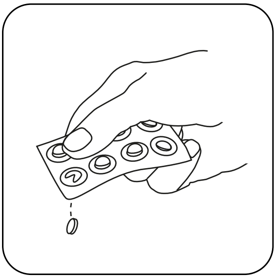
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

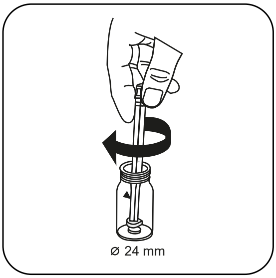
Premere il tasto **ZERO**.



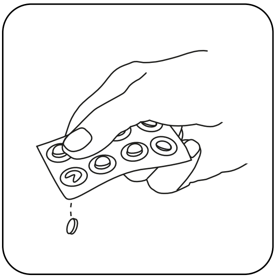
Prelevare la cuvetta dal vano di misurazione.



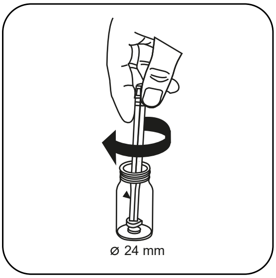
Aggiungere **una pastiglia COPPER No. 1**.



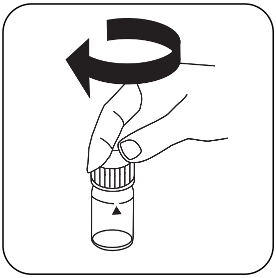
Frantumare e far sciogliere la/e pastiglia/e con una leggera rotazione.



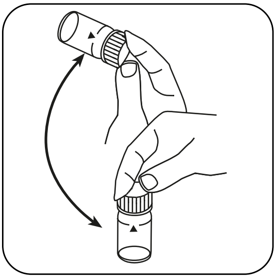
Aggiungere **una pastiglia COPPER No. 2**.



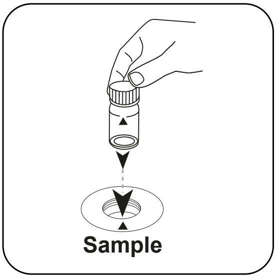
Frantumare la/e pastiglia/e con una leggera rotazione.



Chiudere la/e cuvetta/e.



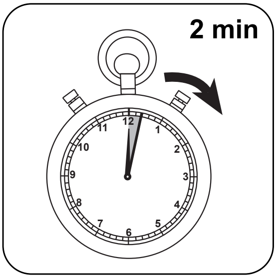
Far sciogliere la/e pastiglia/e agitando.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Test

Premere il tasto **TEST** (XD: **START**).



Attendere un **tempo di reazione di 2 minuto/i** .

Allo scadere del tempo di reazione viene effettuata automaticamente la misurazione.

Sul display compare il risultato in mg/L di Rame totale.

Metodo chimico

Bichinolina

Appendice

Interferenze

Interferenze permanenti

1. Cianuro CN^- e Argento Ag^+ interferiscono con la rilevazione.

Validazione metodo

Limite di rilevabilità	0.05 mg/L
Limite di quantificazione	0.15 mg/L
Estremità campo di misura	5 mg/L
Sensibilità	3.8 mg/L / Abs
Intervallo di confidenza	0.026 mg/L
Deviazione standard della procedura	0.011 mg/L
Coefficiente di variazione della procedura	0.42 %

Riferimenti bibliografici

Photometrische Analyse, Lange/Vedjelek, Verlag Chemie 1980

[a)]Determinazione di libero, vincolato, totale possibile | [j)] #Bacchetta compresa

Ferro in Mo PP M224

0.01 - 1.8 mg/L Fe FEM

TPTZ

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
Set di reagenti VARIO Fe in MO	1 set	536010

Prelievo del campione

1. Eseguire il prelievo del campione utilizzando flaconi di vetro o di plastica puliti. Questi devono essere stati puliti con 6 N (1:1) di acido cloridrico e successivamente con acqua demineralizzata.
2. Per far sì che sia possibile conservare il campione per analizzarlo in un secondo momento, il valore di pH deve essere abbassato fino a un valore inferiore a 2. A tale scopo aggiungere circa 2 ml di acido cloridrico concentrato per litro di campione. Se il campione viene analizzato immediatamente, questa aggiunta non è necessaria.
3. Per rilevare il ferro disciolto è necessario filtrare il campione con un filtro da 0,45 µm o equivalente subito dopo il prelievo e prima dell'acidificazione.
4. I campioni conservati devono essere immagazzinati a temperatura ambiente per non più di 6 mesi.
5. Prima dell'analisi è necessario regolare il valore di pH su un valore compreso tra 3 e 5 tramite l'aggiunta di 6 N di liscivia. Non superare il valore di pH 5 per evitare precipitazioni di ferro.
6. Il risultato deve essere corretto tenendo in considerazione le aggiunte volumetriche.

Preparazione

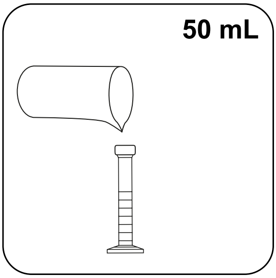
1. Pulire tutti i dispositivi in vetro con un detergente, quindi risciacquarli con acqua corrente. Successivamente pulirli nuovamente con acido cloridrico (1:1) e acqua demineralizzata. Queste operazioni consentono di eliminare eventuali depositi, che possono provocare risultati leggermente maggiorati.
2. Se il campione contiene 100 mg/L di molibdato (MoO_4^{2-}) o più, la misurazione del campione deve essere eseguita /subito dopo la misurazione dello zero.
3. Per ottenere risultati più accurati è possibile determinare un valore cieco per il reagente per ogni nuovo lotto di reagenti. A tale scopo procedere come descritto, ma utilizzare acqua demineralizzata invece del campione. Il valore di misura ottenuto viene sottratto dai valori di misura rilevati con questo lotto.

Note

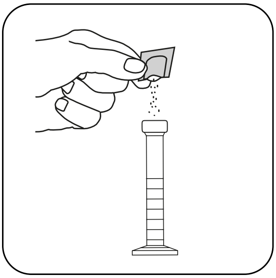
1. In presenza di ferro si sviluppa una colorazione blu. Una piccola quantità di polvere non disciolta non ha alcun effetto sul risultato.

Esecuzione della rilevazione Ferro totale (Fe in Mo) in presenza di molibdato con polvere in bustine Vario

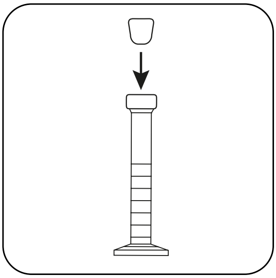
Selezionare il metodo nel dispositivo.



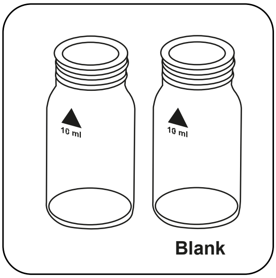
Immettere **50 mL di campione** in un cilindro di miscelazione da 50 mL.



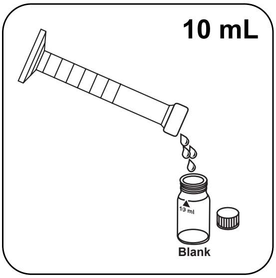
Aggiungere **una bustina di polvere Vario (Fe in Mo) Rgt 1**.



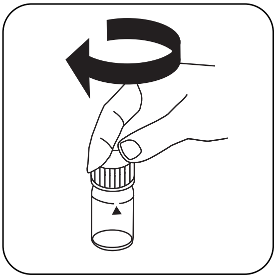
Chiudere il cilindro di miscelazione con un tappo. Far sciogliere la polvere capovolgendo.



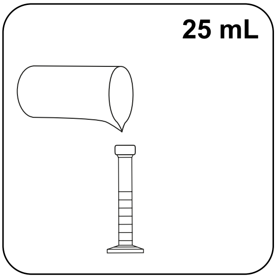
Preparare due cuvette pulite da 24 mm. Contrassegnare una cuvetta come cuvetta zero.



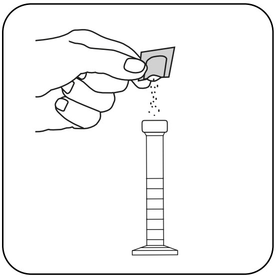
Immettere **10 mL del campione preparato** nella cuvetta zero.



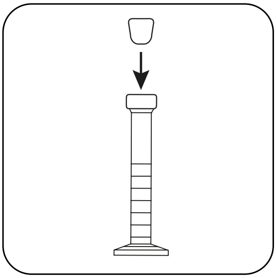
Chiudere la/e cuvetta/e.



Immettere **25 mL del campione preparato** in un cilindro di miscelazione da 25 mL.

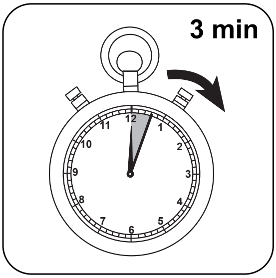


Aggiungere **una bustina di polvere Vario (Fe in Mo) Rgt 2**.

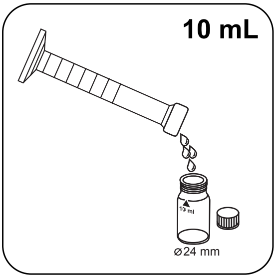


Chiudere il cilindro di miscelazione con un tappo. Far sciogliere la polvere capovolgendo.

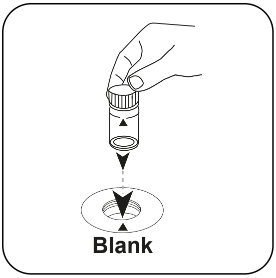
Premere il tasto **ENTER**.



Attendere un **tempo di reazione di 3 minuto/i** .



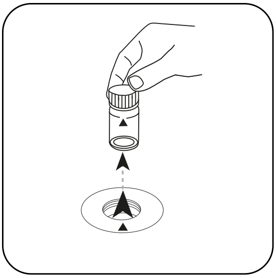
Immettere **10 mL di campione** nella cuvetta del campione.



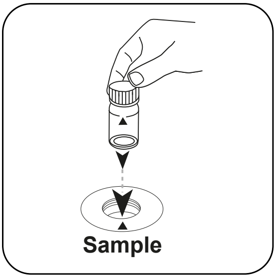
Posizionare la **cuvetta zero** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

Premere il tasto **ZERO**.



Prelevare la cuvetta dal vano di misurazione.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Test

Premere il tasto **TEST** (XD: **START**).

Sul display compare il risultato in mg/L di Fe.

Metodo chimico

TPTZ

Appendice

Interferenze

Interferenze escludibili

1. Interferenza dovuta al valore del pH: se il pH del campione dopo l’aggiunta del reagente è minore di 3 o maggiore di 4, lo sviluppo della colorazione potrebbe essere ostacolato in quanto il colore ottenuto sbiadisce troppo rapidamente o si verifica un intorbidimento. Per questo motivo prima di aggiungere il reagente è necessario regolare il valore di pH nel cilindro di misurazione su un valore compreso tra 3 e 5:
   Immettere in gocce una quantità adatta di un acido o di una base privi di ferro, ad esempio 1 N di acido solforico o 1 N di liscivia.
   Se è stata aggiunta una quantità significativa di acido o base è necessario eseguire una correzione del volume.

Riferimenti bibliografici

G. Frederic Smith Chemical Co., The Iron Reagents, 3rd ed. (1980)

Ferro LR L (A) M225

0.03 - 2 mg/L Fe FE

Ferrozine / acido tioglicolico

Materiale

Materiale richiesto (in parte facoltativo):

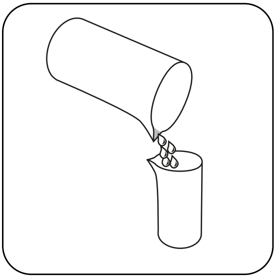
Reagenti	Unità di imballaggio	N. ordine
Acidità / Alcalinità P Indicatore PA1	65 mL	56L013565
Tampone di durezza del calcio CH2	65 mL	56L014465
KP962-Persolfato di ammonio in polvere	Polvere / 40 g	56P096240
KS63-FE6-Tioglicolato/molibdato HR RGT	30 mL	56L006330
KS63-FE6-Tioglicolato/molibdato HR RGT	65 mL	56L006365
KS61-FE5-Ferrozine/Tioglicolato	65 mL	56L006165

Preparazione

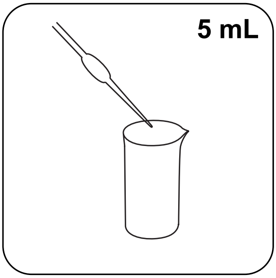
1. Se nel campione sono presenti forti complessanti, il tempo di reazione deve essere prolungato finché non sarà più visibile alcuno sviluppo di colore. I complessi di ferro molto forti tuttavia non vengono rilevati nella misurazione. In questo caso i complessanti devono essere disgregati tramite ossidazione con acido/persolfato e successivamente il campione deve essere portato a pH 6-9 tramite neutralizzazione.
2. Per la rilevazione del ferro totale disciolto e sospeso è necessario cuocere il campione con acido/persolfato. Neutralizzare quindi a pH 6-9 e riempire nuovamente con acqua demineralizzata fino al volume originario.

Digestione

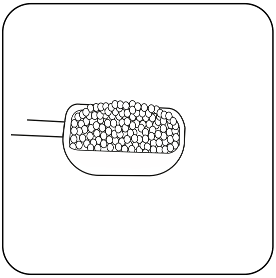
Il ferro totale è costituito da ferro solubile, complessato e sospeso. Prima della misurazione il campione non deve essere filtrato. Per garantire l'omogeneizzazione del campione è necessario distribuire uniforme le particelle sedimentate appena prima del prelievo del campione agitando energicamente. Per la determinazione del ferro solubile totale (compresi i composti di ferro complessi) è necessaria una filtrazione del campione.I dispositivi e i reagenti necessari per la determinazione del ferro totale non sono compresi nella fornitura standard.



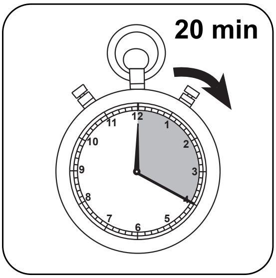
Riempire un recipiente di digestione adeguato con **50 mL di campione omogeneizzato**.



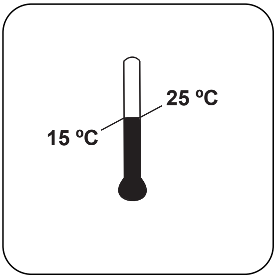
Aggiungere **5 mL di 1:1 acido cloridrico**.



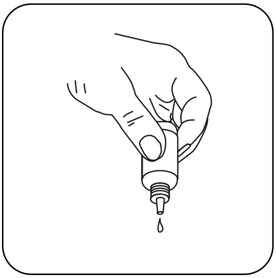
Aggiungere **un cucchiaio dosatore di KP 962 (Ammonium Persulfat Powder)**.



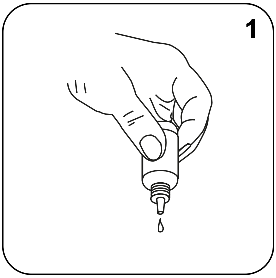
Cuocere il campione per 20 minuti . Il volume del campione dovrebbe restare al di sopra dei 25 mL; se necessario, rabboccare con acqua demineralizzata.



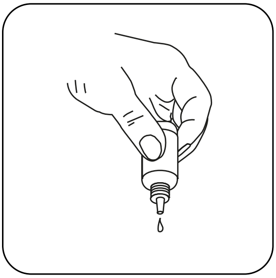
Lasciar raffreddare il campione a **temperatura ambiente**.



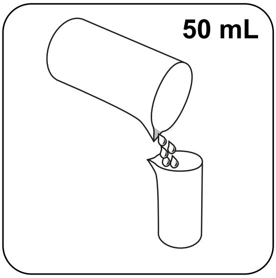
Tenere le boccette contagocce in posizione verticale e introdurre, premendo lentamente, gocce della stessa dimensione nella cuvetta.



Aggiungere **1 gocce di Acidity / Alkalinity P Indicator PA1**.



Aggiungere allo stesso campione **Hardness Calcium Buffer CH2** in gocce finché non si presenta una colorazione da rosa chiaro a rosso. **(Attenzione: dopo l’aggiunta di ogni goccia far oscillare il campione!)**



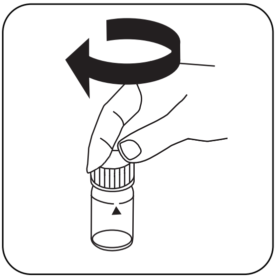
Aggiungere al campione **acqua demineralizzata fino a raggiungere i 50 mL** .

Esecuzione della rilevazione Ferro, LR totale (A) con reagente liquido

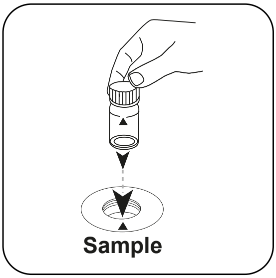
Selezionare il metodo nel dispositivo.

Per la determinazione di **Ferro, LR totale** eseguire la **digestione** descritta.

Riempire una cuvetta da 24 mm con **10 mL di acqua demineralizzata**.



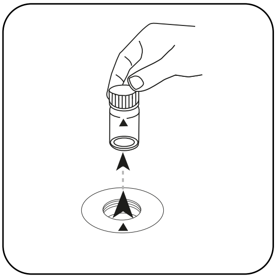
Chiudere la/e cuvetta/e.



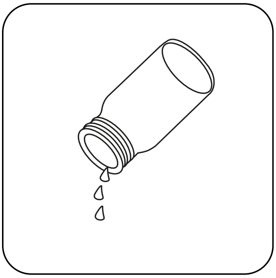
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

Premere il tasto **ZERO**.

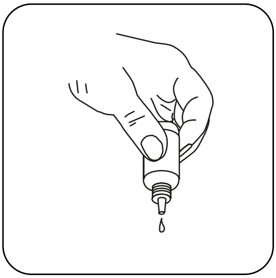


Prelevare la cuvetta dal vano di misurazione.

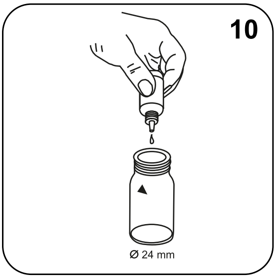


Svuotare la cuvetta.

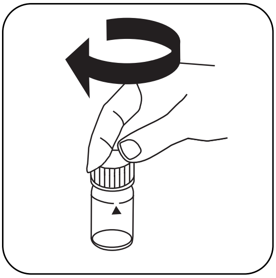
Riempire una cuvetta da 24 mm con **10 mL del campione preparato**.



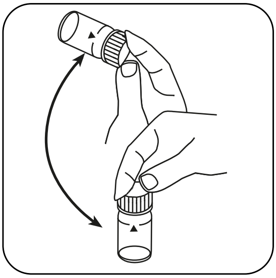
Tenere le boccette contagocce in posizione verticale e introdurre, premendo lentamente, gocce della stessa dimensione nella cuvetta.



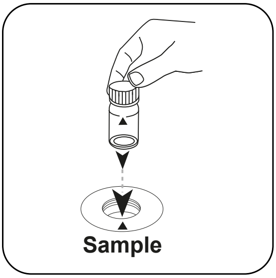
Aggiungere **10 gocce di Iron Reagent FE5**.



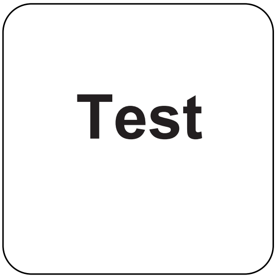
Chiudere la/e cuvetta/e.



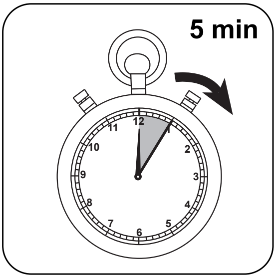
Miscelare il contenuto capovolgendo.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



Premere il tasto **TEST** (XD: **START**).



Attendere un **tempo di reazione di 5 minuto/i** .

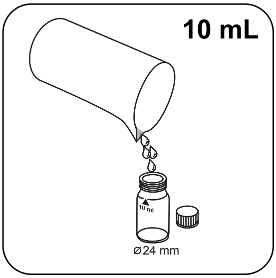
Allo scadere del tempo di reazione viene effettuata automaticamente la misurazione.

Sul display compare il risultato in mg/L di ferro totale o quando si utilizza un campione filtrato, ferro solubile totale in mg/l.

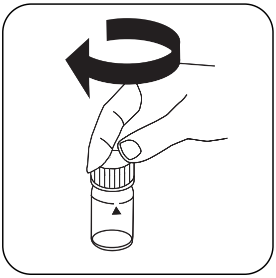
Esecuzione della rilevazione Ferro, LR (A) con reagente liquido

Selezionare il metodo nel dispositivo.

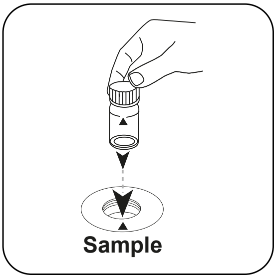
Per la determinazione del ferro disciolto totale è necessario filtrare il campione prima della rilevazione (diametro pori 0,45 µm). In caso contrario verranno rilevate anche particelle di ferro e ferro sospeso.



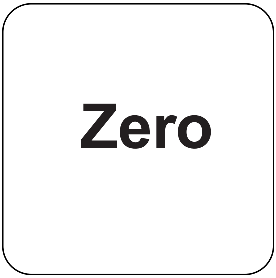
Riempire una cuvetta da 24 mm con **10 mL del campione preparato**.



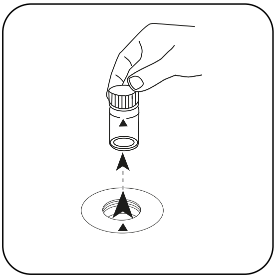
Chiudere la/e cuvetta/e.



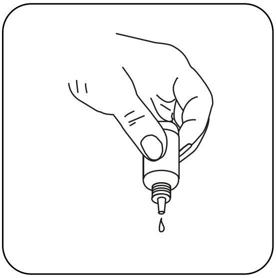
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



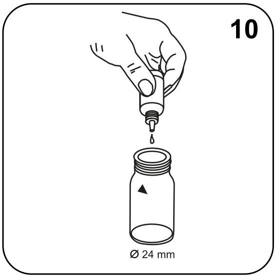
Premere il tasto **ZERO**.



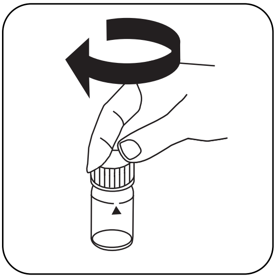
Prelevare la cuvetta dal vano di misurazione.



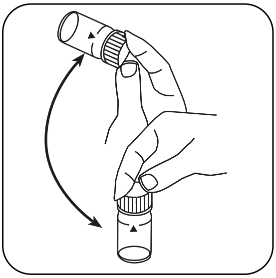
Tenere le boccette contagocce in posizione verticale e introdurre, premendo lentamente, gocce della stessa dimensione nella cuvetta.



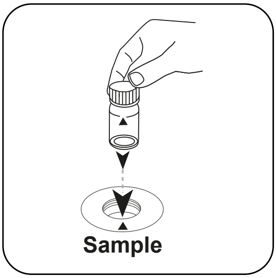
Aggiungere **10 gocce di Iron Reagent FE5**.



Chiudere la/e cuvetta/e.



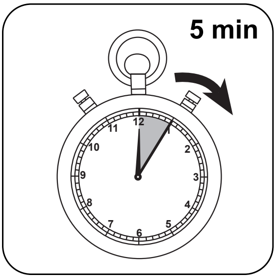
Miscelare il contenuto capovolgendo.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Test

Premere il tasto **TEST** (XD: **START**).



Attendere un **tempo di reazione di 5 minuto/i** .

Allo scadere del tempo di reazione viene effettuata automaticamente la misurazione.

Sul display compare il risultato in mg/L di Ferro.

Metodo chimico

Ferrozine / acido tioglicolico

Appendice

Interferenze

Interferenze escludibili

1. Se si utilizza il KS61 (Ferrozine/tioglicolato), una concentrazione elevata di molibdato provoca un'intensa colorazione gialla. In questo caso è necessario un valore cieco della sostanza chimica:
   - Preparare due **cuvette da 24 mm** pulite.
   - Contrassegnare una cuvetta come cuvetta zero.
   - Immettere in una cuvetta da 24 mm pulita **10 ml di campione** (cuvetta zero).
   - Immettere nella cuvetta **10 gocce di KS63 (tioglicolato)**.
   - Chiudere la cuvetta con il coperchio e miscelarne il contenuto capovolgendola.
   - Inserire la cuvetta zero nel vano di misurazione. Fare attenzione al posizionamento.
   - Premere il tasto **ZERO**.
   - Prelevare la cuvetta dal vano di misurazione.
   - Immettere in una seconda cuvetta da 24 mm pulita **10 ml di campione** (cuvetta campione).
   - Aggiungere **10 gocce di KS61 (Ferrozine/tioglicolato)** e procedere come descritto per l'esecuzione del test.

Interferenze	da / [mg/L]
Co	8
Cu	2
Oxalat	500
CN^-	10
NO_2^-	

Riferimenti bibliografici

D. F. Boltz and J. A. Howell, eds., Colorimetric Determination of Nonmetals, 2nd ed., Vol. 8, pag. 304 (1978). Carpenter, J.F. "A New Field Method for Determining the Levels of Iron Contamination in Oilfield Completion Brine", SPE International Symposium (2004)

Molibdato LR PP M251

0.03 - 3 mg/L Mo Mo1

Complesso Ternario

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
VARIO Molibdeno LR, Set	1 pz.	535450

Sono necessari inoltre i seguenti accessori.

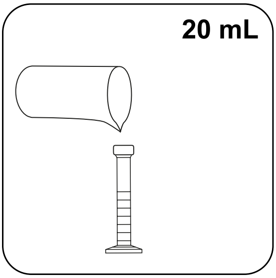
Accessori	Unità di imballaggio	N. ordine
Cilindro di miscelazione con tappo accessorio necessario per la determinazione del molibdeno LR con MD 100 (276140)	1 pz.	19802650

Preparazione

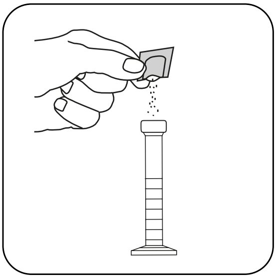
1. Le acque fortemente alcaline o acide devono essere portate prima dell’analisi entro un range di pH compreso tra 3 e 5 (con 0,5 mol/l di acido solforico o 1 mol/l di liscivia).
2. Per evitare errori dovuti a depositi, prima dell’analisi sciacquare i dispositivi in vetro con una soluzione di acido cloridrico (al 20% circa) e successivamente con acqua demineralizzata.

Esecuzione della rilevazione Molibdato LR con polvere in bustine Vario

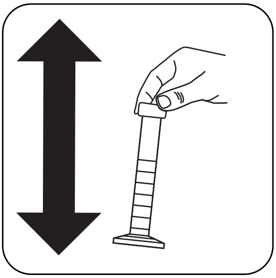
Selezionare il metodo nel dispositivo.



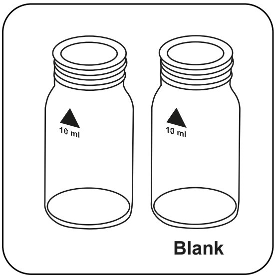
Immettere **20 mL di campione** in un cilindro di miscelazione da 25 mL.



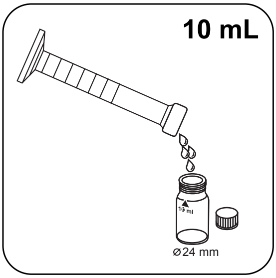
Aggiungere **una bustina di polvere Vario Molybdenum 1 LR F20**.



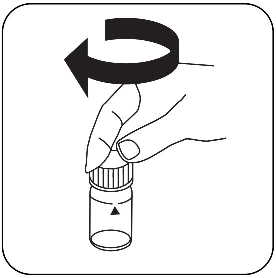
Chiudere il cilindro di miscelazione con un tappo. Far sciogliere la polvere agitando.



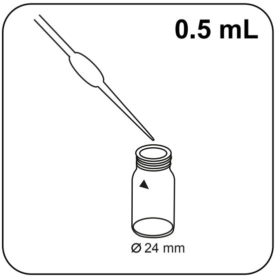
Preparare due cuvette pulite da 24 mm. Contrassegnare una cuvetta come cuvetta zero.



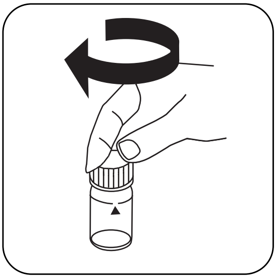
Immettere **10 mL di campione** in ogni cuvetta.



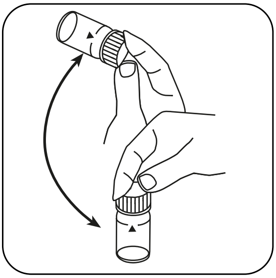
Chiudere bene la **cuvetta zero**.



Introdurre **0.5 mL di soluzione Molybdenum 2 LR** nella cuvetta del campione.



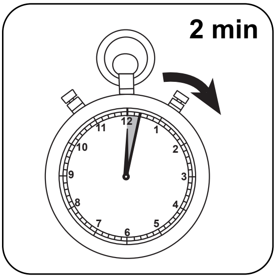
Chiudere la/e cuvetta/e.



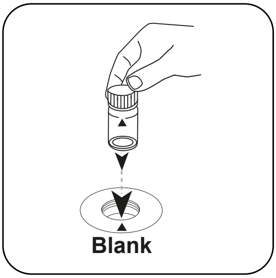
Miscelare il contenuto capovolgendo.

↵

Premere il tasto **ENTER**.



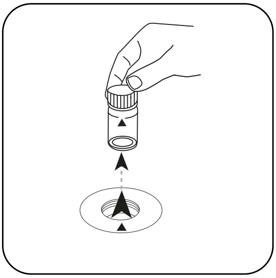
Attendere un **tempo di reazione di 2 minuto/i** .



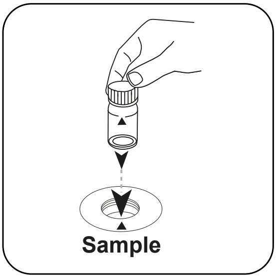
Posizionare la **cuvetta zero** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

Premere il tasto **ZERO**.



Prelevare la cuvetta dal vano di misurazione.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Test

Premere il tasto **TEST** (XD: **START**).

Sul display compare il risultato in mg/L di Molibdato.

Valutazione

La seguente tabella identifica i valori di output che possono essere convertiti in altre forme di citazione.

Unità di misura	Forma di citazione	Fattore di conversione
mg/l	MoO_4	1
mg/l	Mo	0.6
mg/l	Na_2MoO_4	1.29

Metodo chimico

Complesso Ternario

Appendice

Interferenze

Interferenze	da / [mg/L]	Influenza
Al	50	
Cr	1000	
Fe	50	
Ni	50	
NO_2^-	in tutte le quantità	
Cu	10	Porta a letture più elevate con un tempo di risposta superiore a 5 minuti

Riferimenti bibliografici

Analytical Chemistry, 25(9) 1363 (1953)

Molibdato HR L M254

1 - 100 mg/L MoO_4 Mo2

Tioglicolato

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
KS63-FE6-Tioglicolato/molibdato HR RGT	65 mL	56L006365

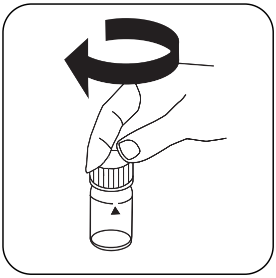
Prelievo del campione

1. Il test deve essere eseguito subito dopo il prelievo del campione. Il molibdato si deposita sulle pareti del recipiente di campionamento provocando risultati di misura troppo bassi.

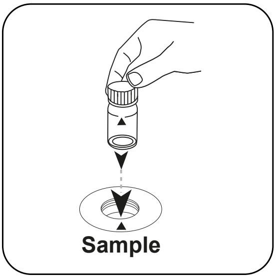
Esecuzione della rilevazione Molibdato HR con reagente liquido

Selezionare il metodo nel dispositivo.

Riempire una cuvetta da 24 mm con **10 mL di campione**.



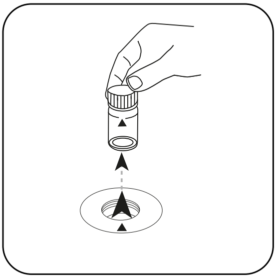
Chiudere la/e cuvetta/e.



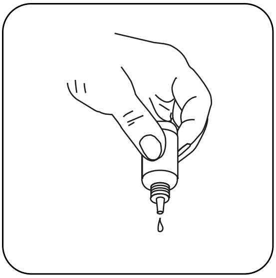
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

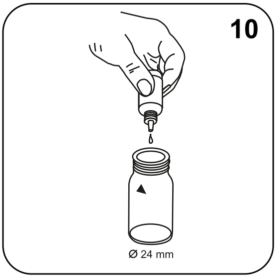
Premere il tasto **ZERO**.



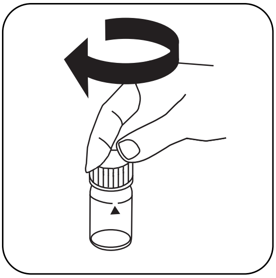
Prelevare la cuvetta dal vano di misurazione.



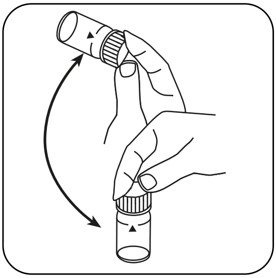
Tenere le boccette contagocce in posizione verticale e introdurre, premendo lentamente, gocce della stessa dimensione nella cuvetta.



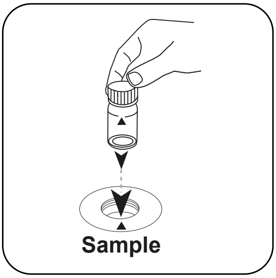
Aggiungere **10 gocce di Iron Reagent FE6**.



Chiudere la/e cuvetta/e.



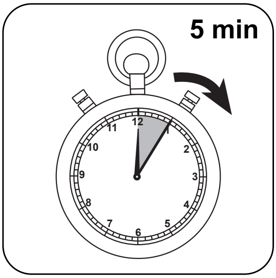
Miscelare il contenuto capovolgendo.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Test

Premere il tasto **TEST** (XD: **START**).



Attendere un **tempo di reazione di 5 minuto/i** .

Allo scadere del tempo di reazione viene effettuata automaticamente la misurazione.

Sul display compare il risultato in mg/L di Molibdato.

Valutazione

La seguente tabella identifica i valori di output che possono essere convertiti in altre forme di citazione.

Unità di misura	Forma di citazione	Fattore di conversione
mg/l	MoO_4	1
mg/l	Mo	0.6
mg/l	Na_2MoO_4	1.29

Metodo chimico

Tioglicolato

Appendice

Interferenze

Interferenze escludibili

1. L’interferenza da parte di niobio, tantalio, titanio e zirconio può essere mascherata con acido citrico.
2. L’interferenza da parte del vanadio(V) viene mascherata con fluoruro di potassio.

Riferimenti bibliografici

Photometrische Analyse, Lange/Vjedelek, Verlag Chemie 1980

Ozono T M300

0.02 - 2 mg/L O_3 O3

DPD/glicina

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
DPD No.1	Pastiglia / 100	511050BT
DPD No. 1	Pastiglia / 250	511051BT
DPD No. 1	Pastiglia / 500	511052BT
DPD No. 3	Pastiglia / 100	511080BT
DPD No. 3	Pastiglia / 250	511081BT
DPD No. 3	Pastiglia / 500	511082BT
DPD No. 1 Alto Calcio e)	Pastiglia / 100	515740BT
DPD No. 1 Alto Calcio e)	Pastiglia / 250	515741BT
DPD No. 1 Alto Calcio e)	Pastiglia / 500	515742BT
DPD No. 3 High Calcium e)	Pastiglia / 100	515730BT
DPD No. 3 High Calcium e)	Pastiglia / 250	515731BT
DPD No. 3 High Calcium e)	Pastiglia / 500	515732BT
Glicina f)	Pastiglia / 100	512170BT
Glicina f)	Pastiglia / 250	512171BT
Set DPD No. 1/no. 3#	ciascuna 100	517711BT
Set DPD No. 1/no. 3#	ciascuna 250	517712BT
Set DPD No. 1/no. 3 High Calcium#	ciascuna 100	517781BT
Set DPD No. 1/no. 3 High Calcium#	ciascuna 250	517782BT
Set DPD No. 1/glicina #	ciascuna 100	517731BT
Set DPD No. 1/glicina #	ciascuna 250	517732BT

Preparazione

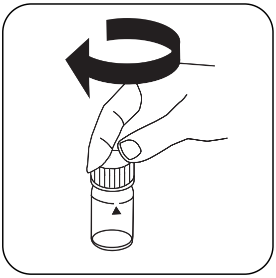
1. Pulizia delle cuvette:
   Poiché molti detergenti ad uso domestico (ad es. detersivo per piatti) contengono sostanze riducenti, nella successiva rilevazione di ossidanti (ad es. ozono, cloro) si potrebbero ottenere risultati troppo bassi. Per escludere tali errori di misura è necessario che i dispositivi in vetro siano esenti dal consumo di cloro. I dispositivi in vetro inoltre vengono conservati in una soluzione di ipoclorito di sodio (0,1 g/L) per un'ora e successivamente vengono risciacquati abbondantemente con acqua demineralizzata.
2. Nella preparazione del campione occorre evitare la degassificazione dell'ozono, ad es. utilizzando pipette e agitando. L'analisi deve essere eseguita subito dopo il prelievo del campione.
3. Le acque fortemente alcaline o acide devono essere portate prima dell'analisi entro un range di pH compreso tra 6 e 7 (con 0,5 mol/l di acido solforico o 1 mol/l di liscivia).

Esecuzione della rilevazione Ozono, in presenza di cloro con pastiglia

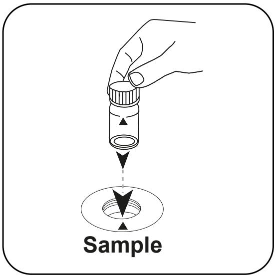
Selezionare il metodo nel dispositivo.

Selezionare inoltre la determinazione: in presenza di Cloro

Riempire una cuvetta da 24 mm con **10 mL di campione**.



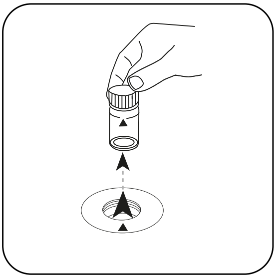
Chiudere la/e cuvetta/e.



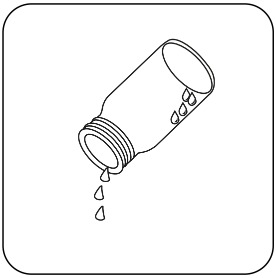
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

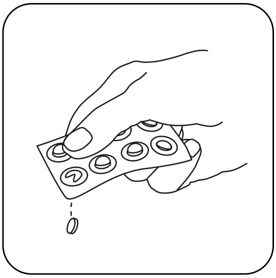
Premere il tasto **ZERO**.



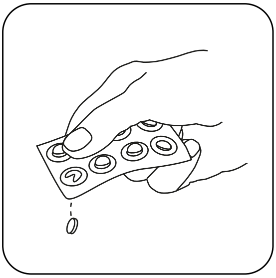
Prelevare la cuvetta dal vano di misurazione.



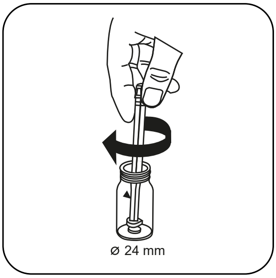
Svuotare la cuvetta finché non rimangono alcune gocce.



Aggiungere **una pastiglia DPD No. 1**.

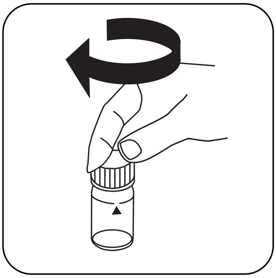


Aggiungere **una pastiglia DPD No. 3**.

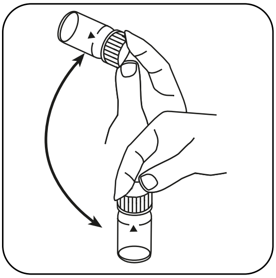


Frantumare la/e pastiglia/e con una leggera rotazione.

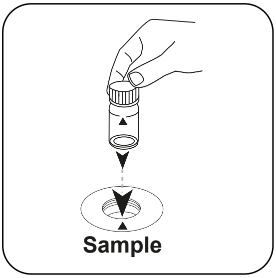
Immettere il **campione** nella cuvetta fino a raggiungere **la tacca dei 10 mL** .



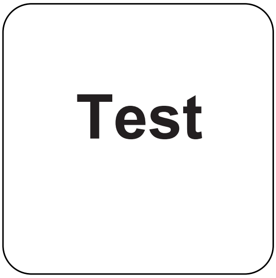
Chiudere la/e cuvetta/e.



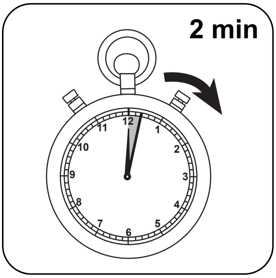
Far sciogliere la/e pastiglia/e agitando.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

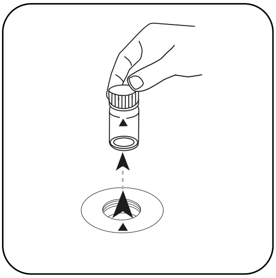


Premere il tasto **TEST** (XD: **START**).

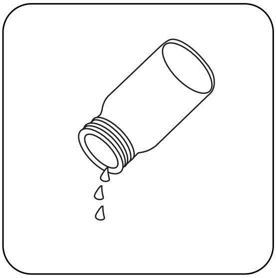


Attendere un **tempo di reazione di 2 minuto/i** .

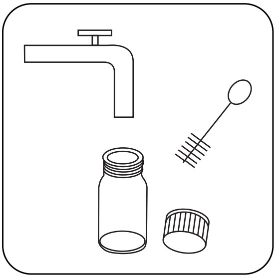
Allo scadere del tempo di reazione viene effettuata automaticamente la misurazione.



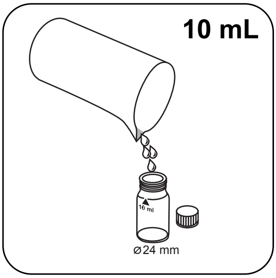
Prelevare la cuvetta dal vano di misurazione.



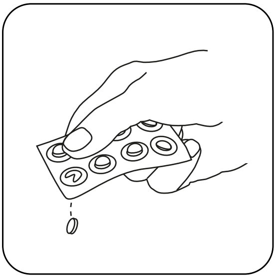
Svuotare la cuvetta.



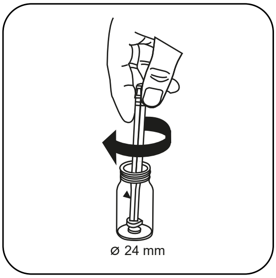
Pulire a fondo la cuvetta e il coperchio della cuvetta.



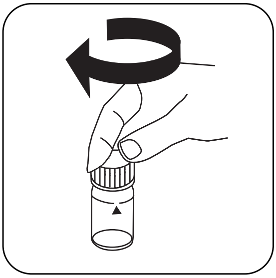
Riempire una **seconda cuvetta** con **10 mL di campione**.



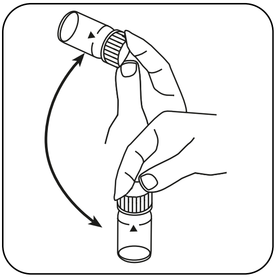
Aggiungere **una pastiglia GLYCINE**.



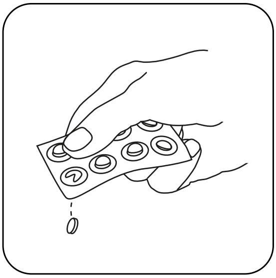
Frantumare la/e pastiglia/e con una leggera rotazione.



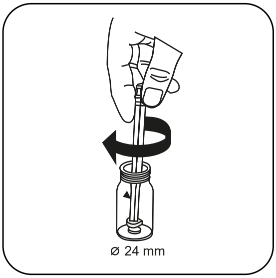
Chiudere la/e cuvetta/e.



Far sciogliere la/e pastiglia/e agitando.

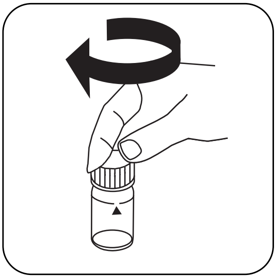


Immettere direttamente dalla pellicola nella prima cuvetta **una pastiglia DPD No. 1** e **una pastiglia DPD No. 3**.

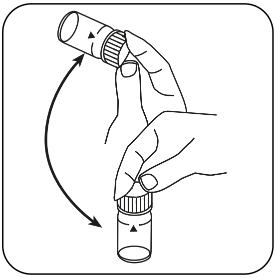


Frantumare la/e pastiglia/e con una leggera rotazione.

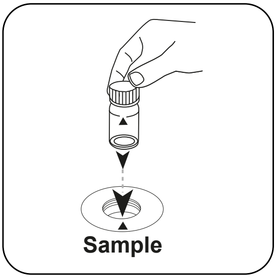
Immettere la **soluzione di glicina** preparata nella cuvetta preparata.



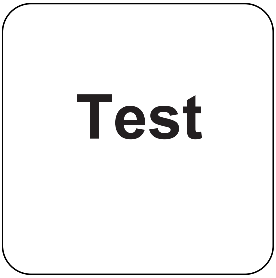
Chiudere la/e cuvetta/e.



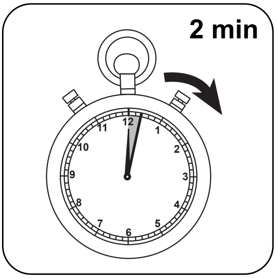
Far sciogliere la/e pastiglia/e agitando.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



Premere il tasto **TEST** (XD: **START**).



Attendere un **tempo di reazione di 2 minuto/i** .

Allo scadere del tempo di reazione viene effettuata automaticamente la misurazione.

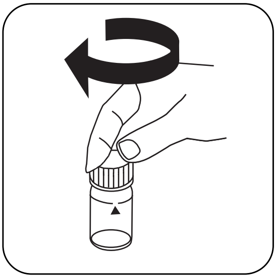
Sul display compare il risultato in mg/L di Ozono; Cloro totale mg/l.

Esecuzione della rilevazione Ozono, in assenza di cloro con pastiglia

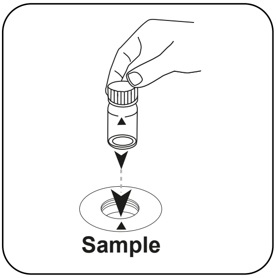
Selezionare il metodo nel dispositivo.

Selezionare inoltre la determinazione: senza Cloro

Riempire una cuvetta da 24 mm con **10 mL di campione**.



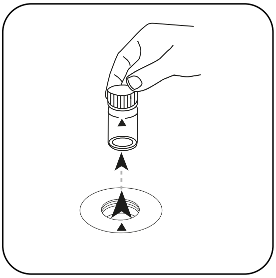
Chiudere la/e cuvetta/e.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

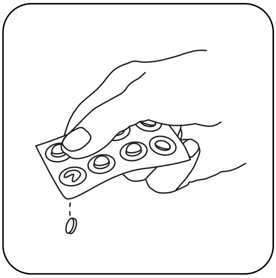
Zero

Premere il tasto **ZERO**.

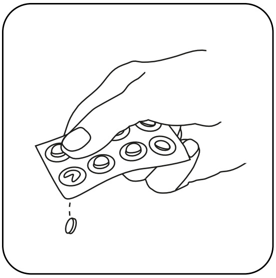


Prelevare la cuvetta dal vano di misurazione.

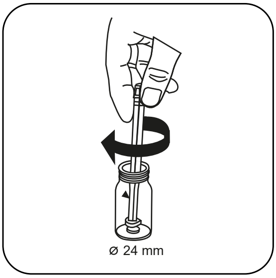
Svuotare la cuvetta finché non rimangono alcune gocce.



Aggiungere **una pastiglia DPD No. 1**.

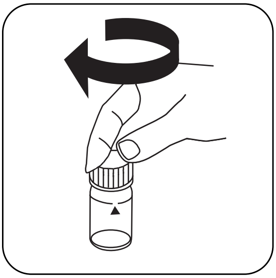


Aggiungere **una pastiglia DPD No. 3**.

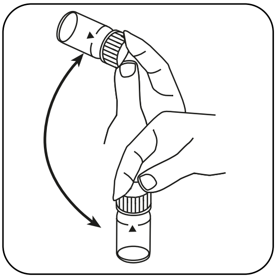


Frantumare la/e pastiglia/e con una leggera rotazione.

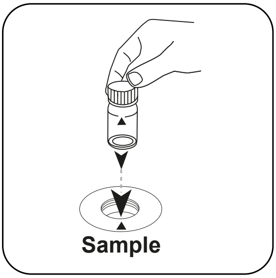
Immettere il **campione** nella cuvetta fino a raggiungere **la tacca dei 10 mL** .



Chiudere la/e cuvetta/e.



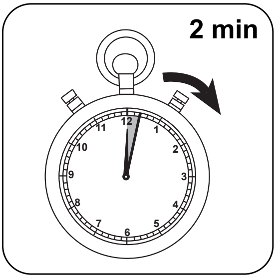
Far sciogliere la/e pastiglia/e agitando.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Test

Premere il tasto **TEST** (XD: **START**).



Attendere un **tempo di reazione di 2 minuto/i** .

Allo scadere del tempo di reazione viene effettuata automaticamente la misurazione.

Sul display compare il risultato in mg/L di Ozono.

Valutazione

La seguente tabella identifica i valori di output che possono essere convertiti in altre forme di citazione.

Unità di misura	Forma di citazione	Fattore di conversione
mg/l	O_3	1
mg/l	Cl_2	1.4771

Metodo chimico

DPD/glicina

Appendice

Interferenze

Interferenze permanenti

1. Tutti gli ossidanti presenti nei campioni reagiscono come il cloro dando risultati troppo elevati.
2. Le concentrazioni di ozono maggiori di 6 mg/L possono dare risultati entro il range di misura fino a 0 mg/L. In questo caso il campione di acqua deve essere diluito. 10 ml del campione diluito vengono addizionati con il reagente e la misurazione viene ripetuta (test di plausibilità).

Riferimenti bibliografici

Colorimetric Chemical Analytical Methods, 9th Edition, Lovibond

Derivato di

DIN 38408-3:2011-04

[e]Reagente ausiliario, in alternativa a DPD n. 1 / no 3 in caso di torbidità del campione a causa di alto contenuto di ioni di calcio e / o alta conduttività | [f]Reagente ausiliario, è inoltre necessario per la determinazione di bromo, biossido di cloro o ozono in presenza di cloro | [j] #Bacchetta compresa

Poliacrilati L M338

1 - 30 mg/L Polyacryl POLY

Torbidità

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
Cartuccia C18	1 pz.	56A020101
KS173-P2-2,4 Indicatore di dinitrofenolo	65 mL	56L017365
KS183-QA2-MO1-P3-Acido nitrico	65 mL	56L018365
Polyacrylate L Reagent Set	1 pz.	56R019165
KS336-Propan-2-ol, 65 mL	65 mL	56L033665

Sono necessari inoltre i seguenti accessori.

Accessori	Unità di imballaggio	N. ordine
Pipette, 1000 µl	1 pz.	365045
Puntali per pipette, 0,1-1 ml (blu), 1000 pezzi	1 pz.	419073

Preparazione

- **Preparazione della cartuccia:**

1. Rimuovere lo stantuffo di una siringa adeguata. Fissare la cartuccia C18 al cilindro della siringa.
2. Immettere 5 ml di KS336 (propan-2-olo) nel cilindro della siringa.
3. Con l’ausilio dello stantuffo introdurre il solvente, a gocce, nella cartuccia.
4. Rimuovere il solvente fuoriuscito.
5. Rimuovere nuovamente lo stantuffo. Riempire il cilindro della siringa con 20 ml di acqua demineralizzata.
6. Con l’ausilio dello stantuffo introdurre il contenuto, a gocce, nella cartuccia.
7. Scartare l’acqua demineralizzata fuoriuscita.
8. La cartuccia è ora pronta all’uso.

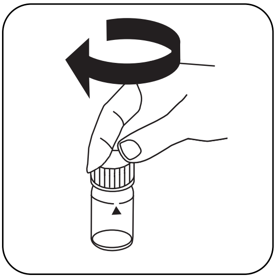
Note

1. Se nonostante un dosaggio corretto dei campioni e dei reagenti non si verifica alcun intorbidimento o si verifica solo leggermente, per il rilevamento dei poliacrilati/polimeri è necessario concentrare il campione.
2. Si possono ottenere risultati divergenti se sono presenti interferenze dovute a componenti o impurità del campione. In questi casi è necessario eliminare le interferenze.
3. Il metodo è stato approvato utilizzando acido poliacrilico 2100 sale di sodio nel range 1-30 mg/L. Altri poliacrilati/polimeri danno risultati divergenti, pertanto il range di misura può variare.

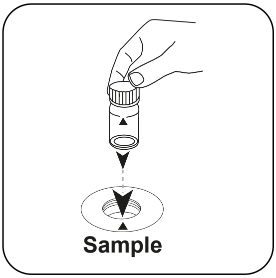
Esecuzione della rilevazione Poliacrilati con reagente liquido

Selezionare il metodo nel dispositivo.

Riempire una cuvetta da 24 mm con **10 mL di campione**.



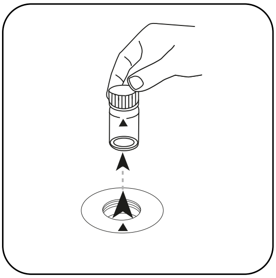
Chiudere la/e cuvetta/e.



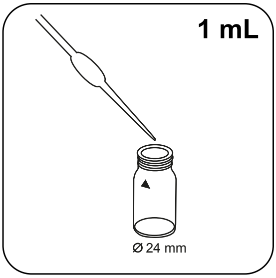
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

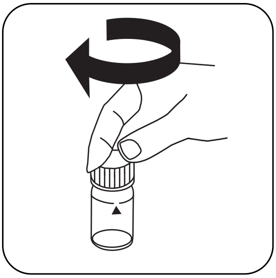
Premere il tasto **ZERO**.



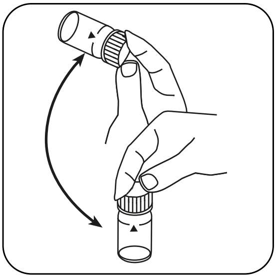
Prelevare la cuvetta dal vano di misurazione.



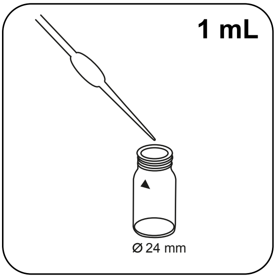
Introdurre **1 mL di soluzione (25 drops) Polyacrylate Buffer A1** nella cuvetta del campione.



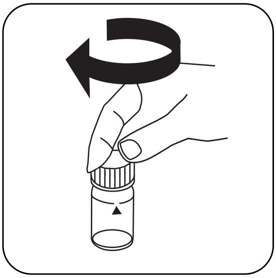
Chiudere la/e cuvetta/e.



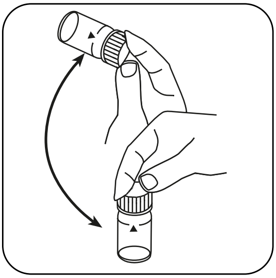
Miscelare il contenuto capovolgendo.



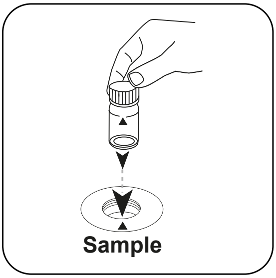
Introdurre **1 mL di soluzione (25 drops) Polyacrylate Precipitant A2** nella cuvetta del campione.



Chiudere la/e cuvetta/e.



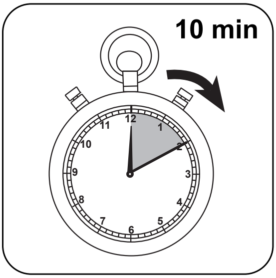
Miscelare il contenuto capovolgendo.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Test

Premere il tasto **TEST** (XD: **START**).



Attendere un **tempo di reazione di 10 minuto/i** .

Allo scadere del tempo di reazione viene effettuata automaticamente la misurazione.

Sul display compare il risultato in mg/L di Acido poliacrilico 2100 sale di sodio.

Metodo chimico

Torbidità

Appendice

Riferimenti bibliografici

W.B. Crummett, R.A. Hummel (1963), The Determination of Polyacrylamides in Water, American Water Works Association, 55 (2), pagg. 209-219

Solfato PP M360

5 - 100 mg/L SO_4^{2-} SO4

Torbidità con solfato di bario

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
VARIO Sulfa 4 F10	Polvere / 100 pz.	532160
ValidCheck Solfato 75 mg/l	1 pz.	48311325

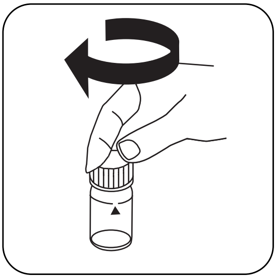
Note

1. Il solfato provoca un intorbidimento distribuito finemente.

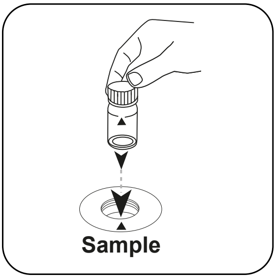
Esecuzione della rilevazione Solfato con polvere in bustine Vario

Selezionare il metodo nel dispositivo.

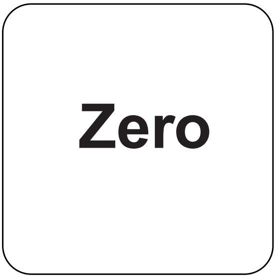
Riempire una cuvetta da 24 mm con **10 mL di campione**.



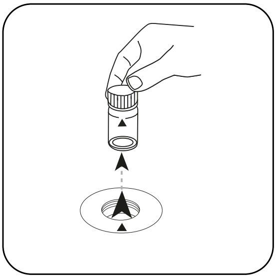
Chiudere la/e cuvetta/e.



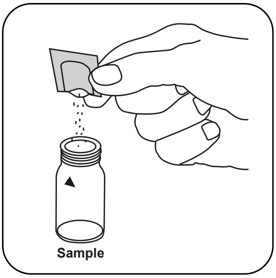
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



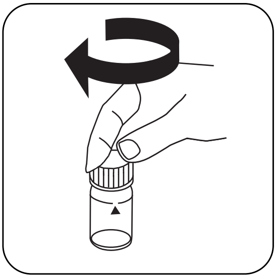
Premere il tasto **ZERO**.



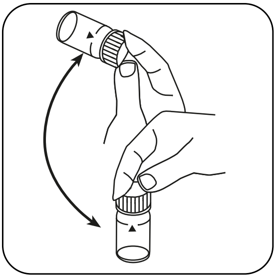
Prelevare la cuvetta dal vano di misurazione.



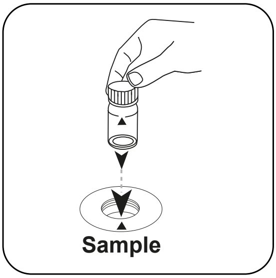
Aggiungere **una bustina di polvere Vario Sulpha 4/ F10**.



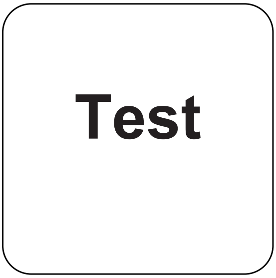
Chiudere la/e cuvetta/e.



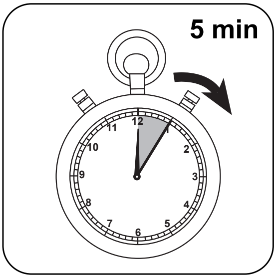
Miscelare il contenuto capovolgendo.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



Premere il tasto **TEST** (XD: **START**).



Attendere un **tempo di reazione di 5 minuto/i** .

Allo scadere del tempo di reazione viene effettuata automaticamente la misurazione.

Sul display compare il risultato in mg/L di Solfato.

Metodo chimico

Torbidità con solfato di bario

Appendice

Secondo

Standard Method 4500-SO42- E
US EPA 375.4

Derivato di

DIN ISO 15923-1 D49

Triazolo PP M388

1 - 16 mg/L Benzotriazole or Tolyltriazole tri

Digestione UV catalizzata

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
VARIO Triazole RGT Powder Pack F25	Polvere / 100 pz.	532200
VARIO Rochelle soluzione salina, 30 ml h)	30 mL	530640

Sono necessari inoltre i seguenti accessori.

Accessori	Unità di imballaggio	N. ordine
Lampada a penna UV, 254 nm	1 pz.	400740
Occhiali con protezione UV, arancione	1 pz.	400755

Indicazioni di pericolo

Mentre la lampada UV è in funzione si devono indossare occhiali di protezione contro gli UV.

Prelievo del campione

1. Il campione di acqua deve essere misurato al più presto dopo il prelievo.

Preparazione

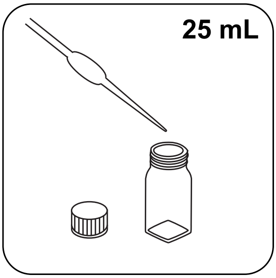
1. Perché i risultati dell'analisi siano accurati è necessario che il campione abbia una temperatura compresa tra 20 °C e 25 °C.
2. Le acque contenenti nitrito o borace devono essere portate prima dell'analisi entro un range di pH compreso tra 4 e 6 (con 1N di acido solforico).
3. Se il campione ha una durezza di più di 500 mg/L di $CaCO_3$ si aggiungono 10 gocce di soluzione salina Rochelle.

Note

1. Polvere in bustine Triazole Reagent e lampada UV disponibile su richiesta.
2. Per l’uso della lampada UV fare riferimento al manuale del produttore. Non toccare la superficie della lampada UV. Le impronte digitali corrodono il vetro. Tra una misurazione e l’altra pulire la lampada UV con un panno morbido e pulito.
3. Il test non distingue tra tolitriazolo e benzotriazolo.

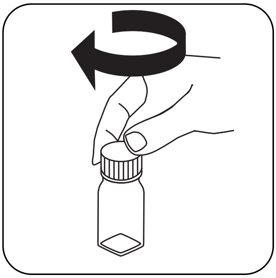
Esecuzione della rilevazione Benzotriazolo/tolitriazolo con polvere in bustine Vario

Selezionare il metodo nel dispositivo.

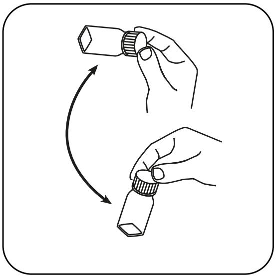


Riempire un contenitore di decomposizione con **25 mL** di campione.

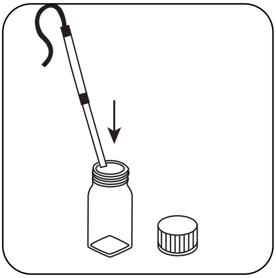
Aggiungere **una bustina di polvere** .



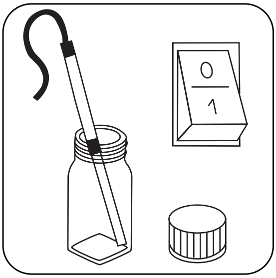
Chiudere la contenitore di decomposizione.



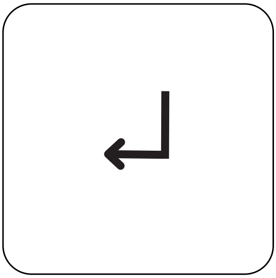
Far sciogliere la polvere capovolgendo.



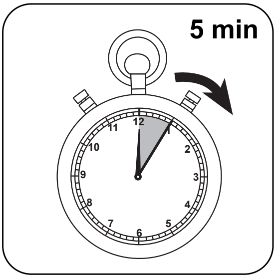
Tenere la lampada UV nel campione. **Attenzione: indossare occhiali di protezione contro i raggi UV!**



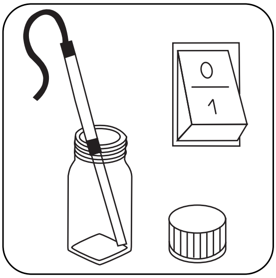
Accendere la lampada UV.



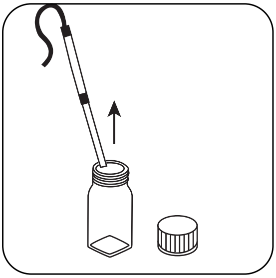
Premere il tasto **ENTER**.



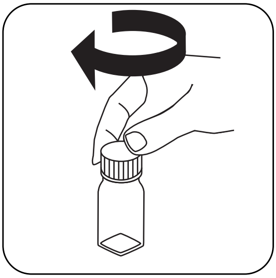
Attendere un **tempo di reazione di 5 minuto/i** .



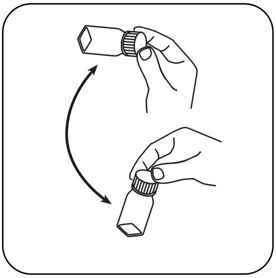
Spegnere la lampada UV al termine del conto alla rovescia.



Prelevare la lampada UV dal campione.

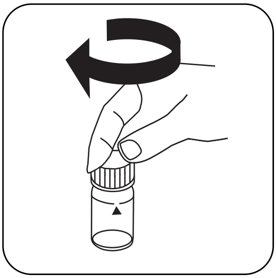


Chiudere la contenitore di decomposizione.

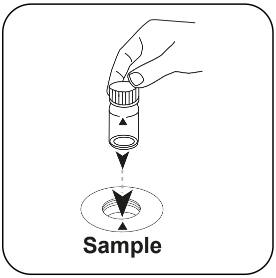


Miscelare il contenuto capovolgendo.

Riempire una cuvetta da 24 mm con **10 mL di acqua demineralizzata**.



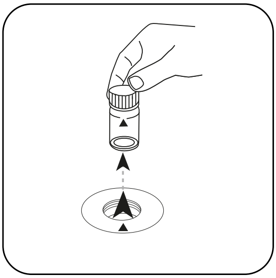
Chiudere la/e cuvetta/e.



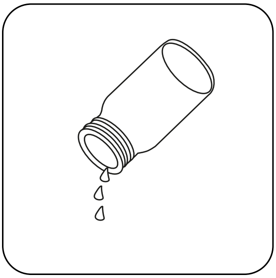
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

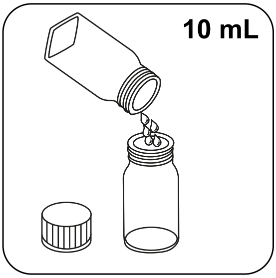
Premere il tasto **ZERO**.



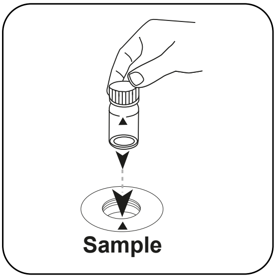
Prelevare la cuvetta dal vano di misurazione.



Svuotare la cuvetta.



Riempire una cuvetta da 24 mm con **10 mL del campione preparato**.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Test

Premere il tasto **TEST** (XD: **START**).

Sul display compare il risultato in mg/L di Benzotriazolo/tolitriazolo (Passare da una forma di citazione all'altra premendo le frecce su/giù.).

Valutazione

La seguente tabella identifica i valori di output che possono essere convertiti in altre forme di citazione.

Unità di misura	Forma di citazione	Fattore di conversione
mg/l	Benzotriazole	1
mg/l	Tolyltriazole	1.1177

Metodo chimico

Digestione UV catalizzata

Appendice

Interferenze

Interferenze permanenti

- Se la fotolisi viene eseguita per più o meno di 5 minuti si possono ottenere risultati troppo bassi.

Riferimenti bibliografici

Harp, D., Proceedings 45th International Water Conference, 299 (October 22-24, 1984)

[h)] Reagente ausiliario, è utilizzato anche per campioni con durezza superiore a 300 mg / l $CaCO_3$

Zinco L M405

0.1 - 2.5 mg/L Zn Zn

Zincon/EDTA

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
KS 89 - Soppressore cationico	65 mL	56L008965
Zinc LR Reagent Set	1 pz.	56R023965
Tampone di zinco Z1B	65 mL	56L024365
KP244-Reagente allo zinco 2	Polvere / 20 g	56P024420

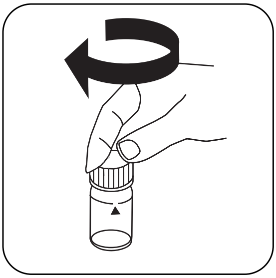
Note

1. Per il dosaggio corretto si deve utilizzare il cucchiaio dosatore fornito in dotazione con i reagenti.
2. Questo test è indicato per la determinazione dello zinco libero solubile. Lo zinco legato a forti complessanti non viene rilevato.

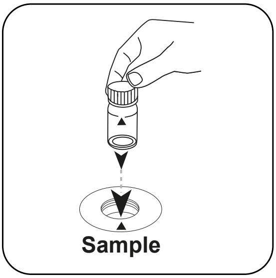
Esecuzione della rilevazione Zinco con reagente liquido e polvere

Selezionare il metodo nel dispositivo.

Riempire una cuvetta da 24 mm con **10 mL di campione**.



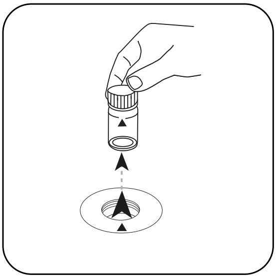
Chiudere la/e cuvetta/e.



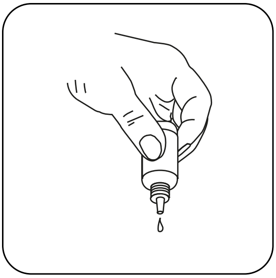
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

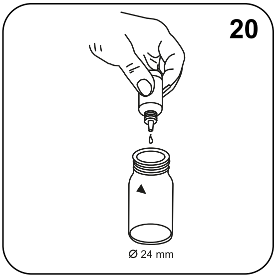
Premere il tasto **ZERO**.



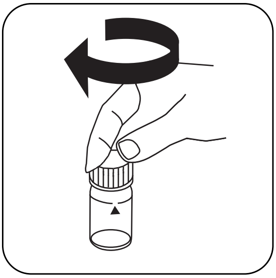
Prelevare la cuvetta dal vano di misurazione.



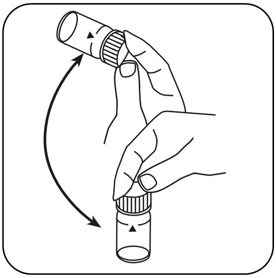
Tenere le boccette contagocce in posizione verticale e introdurre, premendo lentamente, gocce della stessa dimensione nella cuvetta.



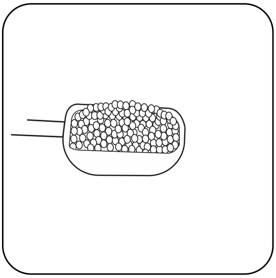
Aggiungere **20 gocce di Zinc Buffer Z1B**.



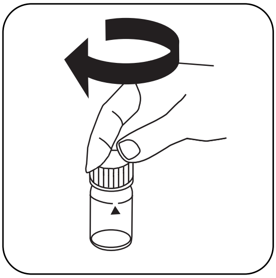
Chiudere la/e cuvetta/e.



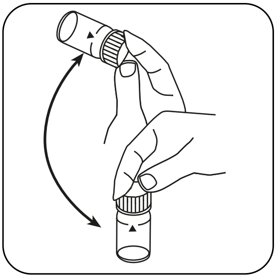
Miscelare il contenuto capovolgendo.



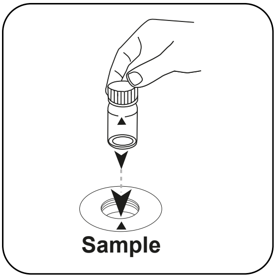
Aggiungere **un cucchiaio dosatore di Zinc Indicator Z4P**.



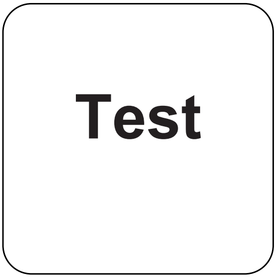
Chiudere la/e cuvetta/e.



Far sciogliere la polvere capovolgendo.



Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



Premere il tasto **TEST** (XD: **START**).

Sul display compare il risultato in mg/L di Zinco.

Metodo chimico

Zincon/EDTA

Appendice

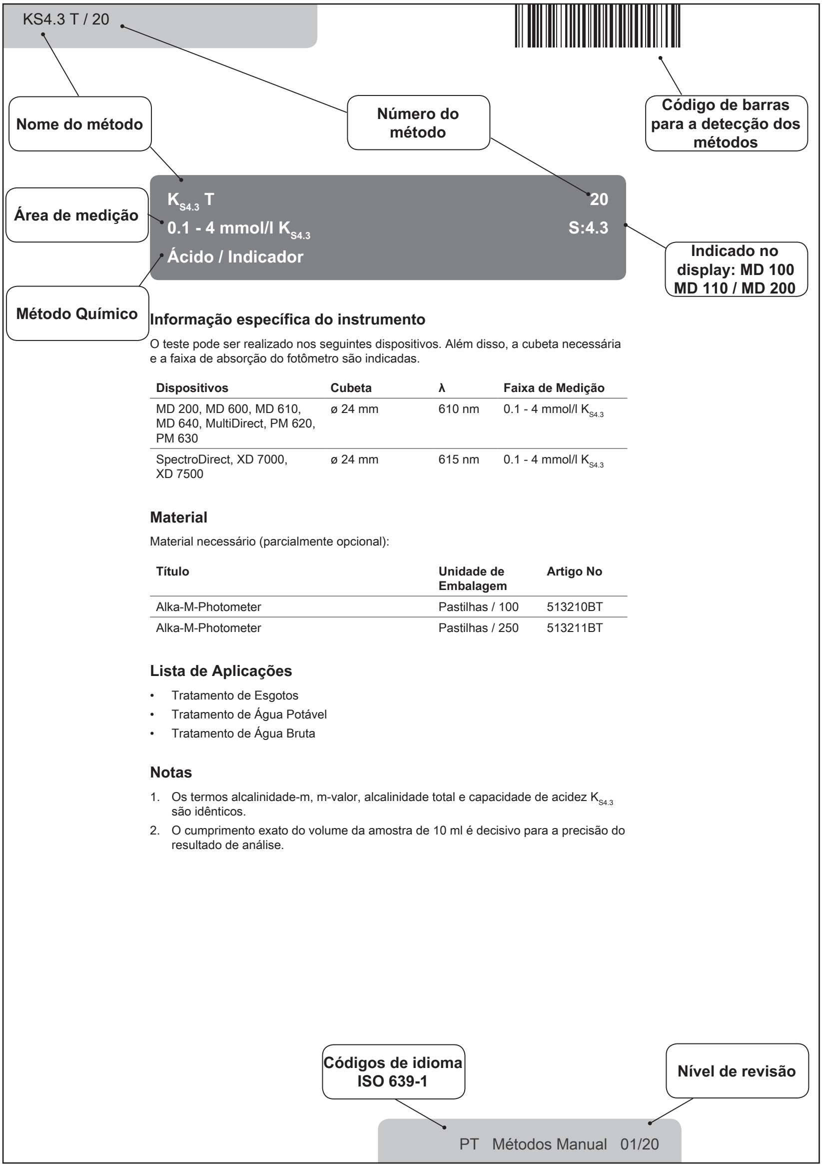
Interferenze

Interferenze escludibili

- I cationi quali i composti di ammonio quaternario alterano il colore da rosa-rosso a viola, a seconda della concentrazione di rame presente. In questo caso bisogna aggiungere al campione KS89 (cationic surpressor) in gocce finché non sarà visibile una colorazione arancione/blu. Attenzione: dopo l’aggiunta di ogni goccia far oscillare il campione.

Riferimenti bibliografici

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stoccarda 1989
S.M. Khopkar, Basic Concepts of Analytical Chemistry (2004), New Age International Ltd. Publishers, New Dheli, pag. 75



KS4.3 T / 20

$K_{S4.3}$ T **20**

0.1 - 4 mmol/l $K_{S4.3}$ **S:4.3**

Ácido / Indicador

Informação específica do instrumento

O teste pode ser realizado nos seguintes dispositivos. Além disso, a cubeta necessária e a faixa de absorção do fotômetro são indicadas.

Dispositivos	Cubeta	λ	Faixa de Medição
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630	ø 24 mm	610 nm	0.1 - 4 mmol/l $K_{S4.3}$
SpectroDirect, XD 7000, XD 7500	ø 24 mm	615 nm	0.1 - 4 mmol/l $K_{S4.3}$

Material

Material necessário (parcialmente opcional):

Título	Unidade de Embalagem	Artigo No
Alka-M-Photometer	Pastilhas / 100	513210BT
Alka-M-Photometer	Pastilhas / 250	513211BT

Lista de Aplicações

- Tratamento de Esgotos
- Tratamento de Água Potável
- Tratamento de Água Bruta

Notas

1. Os termos alcalinidade-m, m-valor, alcalinidade total e capacidade de acidez $K_{S4.3}$ são idênticos.
2. O cumprimento exato do volume da amostra de 10 ml é decisivo para a precisão do resultado de análise.

PT Métodos Manual 01/20

Efetuar a medição

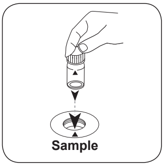
Realização da determinação Capacidade de acidez $K_{S4.3}$ com pastilha

Escolher o método no equipamento.

Para este método não tem de ser efetuada uma medição ZERO nos seguintes equipamentos: XD 7000, XD 7500

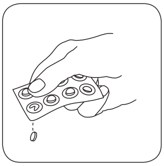
Encher a célula de 24 mm com **10 ml de amostra** .

Fechar a(s) célula(s).

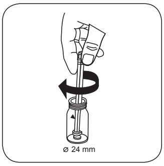


Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

● ● ●



Pastilha ALKA-M-PHOTOMETER.



Esmagar a(s) pastilha(s) rodando ligeiramente.

Fechar a(s) célula(s).

Alumínio PP M50

0.01 - 0.25 mg/L Al AL

Eriochrom Cyanine R

Material

Material necessário (parcialmente opcional):

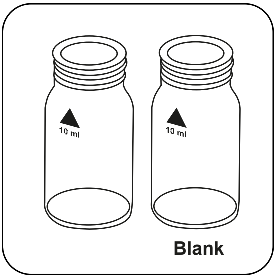
Reagentes	Unidade de Embalagem	Código do Produto
Jogo de alumínio VARIO 20 ml	1 pc.	535000

Preparação

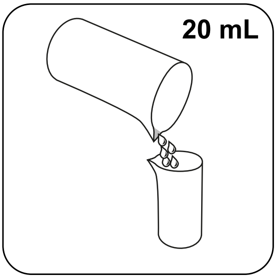
1. Para conseguir resultados de análise precisos, a temperatura da amostra deve ser mantida entre 20 °C e 25 °C.
2. Para evitar erros por causa da sujidade, deve enxaguar a célula e o acessório antes da análise com solução de ácido clorídrico (aprox. de 20 %) e depois com água desmineralizada.

Realização da determinação Alumínio com pacote de pó Vario

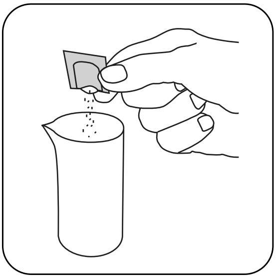
Escolher o método no equipamento.



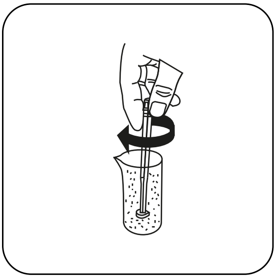
Preparar duas células de 24 mm limpas. Identificar uma célula como célula zero.



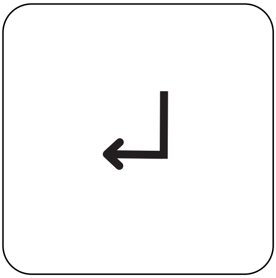
Introduzir **20 mL de amostra** num copo medida de 100 mL.



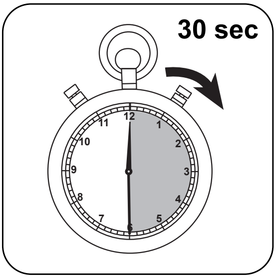
Adicionar um **pacote de pó Vario ALUMINIUM ECR F20** .



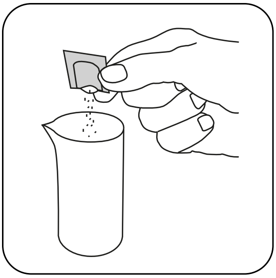
Soltar o pó por agitação.



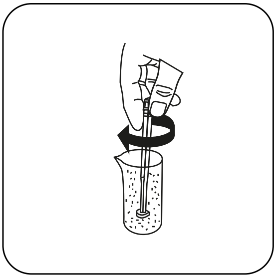
Premir a tecla **ENTER**.



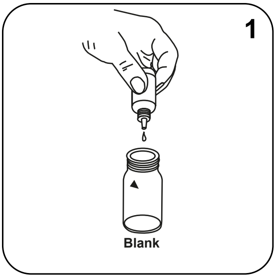
Aguardar **30 segundos de tempo de reação**.



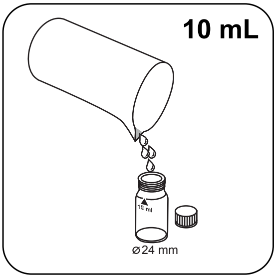
Adicionar um **pacote de pó Vario HEXAMINE F20** .



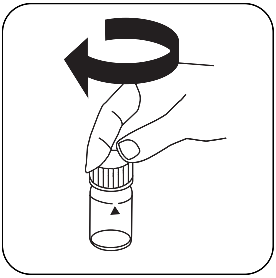
Soltar o pó por agitação.



Adicionar **1 gotas Vario ALUMINIUM ECR Masking Reagent** à célula zero.



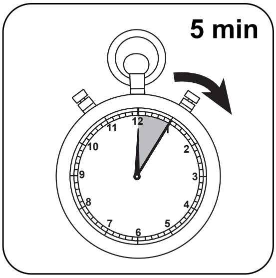
Introduzir em cada célula **10 mL de amostra preparada** .



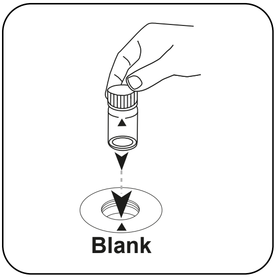
Fechar a(s) célula(s).

↵

Premir a tecla **ENTER**.



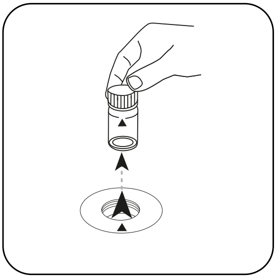
Aguardar **5 minuto(s) de tempo de reação**.



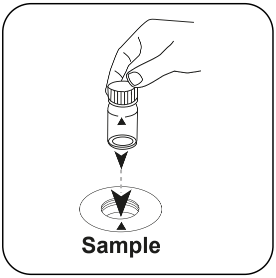
Colocar a **célula zero** no compartimento de medição. Observar o posicionamento.

Zero

Premir a tecla **ZERO**.



Retirar a célula do compartimento de medição.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Test

Premir a tecla **TEST** (XD: **START**).

No visor aparece o resultado em mg/L Alumínio.

Análises

A tabela a seguir identifica os valores de saída que podem ser convertidos em outras formas de citação.

Unidade	Forma de citação	Fator de conversão
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Método Químico

Eriochrom Cyanine R

Apêndice

Texto de Interferências

Interferências Removíveis

- A presença de fluoretos e polifosfatos pode origina resultados de análise baixos. Esta influência tem geralmente um significado importante, a não ser que a água seja artificialmente fluorada. Neste caso, pode usar a tabela indicada em baixo para determinar a concentração real de alumínio.

Fluoreto	**Valor no visor: Alumínio [mg/L]**					
[mg/L F]	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**
0.2	0.05	0.11	0.16	0.21	0.27	0.32
0.4	0.06	0.11	0.17	0.23	0.28	0.34
0.6	0.06	0.12	0.18	0.24	0.30	0.37
0.8	0.06	0.13	0.20	0.26	0.32	0.40
1.0	0.07	0.13	0.21	0.28	0.36	0.45
1.5	0.09	0.20	0.29	0.37	0.48	---

Bibliografia

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

De acordo com

APHA Method 3500-Al B

Bromo T M80

0.05 - 13 mg/L Br_2 Br

DPD

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
DPD Nº.1	Pastilhas / 100	511050BT
DPD Nº. 1	Pastilhas / 250	511051BT
DPD Nº. 1	Pastilhas / 500	511052BT
DPD Nº. 1 Alto Cálcio [e)]	Pastilhas / 100	515740BT
DPD Nº. 1 Alto Cálcio [e)]	Pastilhas / 250	515741BT
DPD Nº. 1 Alto Cálcio [e)]	Pastilhas / 500	515742BT

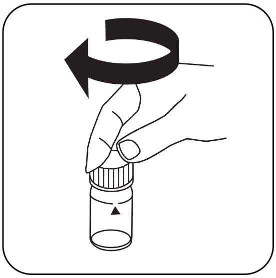
Preparação

1. Limpeza das células:
   Uma vez que muitos produtos de limpeza domésticos (p. ex. lava-louça) contêm substâncias redutoras, na determinação que se segue de oxidantes (p. ex. ozono, cloro) pode haver demasiadas reduções. Para excluir este erro de medição, os equipamentos de vidro não deviam ter a capacidade de absorção de cloro. Para esse efeito, os equipamentos de vidro são guardados por uma hora sob solução de hipoclorito de sódio (0,1 g/L) e depois devem ser bem enxaguados com água desmineralizada.
2. Na preparação da amostra é preciso evitar a libertação de gases de bromo, p. ex. através da pipetagem e agitação. A análise tem de ser efetuada logo após a recolha da amostra.
3. As águas fortemente alcalinas ou ácidas devem, antes da análise, ser ajustadas para um valor pH entre 6 e 7 (com 0,5 mol/l de ácido sulfúrico ou 1 mol/l soda cáustica).

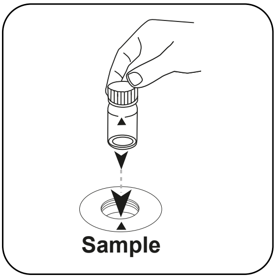
Realização da determinação Bromo com pastilha

Escolher o método no equipamento.

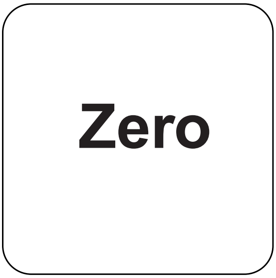
Encher a célula de 24 mm com **10 mL de amostra** .



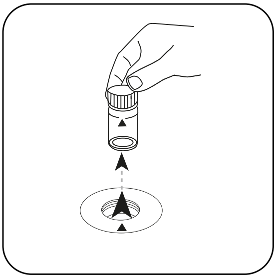
Fechar a(s) célula(s).



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

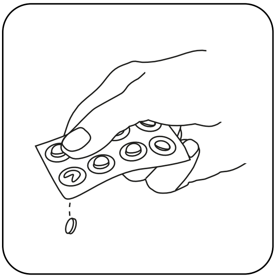


Premir a tecla **ZERO**.

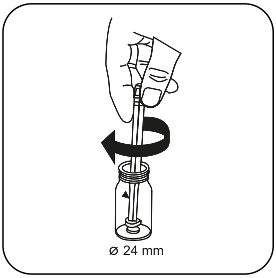


Retirar a célula do compartimento de medição.

Esvaziar a célula até ficarem apenas algumas gotas.

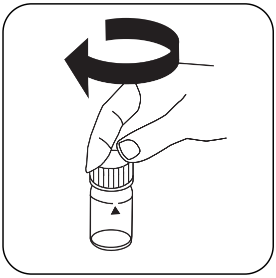


Pastilha DPD No. 1.

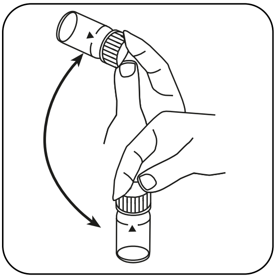


Esmagar a(s) pastilha(s) rodando ligeiramente.

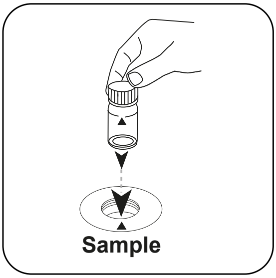
Encher a célula até à **marca de 10 mL** com a **amostra** .



Fechar a(s) célula(s).



Dissolver a(s) pastilha(s) girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Test

Premir a tecla **TEST** (XD: **START**).

No visor aparece o resultado em mg/L Bromo.

Método Químico

DPD

Apêndice

Texto de Interferências

Interferências Pesistentes

1. Todos os oxidantes presentes nas amostras reagem como o bromo, o que leva a resultados demasiado altos.
2. Concentrações de bromo superiores a 22 mg/L podem causar resultados dentro da área de medição até 0 mg/L. Neste caso, deve diluir a amostra de água. 10 ml da amostra diluída é colocada em reagente e a medição é repetida (teste de plausibilidade).

Derivado de

US EPA 330.5 (1983)
APHA Method 4500 Cl-G

[e] Reagente auxiliar, alternativamente ao DPD no. 1 / não 3 quando a amostra é nublada devido ao alto teor de íons de cálcio e / ou alta condutividade

Cloro T

M100

0.01 - 6.0 mg/L Cl_2 [a)]

CL6

DPD

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
DPD Nº.1	Pastilhas / 100	511050BT
DPD Nº. 1	Pastilhas / 250	511051BT
DPD Nº. 1	Pastilhas / 500	511052BT
DPD Nº. 3	Pastilhas / 100	511080BT
DPD Nº. 3	Pastilhas / 250	511081BT
DPD Nº. 3	Pastilhas / 500	511082BT
DPD Nº. 1 Alto Cálcio [e)]	Pastilhas / 100	515740BT
DPD Nº. 1 Alto Cálcio [e)]	Pastilhas / 250	515741BT
DPD Nº. 1 Alto Cálcio [e)]	Pastilhas / 500	515742BT
DPD Nº. 3 Alto Cálcio [e)]	Pastilhas / 100	515730BT
DPD Nº. 3 Alto Cálcio [e)]	Pastilhas / 250	515731BT
DPD Nº. 3 Alto Cálcio [e)]	Pastilhas / 500	515732BT
DPD Nº. 4	Pastilhas / 100	511220BT
DPD Nº. 4	Pastilhas / 250	511221BT
DPD Nº. 4	Pastilhas / 500	511222BT
DPD Nº. 3 Evo	Pastilhas / 100	511420BT
DPD Nº. 3 Evo	Pastilhas / 250	511421BT
DPD Nº. 3 Evo	Pastilhas / 500	511422BT
DPD Nº.4 Evo	Pastilhas / 100	511970BT
DPD Nº. 4 Evo	Pastilhas / 250	511971BT
DPD Nº. 4 Evo	Pastilhas / 500	511972BT

Padrões disponíveis

Título	Unidade de Embalagem	Código do Produto
ValidCheck Cloro 1,5 mg/l	1 pc.	48105510

Amostragem

1. Na preparação da amostra é preciso evitar a libertação de gases de cloro, p. ex. através da pipetagem e agitação.
2. A análise tem de ser efetuada logo após a recolha da amostra.

Preparação

1. Limpeza das células:
   Uma vez que muitos produtos de limpeza domésticos (p. ex. lava-louça) contêm substâncias redutoras, na determinação de cloro pode haver demasiadas reduções. Para excluir este erro de medição, os equipamentos de vidro não deviam ter a capacidade de absorção de cloro. Para esse efeito, os equipamentos de vidro são guardados por uma hora sob solução de hipoclorito de sódio (0,1 g/L) e depois devem ser bem enxaguados com água desmineralizada.
2. Para a determinação individual de cloro livre e cloro total é conveniente usar respetivamente um conjunto próprio de células (ver EN ISO 7393-2, alínea 5.3).
3. A formação de cores DPD ocorre com um valor pH entre 6,2 e 6,5. Os reagentes contêm, por isso, um tampão para ajustar o valor pH. As águas fortemente alcalinas ou ácidas devem, porém, antes da análise, ser ajustadas para um valor pH entre 6 e 7 (com 0,5 mol/L de ácido sulfúrico ou 1 mol/L soda cáustica).

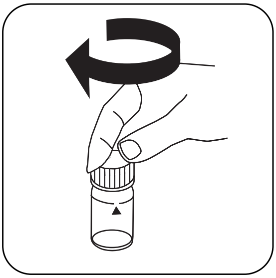
Notas

1. Os pastilhas Evo podem ser utilizadas como alternativa à pastilha padrão correspondente (por exemplo, DPD Nº 3 Evo em vez da DPD Nº 3).

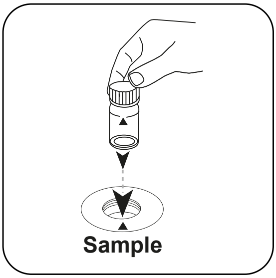
Realização da determinação Cloro livre com pastilha

Escolher o método no equipamento.

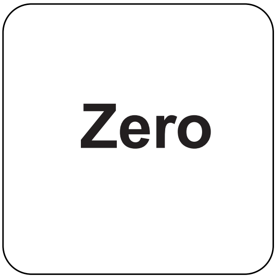
Encher a célula de 24 mm com **10 mL de amostra** .



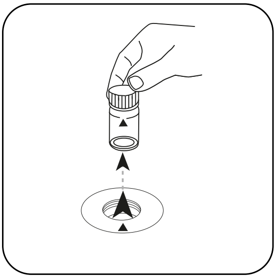
Fechar a(s) célula(s).



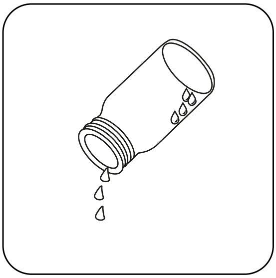
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



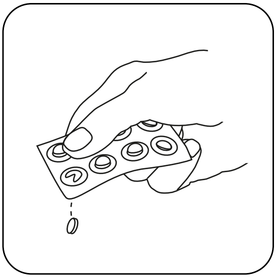
Premir a tecla **ZERO**.



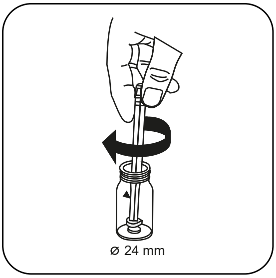
Retirar a célula do compartimento de medição.



Esvaziar a célula até ficarem apenas algumas gotas.

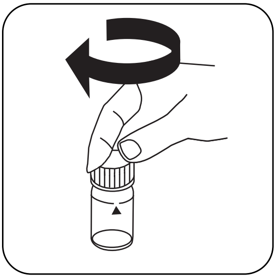


Pastilha DPD No. 1.

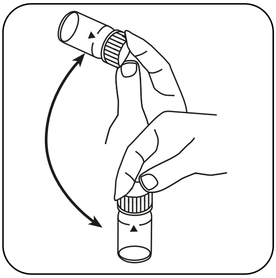


Esmagar a(s) pastilha(s) rodando ligeiramente.

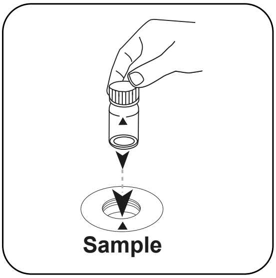
Encher a célula até à **marca de 10 mL** com a **amostra** .



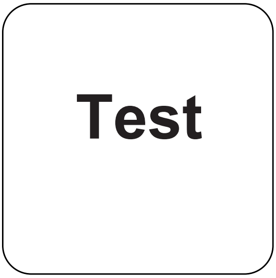
Fechar a(s) célula(s).



Dissolver a(s) pastilha(s) girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



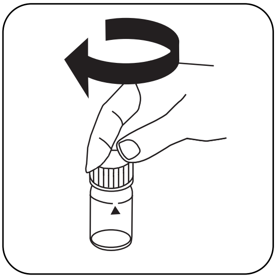
Premir a tecla **TEST** (XD: **START**).

No visor aparece o resultado em mg/L Cloro livre.

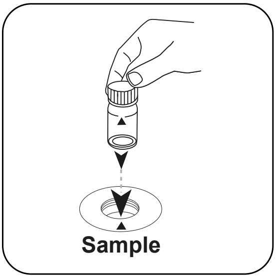
Realização da determinação Cloro total com pastilha

Escolher o método no equipamento.

Encher a célula de 24 mm com **10 mL de amostra** .



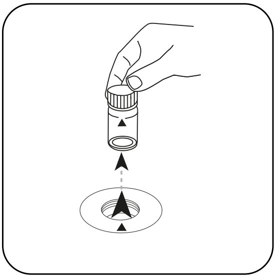
Fechar a(s) célula(s).



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

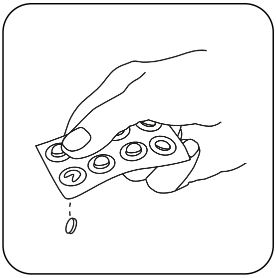
Zero

Premir a tecla **ZERO**.

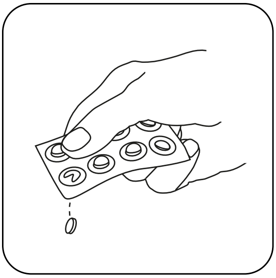


Retirar a célula do compartimento de medição.

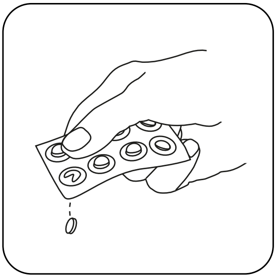
Esvaziar a célula até ficarem apenas algumas gotas.



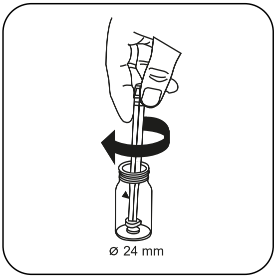
Pastilha DPD No. 1.



Pastilha DPD No. 3.

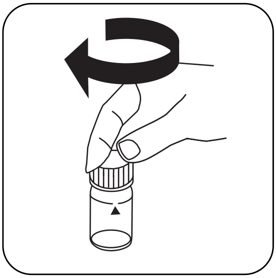


Como alternativa aos comprimidos DPD No. 1 e No. 3, pode ser adicionado 1 comprimido DPD No. 4.

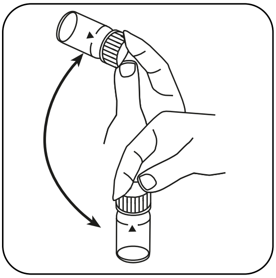


Esmagar a(s) pastilha(s) rodando ligeiramente.

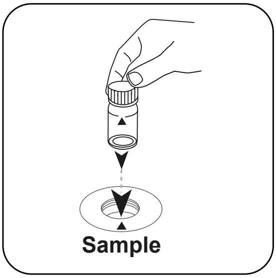
Encher a célula até à **marca de 10 mL** com a **amostra** .



Fechar a(s) célula(s).



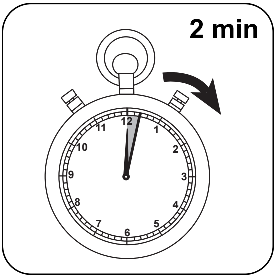
Dissolver a(s) pastilha(s) girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Test

Premir a tecla **TEST** (XD: **START**).



Aguardar **2 minuto(s) de tempo de reação**.

Decorrido o tempo de reação, a medição é efetuada automaticamente.

No visor aparece o resultado em mg/L Cloro total.

Método Químico

DPD

Apêndice

Texto de Interferências

Interferências Pesistentes

- Todos os oxidantes presentes nas amostras reagem como o cloro, o que leva a resultados demasiado altos.

Interferências Removíveis

- As interferências por cobre e ferro(III) devem ser eliminadas por EDTA.
- Nas amostras com elevado teor de cálcio* e/ou elevada condutividade* pode ocorrer, se forem usadas as pastilhas de reagente, uma turvação da amostra e, por conseguinte, a medição pode ficar errada. Neste caso, deve usar em alternativa a pastilha de reagente DPD No. 1 High Calcium e a pastilha de reagente DPD No. 3 High Calcium.
  *não podem ser indicados valores exatos, uma vez que a formação de uma turvação depende do tipo e da composição da água da amostra.
- Concentrações de cloro superiores a 10 mg/L, se forem usadas pastilhas, podem causar resultados dentro da área de medição até 0 mg/L. No caso de uma concentração demasiado alta de cloro, deve diluir a amostra com água sem cloro. 10 mL da amostra diluída é colocada em reagente e a medição é repetida (teste de plausibilidade).

Interferências	**a partir de / [mg/L]**
CrO_4^{2-}	0.01
MnO_2	0.01

Validação de método

Limite de Detecção	0.02 mg/L
Limite de Determinação	0.06 mg/L
Fim da Faixa de Medição	6 mg/L
Sensibilidade	2.05 mg/L / Abs
Faixa de Confiança	0.04 mg/L
Desvio Padrão	0.019 mg/L
Coeficiente de Variação	0.87 %

Conformidade

EN ISO 7393-2

[a] Determinação do possível livre, vinculado, total | [e] Reagente auxiliar, alternativamente ao DPD no. 1 / não 3 quando a amostra é nublada devido ao alto teor de íons de cálcio e / ou alta condutividade

Cloro L M101

0.02 - 4.0 mg/L Cl_2 a) CL6

DPD

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
DPD 1 solução tampão, frasco azul	15 mL	471010
Solução tampão DPD 1	100 mL	471011
DPD 1 solução tampão em embalagem de 6	1 pc.	471016
Solução de reagente DPD 1, frasco verde	15 mL	471020
Solução de reagente DPD 1	100 mL	471021
Solução de reagente DPD 1 numa embalagem de 6 unidades	1 pc.	471026
DPD 3 Solução, frasco vermelho	15 mL	471030
Solução DPD 3	100 mL	471031
Solução DPD 3 numa embalagem de 6 unidades	1 pc.	471036
Kit de reagentes DPD	1 pc.	471056

Padrões disponíveis

Título	Unidade de Embalagem	Código do Produto
ValidCheck Cloro 1,5 mg/l	1 pc.	48105510

Amostragem

1. Na preparação da amostra é preciso evitar a libertação de gases de cloro, p. ex. através da pipetagem e agitação.
2. A análise tem de ser efetuada logo após a recolha da amostra.

Preparação

1. Limpeza das células:
   Uma vez que muitos produtos de limpeza domésticos (p. ex. lava-louça) contêm substâncias redutoras, na determinação de cloro pode haver demasiadas reduções. Para excluir este erro de medição, os equipamentos de vidro não deviam ter a capacidade de absorção de cloro. Para esse efeito, os equipamentos de vidro são guardados por uma hora sob solução de hipoclorito de sódio (0,1 g/L) e depois devem ser bem enxaguados com água desmineralizada.
2. Para a determinação individual de cloro livre e cloro total é conveniente usar respetivamente um conjunto próprio de células (ver EN ISO 7393-2, alínea 5.3).
3. A formação de cores DPD ocorre com um valor pH entre 6,2 e 6,5. Os reagentes contêm, por isso, um tampão para ajustar o valor pH. As águas fortemente alcalinas ou ácidas devem, porém, antes da análise, ser ajustadas para um valor pH entre 6 e 7 (com 0,5 mol/l de ácido sulfúrico ou 1 mol/l soda cáustica).

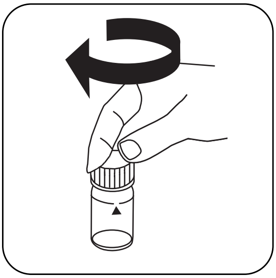
Notas

1. Depois de usados, os frascos conta-gotas devem ser novamente fechados com a respetiva tampa de enroscar à cor.
2. Guardar o conjunto de reagentes em local fresco entre +6 °C e +10 °C.

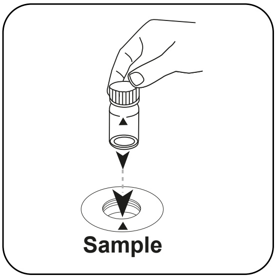
Realização da determinação Cloro livre com reagente líquido

Escolher o método no equipamento.

Encher a célula de 24 mm com **10 mL de amostra** .



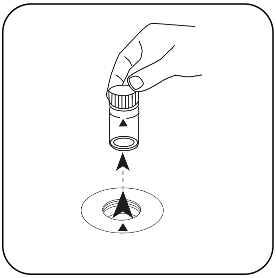
Fechar a(s) célula(s).



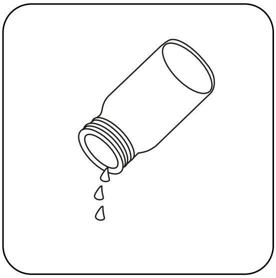
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Zero

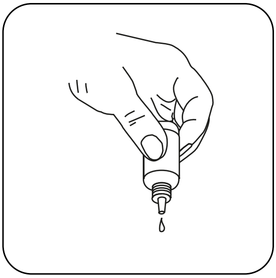
Premir a tecla **ZERO**.



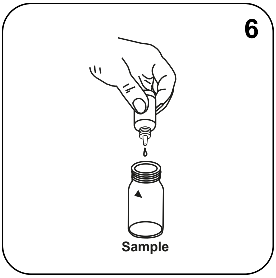
Retirar a célula do compartimento de medição.



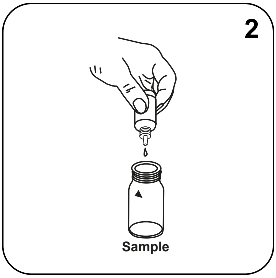
Esvaziar a célula.



Manter os frascos conta gotas na vertical e pressionar lentamente para adicionar gotas de igual dimensão.

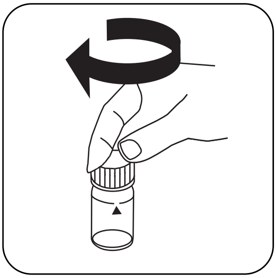


Adicionar **6 gotas DPD 1 Buffer Solution** à célula de amostra.

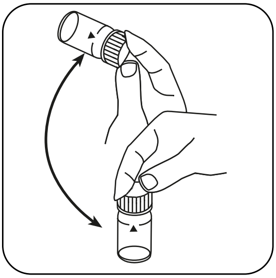


Adicionar **2 gotas DPD 1 Reagent Solution** à célula de amostra.

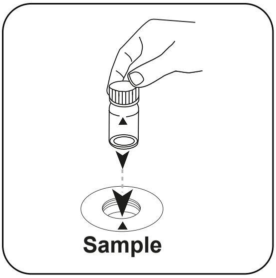
Encher a célula até à **marca de 10 mL** com a **amostra** .



Fechar a(s) célula(s).



Misturar o conteúdo girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Test

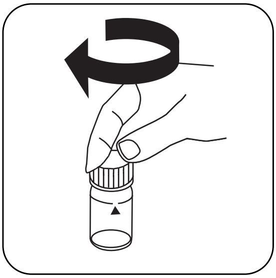
Premir a tecla **TEST** (XD: **START**).

No visor aparece o resultado em mg/L Cloro livre.

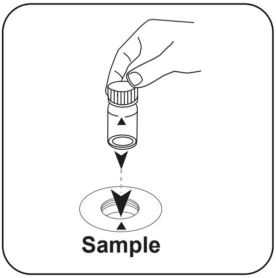
Realização da determinação Cloro total com reagente líquido

Escolher o método no equipamento.

Encher a célula de 24 mm com **10 mL de amostra** .



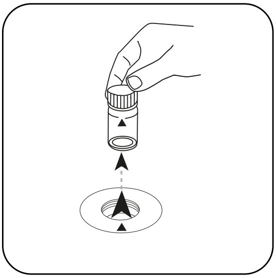
Fechar a(s) célula(s).



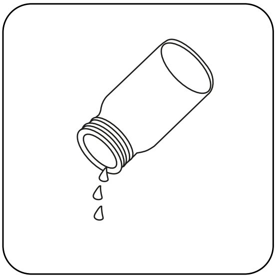
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Zero

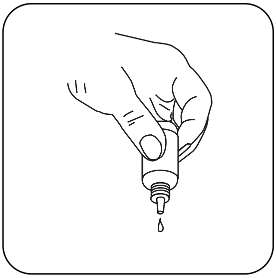
Premir a tecla **ZERO**.



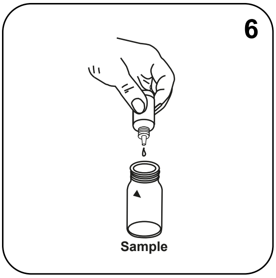
Retirar a célula do compartimento de medição.



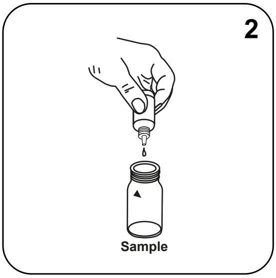
Esvaziar a célula.



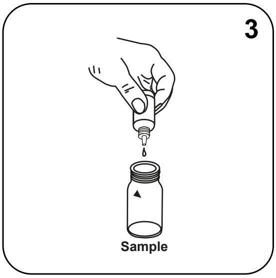
Manter os frascos conta gotas na vertical e pressionar lentamente para adicionar gotas de igual dimensão.



Adicionar **6 gotas DPD 1 Buffer Solution** à célula de amostra.

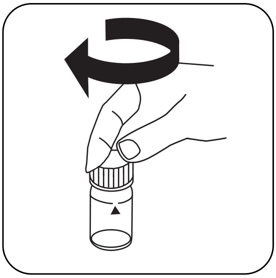


Adicionar **2 gotas DPD 1 Reagent Solution** à célula de amostra.

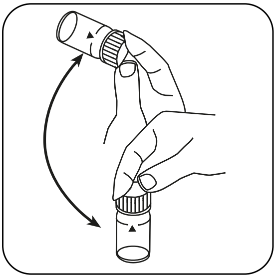


Adicionar **3 gotas DPD 3 Solution** à célula de amostra.

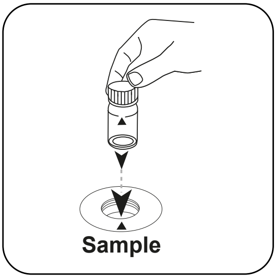
Encher a célula até à **marca de 10 mL** com a **amostra** .



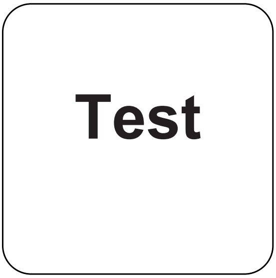
Fechar a(s) célula(s).



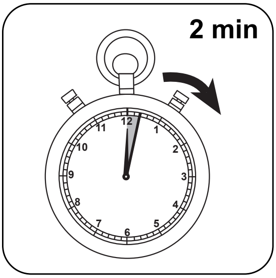
Misturar o conteúdo girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



Premir a tecla **TEST** (XD: **START**).



Aguardar **2 minuto(s) de tempo de reação**.

Decorrido o tempo de reação, a medição é efetuada automaticamente.

No visor aparece o resultado em mg/L Cloro total.

Método Químico

DPD

Apêndice

Texto de Interferências

Interferências Pesistentes

- Todos os oxidantes presentes nas amostras reagem como o cloro, o que leva a resultados demasiado altos.

Interferências Removíveis

- As interferências por cobre e ferro(III) devem ser eliminadas por EDTA.
- Concentrações de cloro superiores a 4 mg/L, se forem usados reagentes líquidos, podem causar resultados dentro da área de medição até 0 mg/L. Neste caso, deve diluir a amostra com água sem cloro. 10 ml da amostra diluída é colocada em reagente e a medição é repetida (teste de plausibilidade).

Interferências	a partir de / [mg/L]
CrO_4^{2-}	0,01
MnO_2	0,01

Conformidade

EN ISO 7393-2

[a] Determinação do possível livre, vinculado, total

Cloro HR (KI) T M105

5 - 200 mg/L Cl_2 CLHr

KI / Ácido

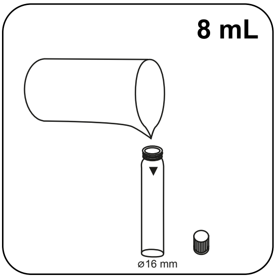
Material

Material necessário (parcialmente opcional):

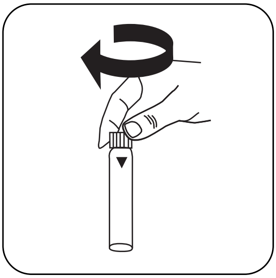
Reagentes	Unidade de Embalagem	Código do Produto
Cloro HR (KI)	Pastilhas / 100	513000BT
Cloro HR (KI)	Pastilhas / 250	513001BT
Acidificante GP	Pastilhas / 100	515480BT
Acidificante GP	Pastilhas / 250	515481BT
Definir Cloro HR (KI)/Acidificar GP#	cada 100	517721BT
Definir Cloro HR (KI)/Acidificar GP#	cada 250	517722BT
Cloro HR (KI)	Pastilhas / 100	501210
Cloro HR (KI)	Pastilhas / 250	501211

Realização da determinação Cloro HR (KI) com pastilha

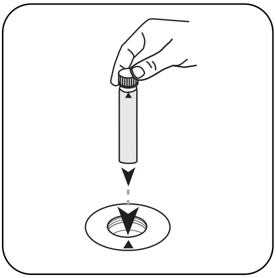
Escolher o método no equipamento.



Encher a célula de 16 mm com **8 mL de amostra** .



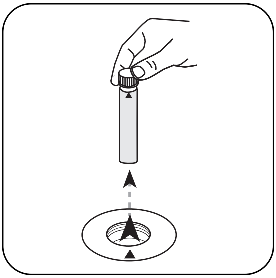
Fechar a(s) célula(s).



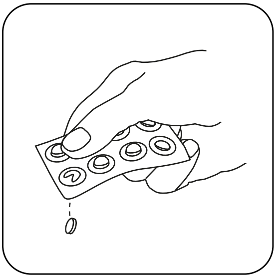
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Zero

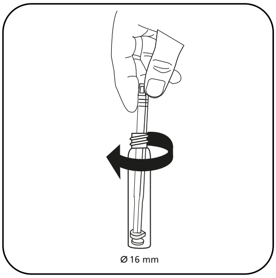
Premir a tecla **ZERO**.



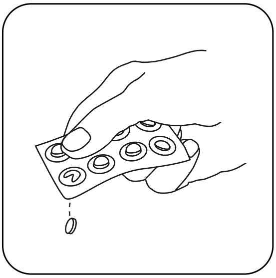
Retirar a **célula** do compartimento de medição.



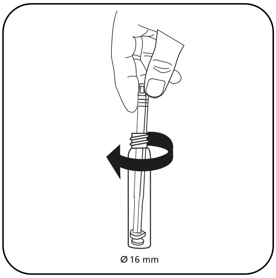
Pastilha Chlorine HR (KI).



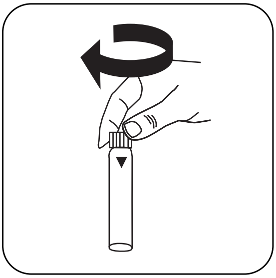
Esmagar a(s) pastilha(s) rodando ligeiramente.



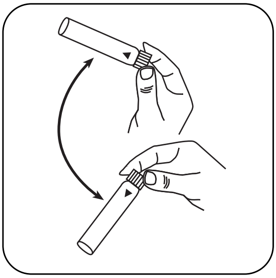
Pastilha ACIDIFYING GP.



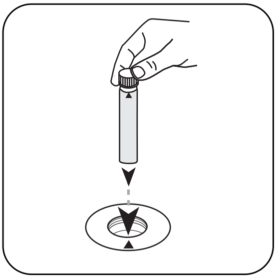
Esmagar a(s) pastilha(s) rodando ligeiramente.



Fechar a(s) célula(s).



Dissolver a(s) pastilha(s) girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Test

Premir a tecla **TEST** (XD: **START**).

No visor aparece o resultado em mg/L Cloro.

Método Químico

KI / Ácido

Apêndice

Texto de Interferências

Interferências Pesistentes

- Todos os oxidantes presentes nas amostras reagem como o cloro, o que leva a resultados demasiado altos.

Validação de método

Limite de Detecção	1.29 mg/L
Limite de Determinação	3.86 mg/L
Fim da Faixa de Medição	200 mg/L
Sensibilidade	83.96 mg/L / Abs
Faixa de Confiança	1.14 mg/L
Desvio Padrão	0.45 mg/L
Coeficiente de Variação	0.45 %

Derivado de

EN ISO 7393-3

#incluindo vareta de agitação

Dióxido de cloro T M120

0.02 - 11 mg/L ClO_2 CLO2

DPD / Glicina

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
DPD Nº.1	Pastilhas / 100	511050BT
DPD Nº. 1	Pastilhas / 250	511051BT
DPD Nº. 1	Pastilhas / 500	511052BT
DPD Nº. 3	Pastilhas / 100	511080BT
DPD Nº. 3	Pastilhas / 250	511081BT
DPD Nº. 3	Pastilhas / 500	511082BT
Glicina f)	Pastilhas / 100	512170BT
Glicina f)	Pastilhas / 250	512171BT
DPD Nº. 3 Alto Cálcio e)	Pastilhas / 100	515730BT
DPD Nº. 3 Alto Cálcio e)	Pastilhas / 250	515731BT
DPD Nº. 3 Alto Cálcio e)	Pastilhas / 500	515732BT
DPD Nº. 1 Alto Cálcio e)	Pastilhas / 100	515740BT
DPD Nº. 1 Alto Cálcio e)	Pastilhas / 250	515741BT
DPD Nº. 1 Alto Cálcio e)	Pastilhas / 500	515742BT
Definir N.º DPD 1/Não. 3#	cada 100	517711BT
Definir N.º DPD 1/Não. 3#	cada 250	517712BT
Definir N.º DPD 1/Glicina #	cada 100	517731BT
Definir N.º DPD 1/Glicina #	cada 250	517732BT
Definir N.º DPD 1/Não. 3 Alto Cálcio#	cada 100	517781BT
Definir N.º DPD 1/Não. 3 Alto Cálcio#	cada 250	517782BT
DPD Nº. 3 Evo	Pastilhas / 100	511420BT
DPD Nº. 3 Evo	Pastilhas / 250	511421BT
DPD Nº. 3 Evo	Pastilhas / 500	511422BT

Amostragem

1. Na preparação da amostra é preciso evitar a libertação de gases, p. ex. através da pipetagem e agitação.
2. A análise tem de ser efetuada logo após a recolha da amostra.

Preparação

1. Limpeza das células:
   Uma vez que muitos produtos de limpeza domésticos (p. ex. lava-louça) contêm substâncias redutoras, na determinação de Dióxido de cloro pode haver demasiadas reduções. Para excluir este erro de medição, os equipamentos de vidro não deviam ter a capacidade de absorção de cloro. Para esse efeito, os equipamentos de vidro são guardados por uma hora sob solução de hipoclorito de sódio (0,1 g/L) e depois devem ser bem enxaguados com água desmineralizada.
2. As águas fortemente alcalinas ou ácidas devem, antes da análise, ser ajustadas para um valor pH entre 6 e 7 (com 0,5 mol/l de ácido sulfúrico ou 1 mol/l soda cáustica).

Notas

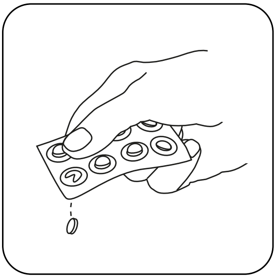
1. Os pastilhas EVO podem ser utilizadas como alternativa à pastilha padrão correspondente (por exemplo, DPD Nº 3 EVO em vez da DPD Nº 3).

Realização da determinação Dióxido de Cloro, na presença de cloro com pastilha

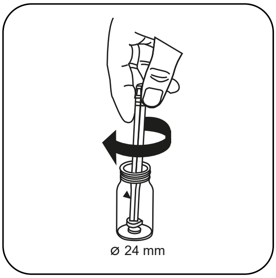
Escolher o método no equipamento.

Escolha ainda a determinação: na presença de Cloro

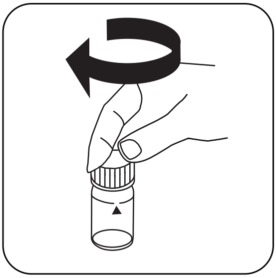
Encher a célula de 24 mm com **10 mL de amostra** .



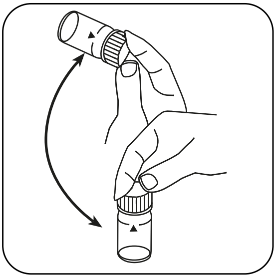
Pastilha GLYCINE.



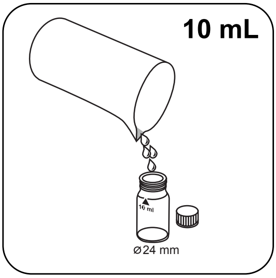
Esmagar a(s) pastilha(s) rodando ligeiramente.



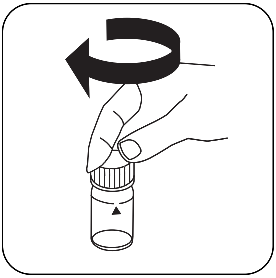
Fechar a(s) célula(s).



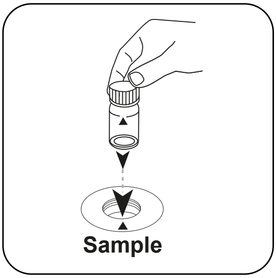
Dissolver a(s) pastilha(s) girando.



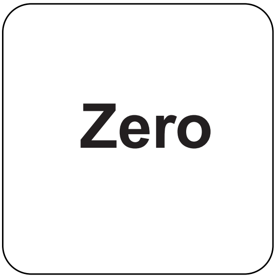
Encher uma **segunda célula** com **10 mL de amostra** .



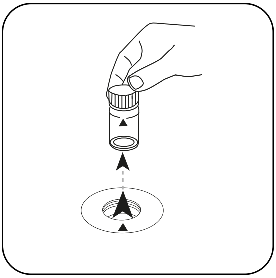
Fechar a(s) célula(s).



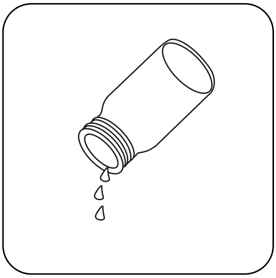
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



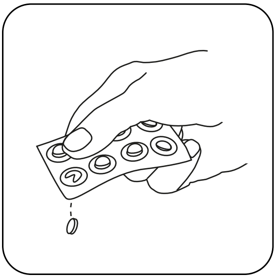
Premir a tecla **ZERO**.



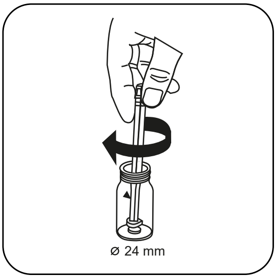
Retirar a célula do compartimento de medição.



Esvaziar a célula.

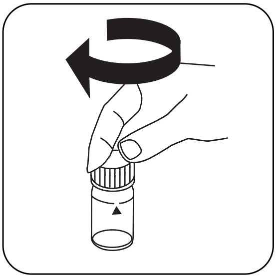


Pastilha DPD No. 1.

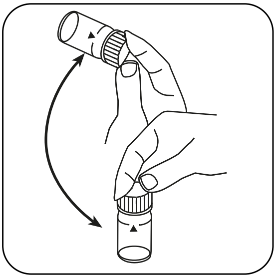


Esmagar a(s) pastilha(s) rodando ligeiramente.

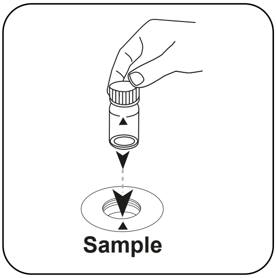
Introduzir a **solução de glicina** preparada na célula preparada.



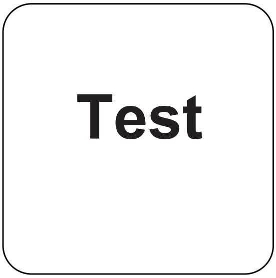
Fechar a(s) célula(s).



Dissolver a(s) pastilha(s) girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



Premir a tecla **TEST** (XD: **START**).

No visor aparece o resultado em mg/L Dióxido de Cloro.

Análises

A tabela a seguir identifica os valores de saída que podem ser convertidos em outras formas de citação.

Unidade	Forma de citação	Fator de conversão
mg/l	ClO_2	1
mg/l	Cl_2 frei	0.525
mg/l	Cl_2 geb.	0.525
mg/l	ges. Cl_2	0.525

Método Químico

DPD / Glicina

Apêndice

Texto de Interferências

Interferências Pesistentes

1. Todos os oxidantes presentes nas amostras levam a resultados demasiado altos.

Interferências Removíveis

1. Concentrações de dióxido de cloro superiores a 19 mg/L podem causar resultados dentro da área de medição até 0 mg/L. Neste caso, deve diluir a amostra de água em água sem dióxido de cloro. 10 ml da amostra diluída é colocada em reagente e a medição é repetida.

Derivado de

DIN 38408, Parte 5

[e)] Reagente auxiliar, alternativamente ao DPD no. 1 / não 3 quando a amostra é nublada devido ao alto teor de íons de cálcio e / ou alta condutividade | [f)] Reagente auxiliar, é adicionalmente necessário para a determinação de bromo, dióxido de cloro ou ozônio na presença de cloro | [#] incluindo vareta de agitação

Cobre T M150

0.05 - 5 mg/L Cu[a)] Cu

Biquinoline

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
Cobre Não. 1	Pastilhas / 100	513550BT
Cobre Não. 1	Pastilhas / 250	513551BT
Cobre Não. 2	Pastilhas / 100	513560BT
Cobre Não. 2	Pastilhas / 250	513561BT
Definir número de cobre 1/Não. 2[#]	cada 100	517691BT
Definir número de cobre 1/Não. 2[#]	cada 250	517692BT
ValidCheck Cobre 2 mg/l	1 pc.	48141525

Preparação

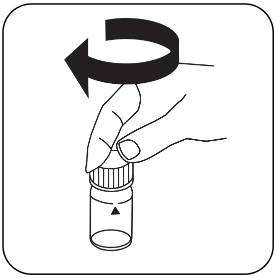
1. As águas fortemente alcalinas ou ácidas deviam, antes da análise, ser ajustadas para um valor pH de 4 a 6.

Realização da determinação Cobre, livre com pastilha

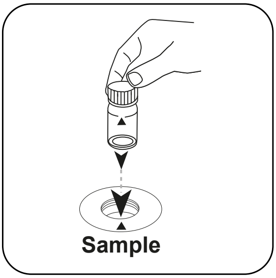
Escolher o método no equipamento.

Escolha ainda a determinação: livre

Encher a célula de 24 mm com **10 mL de amostra** .



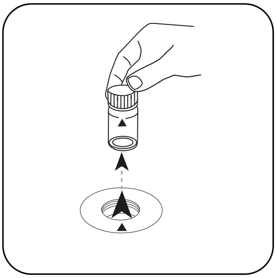
Fechar a(s) célula(s).



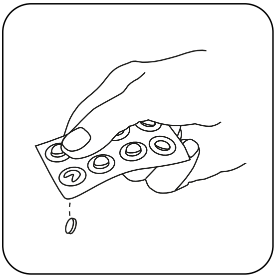
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Zero

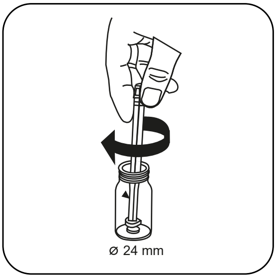
Premir a tecla **ZERO**.



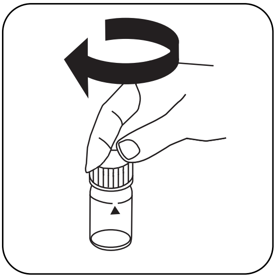
Retirar a célula do compartimento de medição.



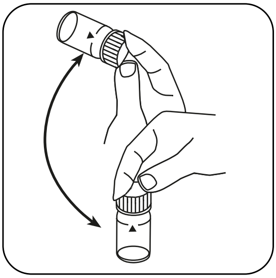
Pastilha COPPER No. 1.



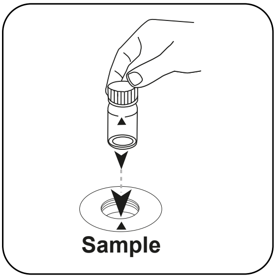
Esmagar a(s) pastilha(s) rodando ligeiramente.



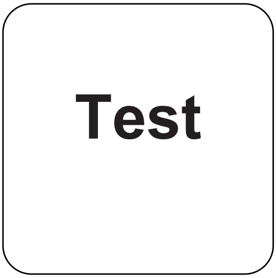
Fechar a(s) célula(s).



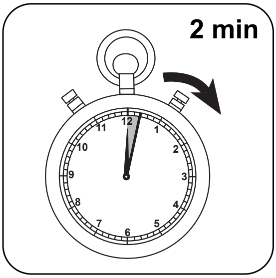
Dissolver a(s) pastilha(s) girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



Premir a tecla **TEST** (XD: **START**).



Aguardar **2 minuto(s) de tempo de reação**.

Decorrido o tempo de reação, a medição é efetuada automaticamente.

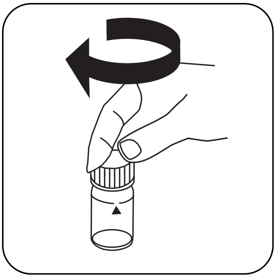
No visor aparece o resultado em mg/L Cobre livre.

Realização da determinação Cobre, total com pastilha

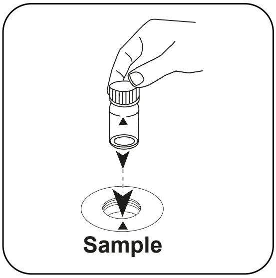
Escolher o método no equipamento.

Escolha ainda a determinação: total

Encher a célula de 24 mm com **10 mL de amostra** .



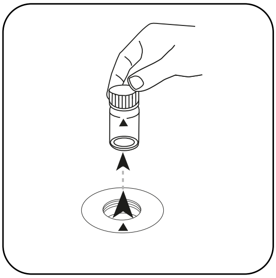
Fechar a(s) célula(s).



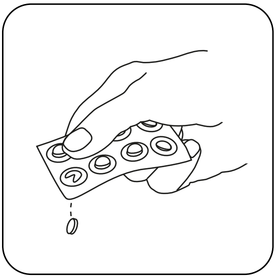
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Zero

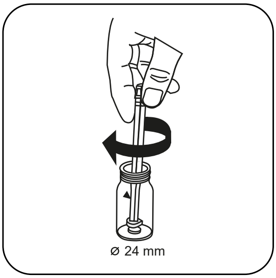
Premir a tecla **ZERO**.



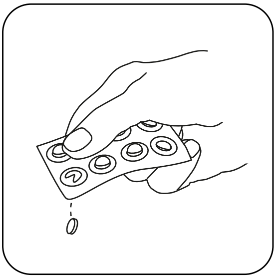
Retirar a célula do compartimento de medição.



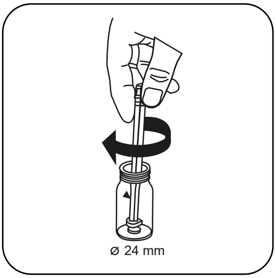
Pastilha COPPER No. 1.



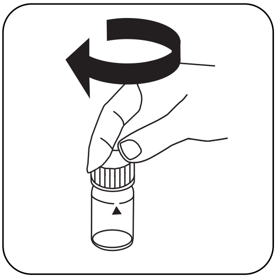
Esmagar a(s) pastilha(s) rodando ligeiramente e dissolver.



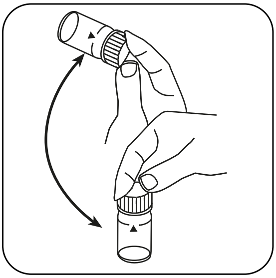
Pastilha COPPER No. 2.



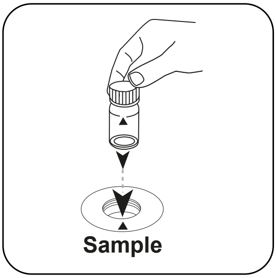
Esmagar a(s) pastilha(s) rodando ligeiramente.



Fechar a(s) célula(s).



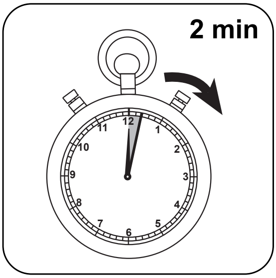
Dissolver a(s) pastilha(s) girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Test

Premir a tecla **TEST** (XD: **START**).



Aguardar **2 minuto(s) de tempo de reação**.

Decorrido o tempo de reação, a medição é efetuada automaticamente.

No visor aparece o resultado em mg/L Cobre total.

Método Químico

Biquinoline

Apêndice

Texto de Interferências

Interferências Pesistentes

1. Cianeto CN^- e Prata Ag^+ interferem a determinação.

Validação de método

Limite de Detecção	0.05 mg/L
Limite de Determinação	0.15 mg/L
Fim da Faixa de Medição	5 mg/L
Sensibilidade	3.8 mg/L / Abs
Faixa de Confiança	0.026 mg/L
Desvio Padrão	0.011 mg/L
Coeficiente de Variação	0.42 %

Bibliografia

Análise fotométrica, Lange/Vjedelek, Verlag Chemie 1980

[a)] Determinação do possível livre, vinculado, total | [#] incluindo vareta de agitação

Ferro em Mo PP M224

0.01 - 1.8 mg/L Fe FEM

TPTZ

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
VARIO Fe no conjunto de reagentes MO	1 Conjunto	536010

Amostragem

1. Recolher a amostra em frascos de vidro ou plástico limpos. Estes devem ter sido limpos com ácido clorídrico 6 N (1:1) e depois com água desmineralizada.
2. Para manter a amostra apta para uma análise futura, o valor pH tem de ficar inferior a 2. Adicionar a isso cerca de 2 ml de ácido clorídrico concentrado por cada litro de amostra. Se a amostra for diretamente analisada, não precisa de fazer esta adição.
3. Para determinar o ferro dissolvido, a amostra tem de ser filtrada por um filtro 0,45µm ou equiparável logo após a recolha da amostra e antes da acidificação.
4. As amostras conservadas não deviam ser guardadas durante mais de 6 meses à temperatura ambiente.
5. Antes da análise, o valor pH tem de ser ajustado para um valore entre 3 e 5 através da adição de soda cáustica 5 N. Não pode ser excedido um valor pH de 5, pois isso pode causar precipitações de ferro.
6. O resultado tem de ser corrigido devido às adições de volume.

Preparação

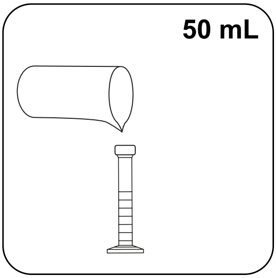
1. Limpar todos os artigos em vidro com produto de limpeza e depois enxaguar com água canalizada. De seguida, voltar a limpar com ácido clorídrico (1:1) e água desmineralizada. Estes passos permitem remover depósitos que podem causar resultados ligeiramente aumentados.
2. Se a amostra tiver 100 mg/L ou mais de molibdénio (MoO_4^{2-}), a medição da amostra tem de ser efetuada logo após à medição zero.
3. Para resultados mais precisos pode ser determinado um valor em branco de reagente para cada lote novo de reagente. Para isso, proceda conforme prescrito, mas deve usar água desmineralizada em vez da amostra. O valor de medição obtido é deduzido dos valores de medição calculados com este lote.

Notas

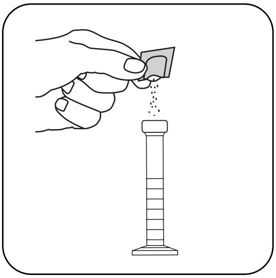
1. Na presença de ferro forma-se uma cor azul. Um pequena quantidade de pó não dissolvido não influencia o resultado.

Realização da determinação Ferro, total (Fe em Mo) na presença de molibdénio com pacote de pó Vario

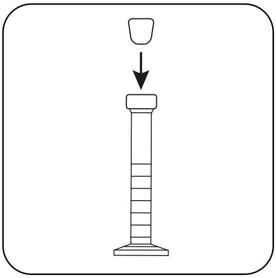
Escolher o método no equipamento.



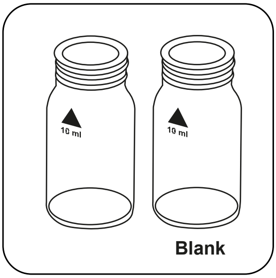
Introduzir **50 mL de amostra** num cilindro misturador de 50 mL.



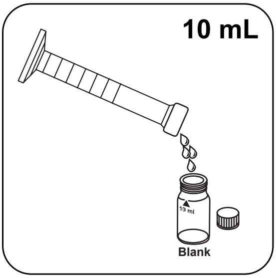
Adicionar um **pacote de pó Vario (Fe in Mo) Rgt 1** .



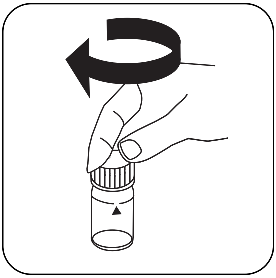
Fechar o cilindro misturador com um tampão. Dissolver o pó girando.



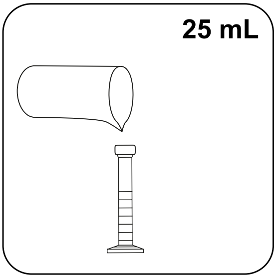
Preparar duas células de 24 mm limpas. Identificar uma célula como célula zero.



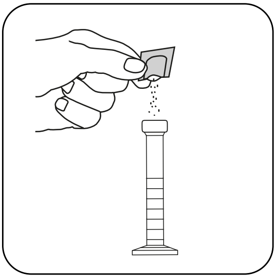
Adicionar **10 mL de amostra preparada** à célula zero.



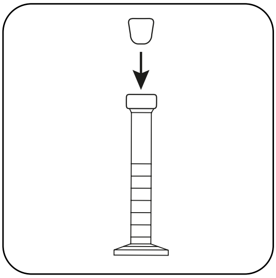
Fechar a(s) célula(s).



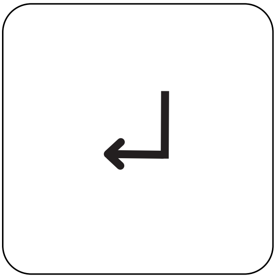
Introduzir **25 mL de amostra preparada** num cilindro misturador de 25 mL.



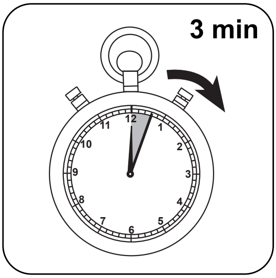
Adicionar um **pacote de pó Vario (Fe in Mo) Rgt 2** .



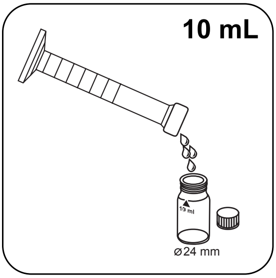
Fechar o cilindro misturador com um tampão. Dissolver o pó girando.



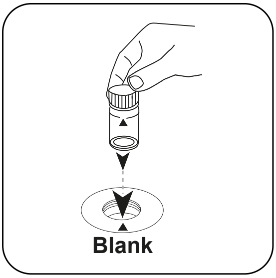
Premir a tecla **ENTER**.



Aguardar **3 minuto(s) de tempo de reação**.



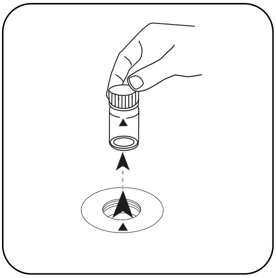
Adicionar **10 mL de amostra** à célula de amostra.



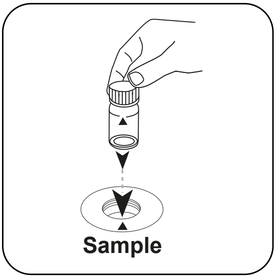
Colocar a **célula zero** no compartimento de medição. Observar o posicionamento.

Zero

Premir a tecla **ZERO**.



Retirar a célula do compartimento de medição.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Test

Premir a tecla **TEST** (XD: **START**).

No visor aparece o resultado em mg/L Fe.

Método Químico

TPTZ

Apêndice

Texto de Interferências

Interferências Removíveis

1. Interferência do valor pH: Um pH da amostra, após adição do reagente, inferior a 3 ou superior a 4 pode impedir a formação de cor, uma vez que a cor que se forma desvanece muito rapidamente ou pode levar a uma turvação. Por isso, o valor pH tem de ser ajustado, antes da adição do reagente, para um valor pH entre 3 e 5 num cilindro de medição:
   Introduza gota-a-gota uma quantidade adequada de um ácido sem ferro ou base como ácido sulfúrico 1 N ou soda cáustica 1 N.
   Corrija o volume se foi introduzida uma quantidade significativa de ácido ou base.

Bibliografia

G. Frederic Smith Chemical Co., The Iron Reagents, 3rd ed. (1980)

Ferro LR L (A) M225

0.03 - 2 mg/L Fe FE

Ferrozine / Thioglycolate

Material

Material necessário (parcialmente opcional):

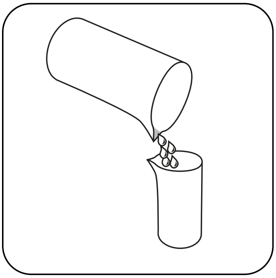
Reagentes	Unidade de Embalagem	Código do Produto
Acidez / Alcalinidade P Indicador PA1	65 mL	56L013565
Tampão de dureza cálcica CH2	65 mL	56L014465
KP962-Amónio Persulfato de amónio em pó	Pó / 40 g	56P096240
KS63-FE6 tioglicolato/molibdato HR RGT	30 mL	56L006330
KS63-FE6 tioglicolato/molibdato HR RGT	65 mL	56L006365
KS61-FE5-Ferrozina/Thioglicolato	65 mL	56L006165

Preparação

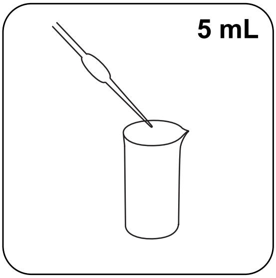
1. Na presença de fortes agentes complexantes na amostra, é necessário aumentar o tempo de reação até deixar de ver mais formações de cor. Os complexos de ferro muito fortes não são, porém, captados na medição. Neste caso, os agentes complexantes têm de ser destruídos por oxidação com ácido/persulfato e a amostra tem de ser depois colocada no pH 6 – 9 por neutralização.
2. Para determinar todo o ferro dissolvido e suspenso, a amostra tem de cozida com ácido/persulfato. No fim, neutralize para o pH 6 – 9 e encha com água desmineralizada para chegar de novo ao volume original.

Digestão

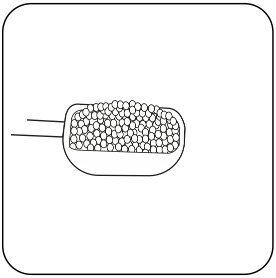
O ferro total é composto por ferro solúvel, complexante e suspenso. A amostra não pode ser filtrada antes da medição. Para assegurar uma homogeneização da amostra, as partículas depositadas têm de ser imediatamente distribuídas antes da recolha da amostra através de uma forte agitação. Para determinar o ferro solúvel total (inclusive os compostos de ferro complexos) é preciso filtrar a amostra.Os equipamentos e reagentes necessários à determinação do ferro total não estão incluídos no volume de fornecimento padrão.



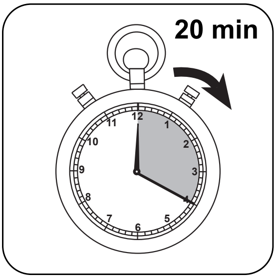
Encher um recipiente de digestão adequado com **50 mL de amostra homogeneizada** .



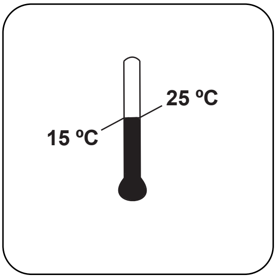
Adicionar **5 mL 1:1 ácido clorídrico** .



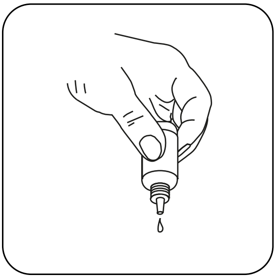
Adicionar **uma colher medida KP 962 (Ammonium Persulfat Powder)** .



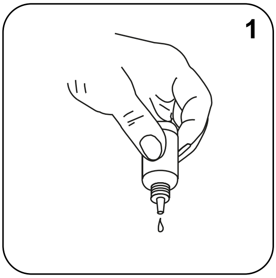
A amostra deve **cozer 20 minutos** . Deve ser mantido um volume de amostra de 25 mL; encher eventualmente com água desmineralizada.



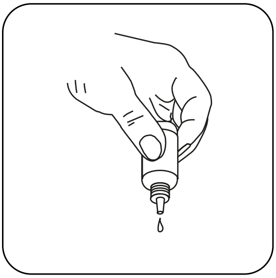
Deixar a amostra arrefecer até à **temperatura ambiente** .



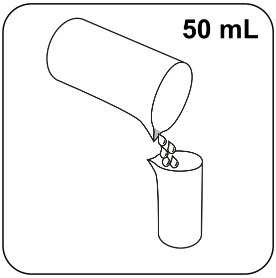
Manter os frascos conta gotas na vertical e pressionar lentamente para adicionar gotas de igual dimensão.



Adicionar **1 gotas Acidity / Alkalinity P Indicator PA1**.



Adicionar **Hardness Calcium Buffer CH2** gota a gota da mesma amostra até aparecer uma coloração ligeiramente rosa a avermelhada. **(Atenção: assim que adicionar cada gota, agite a amostra!)**



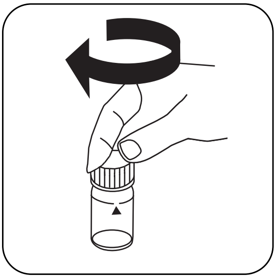
Encher a amostra com **água desmineralizada até 50 mL**
.

Realização da determinação Ferro LR (A) total com reagente líquido

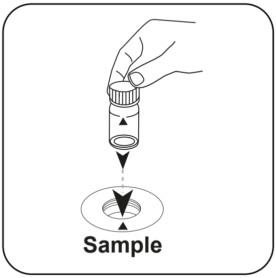
Escolher o método no equipamento.

Para a determinação de **Ferro, total LR** deve realizar a **digestão** descrita.

Encher a célula de 24 mm com **10 mL de água desmineralizada**.



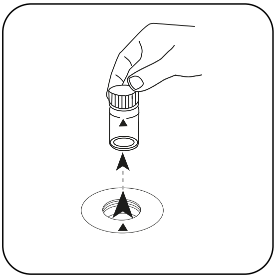
Fechar a(s) célula(s).



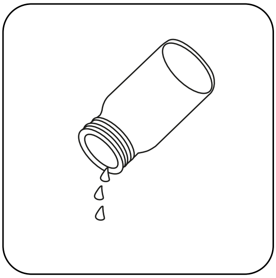
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Zero

Premir a tecla **ZERO**.

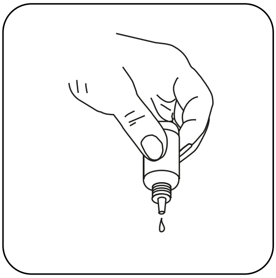


Retirar a célula do compartimento de medição.

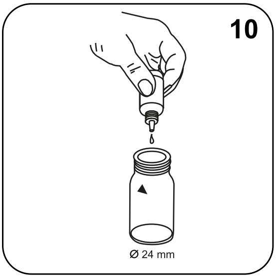


Esvaziar a célula.

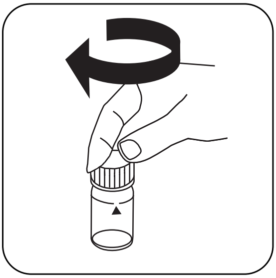
Encher a célula de 24 mm com **10 mL de amostra preparada**.



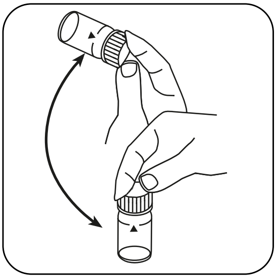
Manter os frascos conta gotas na vertical e pressionar lentamente para adicionar gotas de igual dimensão.



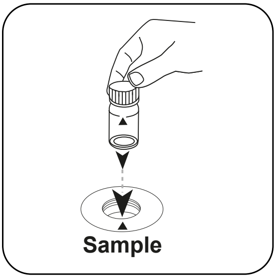
Adicionar **10 gotas Iron Reagent FE5**.



Fechar a(s) célula(s).



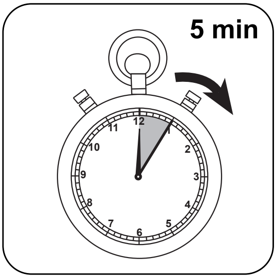
Misturar o conteúdo girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Test

Premir a tecla **TEST** (XD: **START**).



Aguardar **5 minuto(s) de tempo de reação**.

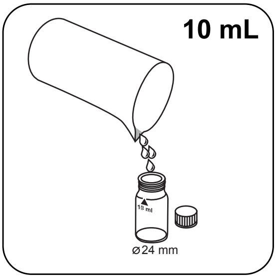
Decorrido o tempo de reação, a medição é efetuada automaticamente.

No visor aparece o resultado em mg/L Ferro total ou ao utilizar uma amostra filtrada em mg/l Ferro solúvel total.

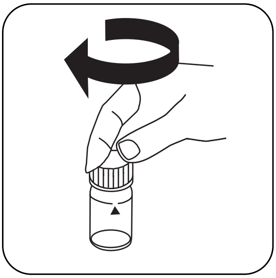
Realização da determinação Ferro LR (A) com reagente líquido

Escolher o método no equipamento.

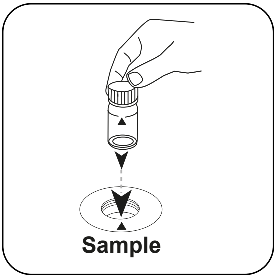
Para uma determinação do ferro total dissolvido, a amostra tem de ser filtrada antes da determinação (dimensão dos poros 0,45 µm). Caso contrário, as partículas de ferro e o ferro suspenso serão igualmente determinados.



Encher a célula de 24 mm com **10 mL de amostra preparada**.



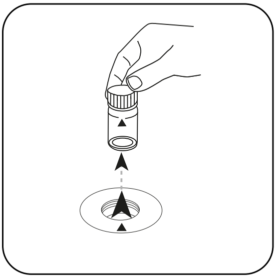
Fechar a(s) célula(s).



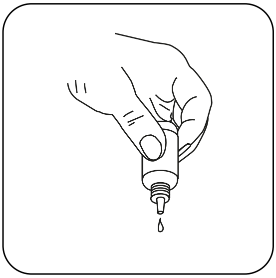
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Zero

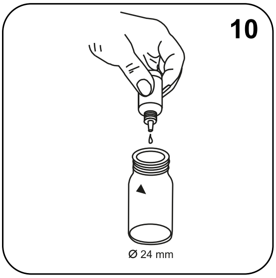
Premir a tecla **ZERO**.



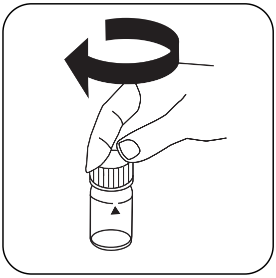
Retirar a célula do compartimento de medição.



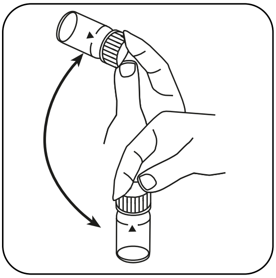
Manter os frascos conta gotas na vertical e pressionar lentamente para adicionar gotas de igual dimensão.



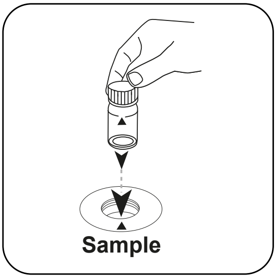
Adicionar **10 gotas Iron Reagent FE5**.



Fechar a(s) célula(s).

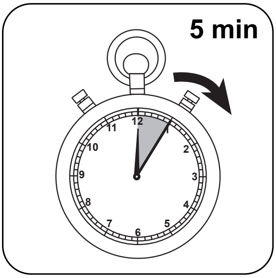


Misturar o conteúdo girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Premir a tecla **TEST** (XD: **START**).



Aguardar **5 minuto(s) de tempo de reação**.

Decorrido o tempo de reação, a medição é efetuada automaticamente.

No visor aparece o resultado em mg/L Ferro.

Método Químico

Ferrozine / Thioglycolate

Apêndice

Texto de Interferências

Interferências Removíveis

1. Uma elevada concentração de molibdénio causa, se usar KS61 (ferrozine/ tioglicolato), uma cor amarela intensa. Neste caso, precisa de um valor químico em branco:
   - Preparar duas **células de 24 mm** limpas.
   - Identificar uma célula como célula zero.
   - Introduzir numa célula de 24 mm limpa **10 ml de amostra** (célula zero).
   - Introduzir na célula **10 gotas KS63 (tioglicolato)**.
   - Fechar a célula com a tampa de célula e misturar o conteúdo girando.
   - Colocar a célula zero no compartimento da célula. Observar o posicionamento.
   - Premir a tecla **ZERO** .
   - Retirar a célula do compartimento da célula.
   - Introduzir numa segunda célula de 24 mm limpa **10 ml de amostra** (célula de amostra).
   - Introduza **10 gotas de KS61 (ferrozine/tioglicolato)** e continue conforme descrito.

Interferências	a partir de / [mg/L]
Co	8
Cu	2
Oxalat	500
CN^-	10
NO_2^-	

Bibliografia

D. F. Boltz and J. A. Howell, eds., Colorimetric Determination of Nonmetals, 2nd ed., Vol. 8, p. 304 (1978). Carpenter, J.F. "A New Field Method for Determining the Levels of Iron Contamination in Oilfield Completion Brine", SPE International Symposium (2004)

Molibdénio LR PP M251

0.03 - 3 mg/L Mo Mo1

Complexo Ternário

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
VARIO Molibdénio LR, Set	1 pc.	535450

São necessários os seguintes acessórios.

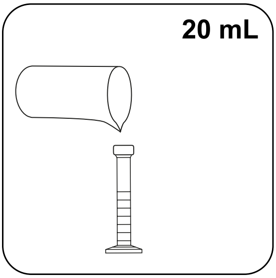
Acessórios	Unidade de Embalagem	Código do Produto
Cilindro misturador com rolha acessório necessário para a determinação do molibdato LR com MD 100 (276140)	1 pc.	19802650

Preparação

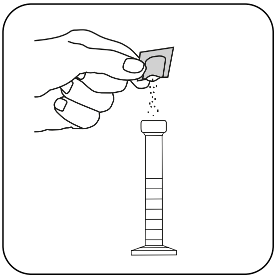
1. As águas fortemente alcalinas ou ácidas devem, antes da análise, ser ajustadas para um valor pH entre 3 e 5 (com 0,5 mol/l de ácido sulfúrico ou 1 mol/l soda cáustica).
2. Para evitar erros por depósito, deve enxaguar os equipamentos de vidro antes da análise com solução de ácido clorídrico (aprox. de 20%) e depois com água desmineralizada.

Realização da determinação Molibdénio LR com pacote de pó Vario

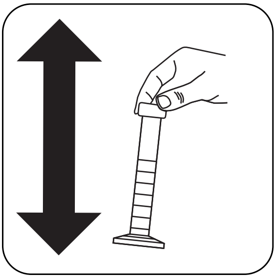
Escolher o método no equipamento.



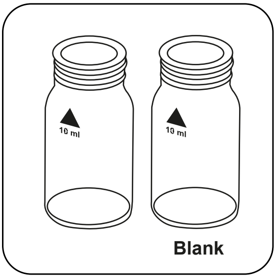
Introduzir **20 mL de amostra** num cilindro misturador de 25 mL.



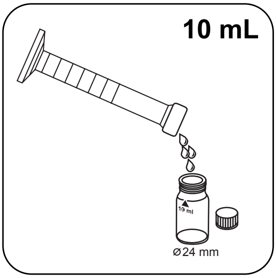
Adicionar um **pacote de pó Vario Molybdenum 1 LR F20** .



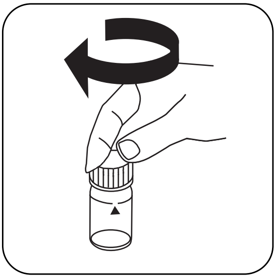
Fechar o cilindro misturador com um tampão. Dissolver o pó agitando.



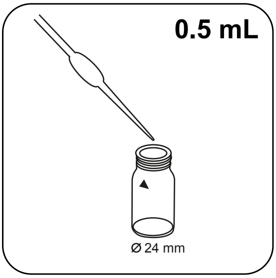
Preparar duas células de 24 mm limpas. Identificar uma célula como célula zero.



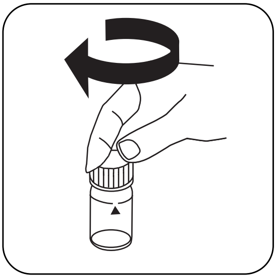
Introduzir em cada célula **10 mL de amostra** .



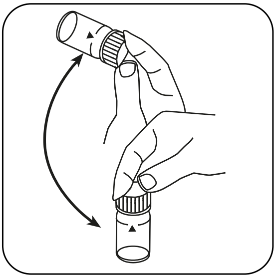
Fechar bem a **célula zero**.



Adicionar **0.5 mL Molybdenum 2 LR de solução** à célula de amostra.



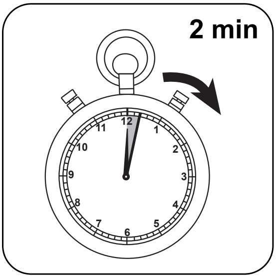
Fechar a(s) célula(s).



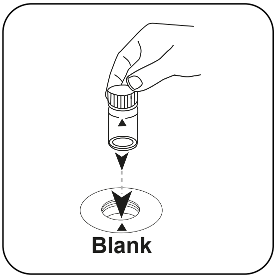
Misturar o conteúdo girando.

↵

Premir a tecla **ENTER**.



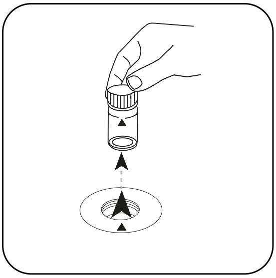
Aguardar **2 minuto(s) de tempo de reação**.



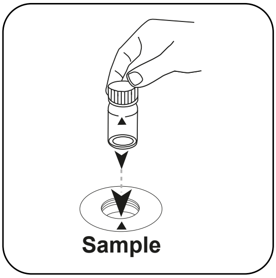
Colocar a **célula zero** no compartimento de medição. Observar o posicionamento.

Zero

Premir a tecla **ZERO**.



Retirar a célula do compartimento de medição.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Test

Premir a tecla **TEST** (XD: **START**).

No visor aparece o resultado em mg/L Molibdénio.

Análises

A tabela a seguir identifica os valores de saída que podem ser convertidos em outras formas de citação.

Unidade	Forma de citação	Fator de conversão
mg/l	MoO_4	1
mg/l	Mo	0.6
mg/l	Na_2MoO_4	1.29

Método Químico

Complexo Ternário

Apêndice

Texto de Interferências

Interferências	a partir de / [mg/L]	Influência
Al	50	
Cr	1000	
Fe	50	
Ni	50	
NO_2^-	em todas as quantidades	
Cu	10	Leva a leituras mais altas com um tempo de resposta de mais de 5 minutos

Bibliografia

Analytical Chemistry, 25(9) 1363 (1953)

Molibdénio HR L M254

1 - 100 mg/L MoO_4 Mo2

Thioglycolate

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
KS63-FE6 tioglicolato/molibdato HR RGT	65 mL	56L006365

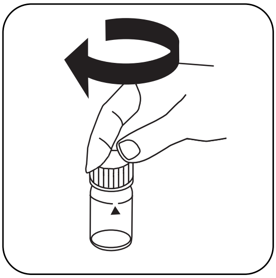
Amostragem

1. A realização do teste tem de ser efetuada logo após a recolha da amostra. O molibdénio deposita-se nas paredes do recipiente de recolha da amostra, o que causa resultados de medição baixos.

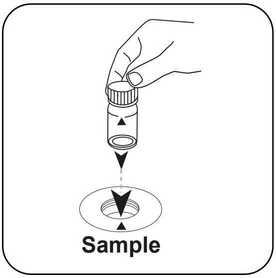
Realização da determinação Molibdénio HR com reagente líquido

Escolher o método no equipamento.

Encher a célula de 24 mm com **10 mL de amostra** .



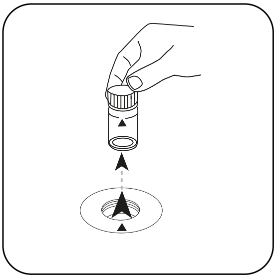
Fechar a(s) célula(s).



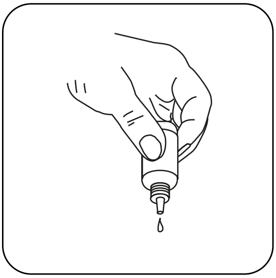
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Zero

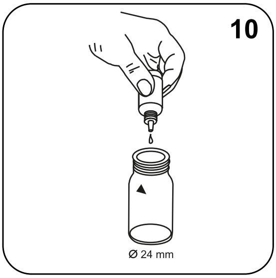
Premir a tecla **ZERO**.



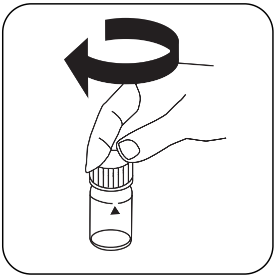
Retirar a célula do compartimento de medição.



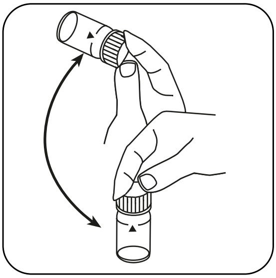
Manter os frascos conta gotas na vertical e pressionar lentamente para adicionar gotas de igual dimensão.



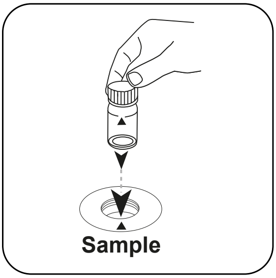
Adicionar **10 gotas Iron Reagent FE6**.



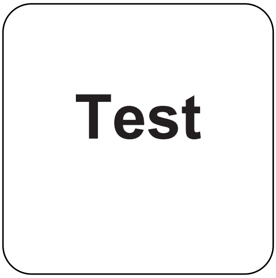
Fechar a(s) célula(s).



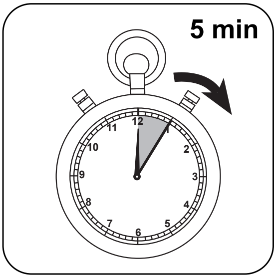
Misturar o conteúdo girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



Premir a tecla **TEST** (XD: **START**).



Aguardar **5 minuto(s) de tempo de reação**.

Decorrido o tempo de reação, a medição é efetuada automaticamente.

No visor aparece o resultado em mg/L Molibdénio.

Análises

A tabela a seguir identifica os valores de saída que podem ser convertidos em outras formas de citação.

Unidade	Forma de citação	Fator de conversão
mg/l	MoO_4	1
mg/l	Mo	0.6
mg/l	Na_2MoO_4	1.29

Método Químico

Thioglycolate

Apêndice

Texto de Interferências

Interferências Removíveis

1. A interferência de nióbio, tântalo, titânio e zircónio é mascarada com ácido cítrico.
2. A interferência de vanádio (V) é mascarada com fluoreto de potássio.

Bibliografia

Análise fotométrica, Lange/ Vjedelek, Verlag Chemie 1980

Ozono T M300

0.02 - 2 mg/L O_3 O3

DPD / Glicina

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
DPD Nº.1	Pastilhas / 100	511050BT
DPD Nº. 1	Pastilhas / 250	511051BT
DPD Nº. 1	Pastilhas / 500	511052BT
DPD Nº. 3	Pastilhas / 100	511080BT
DPD Nº. 3	Pastilhas / 250	511081BT
DPD Nº. 3	Pastilhas / 500	511082BT
DPD Nº. 1 Alto Cálcio e)	Pastilhas / 100	515740BT
DPD Nº. 1 Alto Cálcio e)	Pastilhas / 250	515741BT
DPD Nº. 1 Alto Cálcio e)	Pastilhas / 500	515742BT
DPD Nº. 3 Alto Cálcio e)	Pastilhas / 100	515730BT
DPD Nº. 3 Alto Cálcio e)	Pastilhas / 250	515731BT
DPD Nº. 3 Alto Cálcio e)	Pastilhas / 500	515732BT
Glicina f)	Pastilhas / 100	512170BT
Glicina f)	Pastilhas / 250	512171BT
Definir N.º DPD 1/Não. 3#	cada 100	517711BT
Definir N.º DPD 1/Não. 3#	cada 250	517712BT
Definir N.º DPD 1/Não. 3 Alto Cálcio#	cada 100	517781BT
Definir N.º DPD 1/Não. 3 Alto Cálcio#	cada 250	517782BT
Definir N.º DPD 1/Glicina #	cada 100	517731BT
Definir N.º DPD 1/Glicina #	cada 250	517732BT

Preparação

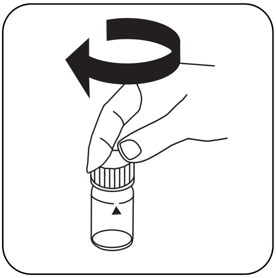
1. Limpeza das células:
   Uma vez que muitos produtos de limpeza domésticos (p. ex. lava-louça) contêm substâncias redutoras, na determinação que se segue de oxidantes (p. ex. ozono, cloro) pode haver demasiadas reduções. Para excluir este erro de medição, os equipamentos de vidro não deviam ter a capacidade de absorção de cloro. Para esse efeito, os equipamentos de vidro são guardados por uma hora sob solução de hipoclorito de sódio (0,1 g/L) e depois devem ser bem enxaguados com água desmineralizada.
2. Na preparação da amostra é preciso evitar a libertação de gases de ozono, p. ex. através da pipetagem e agitação. A análise tem de ser efetuada logo após a recolha da amostra.
3. As águas fortemente alcalinas ou ácidas devem, antes da análise, ser ajustadas para um valor pH entre 6 e 7 (com 0,5 mol/l de ácido sulfúrico ou 1 mol/l soda cáustica).

Realização da determinação Ozono na presença de cloro com pastilha

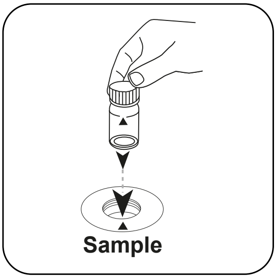
Escolher o método no equipamento.

Escolha ainda a determinação: na presença de Cloro

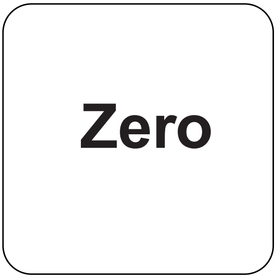
Encher a célula de 24 mm com **10 mL de amostra** .



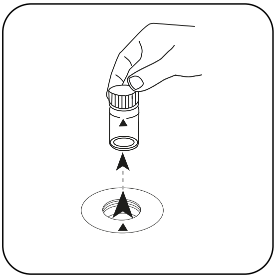
Fechar a(s) célula(s).



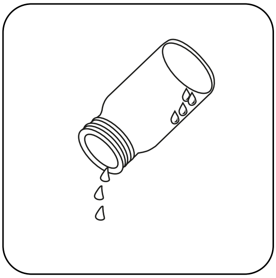
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



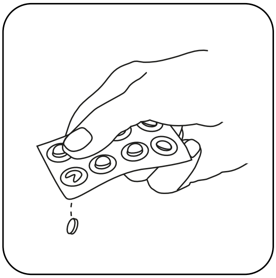
Premir a tecla **ZERO**.



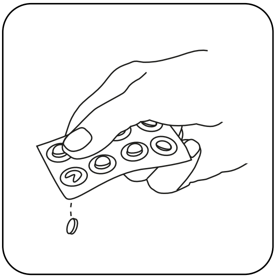
Retirar a célula do compartimento de medição.



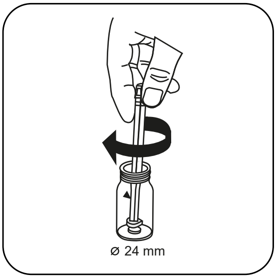
Esvaziar a célula até ficarem apenas algumas gotas.



Pastilha DPD No. 1.

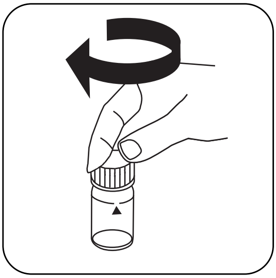


Pastilha DPD No. 3.

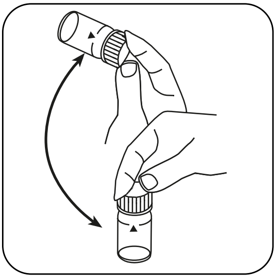


Esmagar a(s) pastilha(s) rodando ligeiramente.

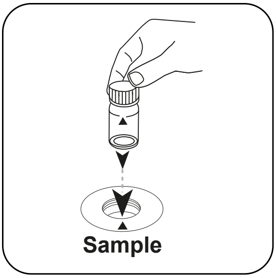
Encher a célula até à **marca de 10 mL** com a **amostra** .



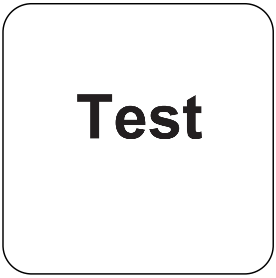
Fechar a(s) célula(s).



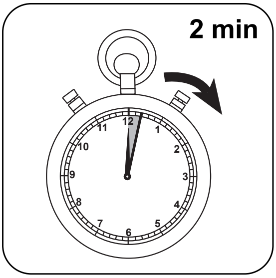
Dissolver a(s) pastilha(s) girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

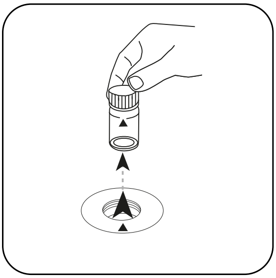


Premir a tecla **TEST** (XD: **START**).

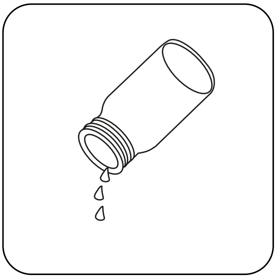


Aguardar **2 minuto(s) de tempo de reação**.

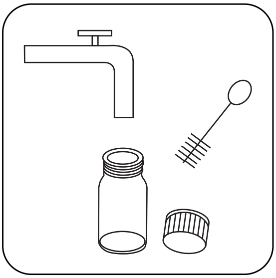
Decorrido o tempo de reação, a medição é efetuada automaticamente.



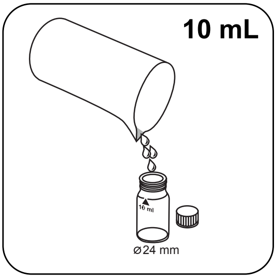
Retirar a célula do compartimento de medição.



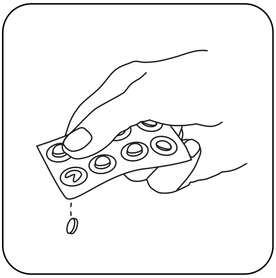
Esvaziar a célula.



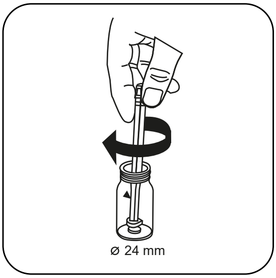
Limpar bem a célula e a tampa da mesma.



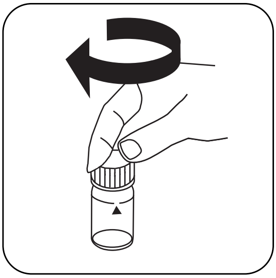
Encher uma **segunda célula** com **10 mL de amostra** .



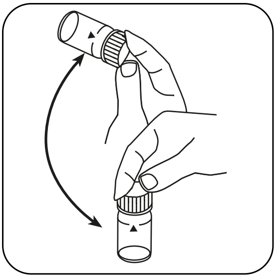
Pastilha GLYCINE.



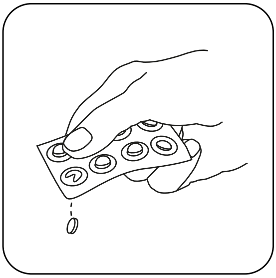
Esmagar a(s) pastilha(s) rodando ligeiramente.



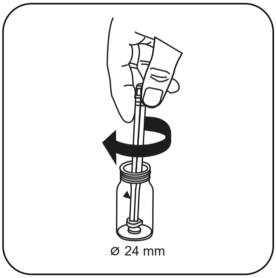
Fechar a(s) célula(s).



Dissolver a(s) pastilha(s) girando.

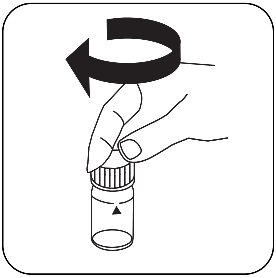


Adicionar **uma pastilha DPD No. 1** e **uma pastilha DPD No. 3** diretamente da película à primeira célula.

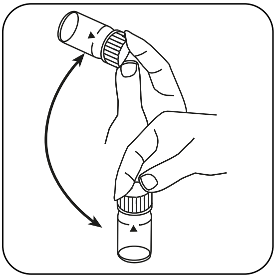


Esmagar a(s) pastilha(s) rodando ligeiramente.

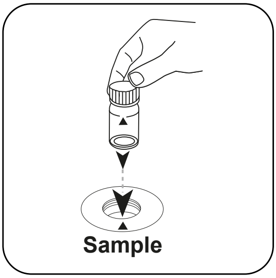
Introduzir a **solução de glicina** preparada na célula preparada.



Fechar a(s) célula(s).



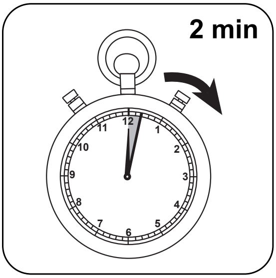
Dissolver a(s) pastilha(s) girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Test

Premir a tecla **TEST** (XD: **START**).



Aguardar **2 minuto(s) de tempo de reação**.

Decorrido o tempo de reação, a medição é efetuada automaticamente.

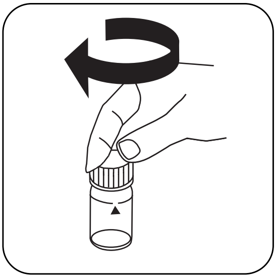
No visor aparece o resultado em mg/L Ozono; mg/l cloro total.

Realização da determinação Ozono, na ausência de cloro com pastilha

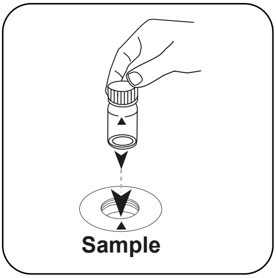
Escolher o método no equipamento.

Escolha ainda a determinação: sem Cloro

Encher a célula de 24 mm com **10 mL de amostra** .



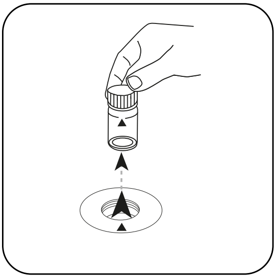
Fechar a(s) célula(s).



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

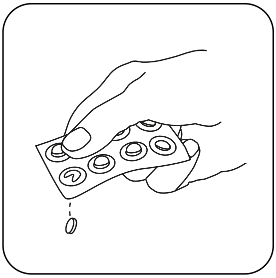
Zero

Premir a tecla **ZERO**.

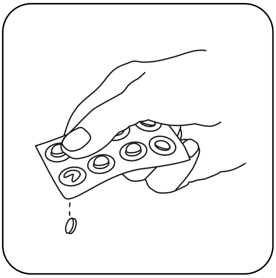


Retirar a célula do compartimento de medição.

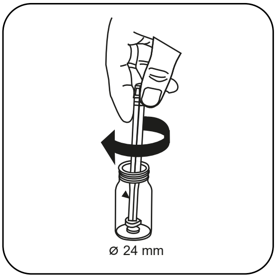
Esvaziar a célula até ficarem apenas algumas gotas.



Pastilha DPD No. 1.

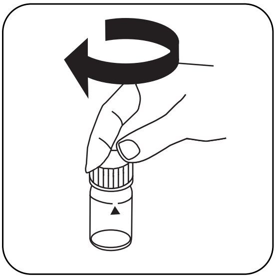


Pastilha DPD No. 3.

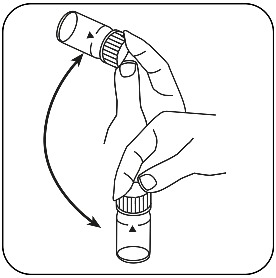


Esmagar a(s) pastilha(s) rodando ligeiramente.

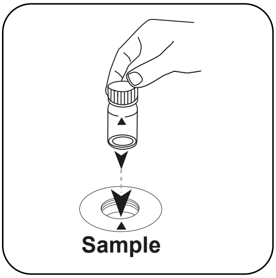
Encher a célula até à **marca de 10 mL** com a **amostra** .



Fechar a(s) célula(s).



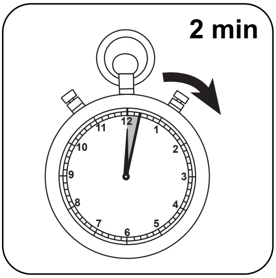
Dissolver a(s) pastilha(s) girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Test

Premir a tecla **TEST** (XD: **START**).



Aguardar **2 minuto(s) de tempo de reação**.

Decorrido o tempo de reação, a medição é efetuada automaticamente.

No visor aparece o resultado em mg/L Ozono.

Análises

A tabela a seguir identifica os valores de saída que podem ser convertidos em outras formas de citação.

Unidade	Forma de citação	Fator de conversão
mg/l	O_3	1
mg/l	Cl_2	1.4771

Método Químico

DPD / Glicina

Apêndice

Texto de Interferências

Interferências Pesistentes

1. Todos os oxidantes presentes nas amostras reagem como o cloro, o que leva a resultados demasiado altos.
2. Concentrações de ozono superiores a 6 mg/L de podem causar resultados dentro da área de medição até 0 mg/L. Neste caso, deve diluir a amostra de água. 10 ml da amostra diluída é colocada em reagente e a medição é repetida (teste de plausibilidade).

Bibliografia

Colorimetric Chemical Analytical Methods, 9th Edition, Lovibond

Derivado de

DIN 38408-3:2011-04

[e)]Reagente auxiliar, alternativamente ao DPD no. 1 / não 3 quando a amostra é nublada devido ao alto teor de íons de cálcio e / ou alta condutividade | [f)]Reagente auxiliar, é adicionalmente necessário para a determinação de bromo, dióxido de cloro ou ozônio na presença de cloro | [#]incluindo vareta de agitação

Poliacrilatos L M338

1 - 30 mg/L Polyacryl POLY

Turbidez

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
Cartucho C18	1 pc.	56A020101
KS173-P2-2,4 Indicador de dinitrofenol	65 mL	56L017365
KS183-QA2-MO1-P3 Ácido nítrico	65 mL	56L018365
Polyacrylate L Reagent Set	1 pc.	56R019165
KS336-Propan-2-ol, 65 mL	65 mL	56L033665

São necessários os seguintes acessórios.

Acessórios	Unidade de Embalagem	Código do Produto
Pipette, 1000 µl	1 pc.	365045
Pontas de pipeta, 0,1-1 ml (azul), 1000 peças	1 pc.	419073

Preparação

- **Preparação do cartucho:**

1. Retirar o êmbolo de uma seringa de 20 ml e fixar a seringa no cartucho C18.
2. Encher a seringa com 5 ml de KS336 (propan-2-ol).
3. Com a ajuda do êmbolo, eluir o conteúdo gota a gota através do cartucho.
4. Eliminar o eluato.
5. Retirar novamente o êmbolo e encher a seringa com 20 ml de água desmineralizada.
6. Com a ajuda do êmbolo, eluir o conteúdo gota a gota através do cartucho.
7. Eliminar o eluato.
8. O cartucho está pronto a usar e pode ser utilizado ou reutilizado.

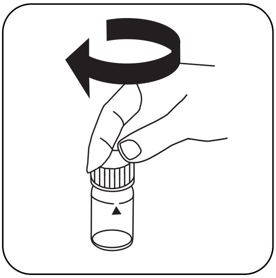
Notas

1. Se, apesar da dosagem correta das amostras e reagentes, se formar nenhuma turvação ou apenas uma ligeira turvação, é necessário aumentar a concentração da amostra para detetar poliacrilatos/polímeros.
2. Podem surgir resultados diferentes quando há interferências devido a componentes ou impurezas da amostra. Nestes casos, é necessário eliminar as interferências.
3. O método foi introduzido utilizando ácido poliacrílico 2100 sal de sódio entre 1 e 30 mg/L. Outros poliacrilatos/polímeros resultam em resultados diferentes, o que pode fazer variar a área de medição.

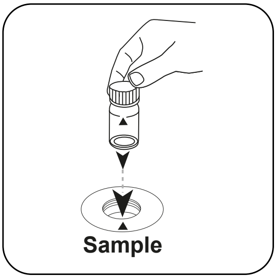
Realização da determinação Poliacrilatos com reagente líquido

Escolher o método no equipamento.

Encher a célula de 24 mm com **10 mL de amostra** .



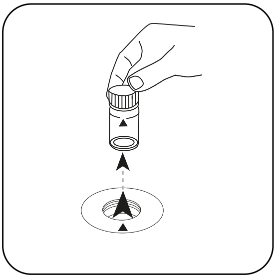
Fechar a(s) célula(s).



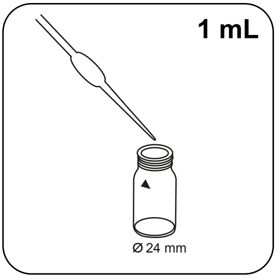
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Zero

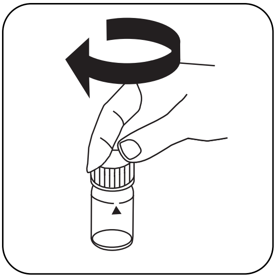
Premir a tecla **ZERO**.



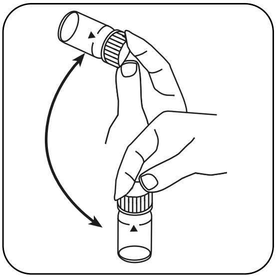
Retirar a célula do compartimento de medição.



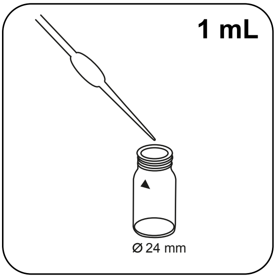
Adicionar **1 mL (25 drops) Polyacrylate Buffer A1 de solução** à célula de amostra.



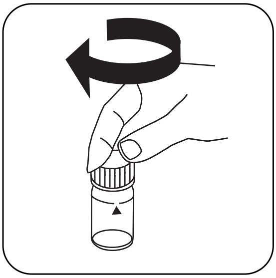
Fechar a(s) célula(s).



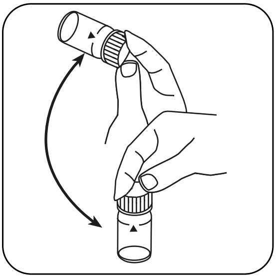
Misturar o conteúdo girando.



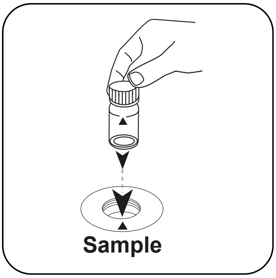
Adicionar **1 mL (25 drops) Polyacrylate Precipitant A2 de solução** à célula de amostra.



Fechar a(s) célula(s).



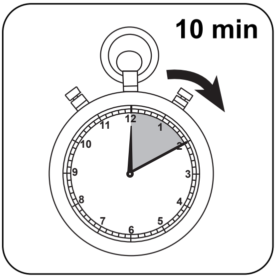
Misturar o conteúdo girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Test

Premir a tecla **TEST** (XD: **START**).



Aguardar **10 minuto(s) de tempo de reação**.

Decorrido o tempo de reação, a medição é efetuada automaticamente.

No visor aparece o resultado em mg/L Ácido poliacrílico 2100 sal sódio.

Método Químico

Turbidez

Apêndice

Bibliografia

W.B. Crummett, R.A. Hummel (1963), The Determination of Polyacrylamides in Water, American Water Works Association, 55 (2), pp. 209-219

Sulfato PP M360

5 - 100 mg/L SO_4^{2-} SO4

Turbidez de Sulfato de Bário

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
VARIO Sulfa 4 F10	Pó / 100 pc.	532160
ValidCheck Sulfate 75 mg/l	1 pc.	48311325

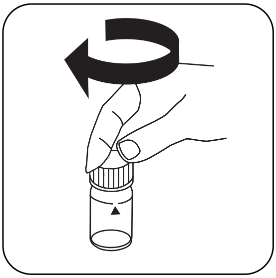
Notas

1. O sulfato causa uma turvação finamente distribuída.

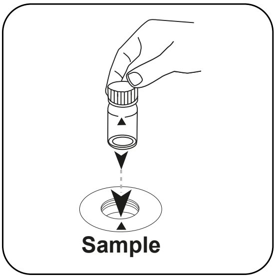
Realização da determinação Sulfato com pacote de pó Vario

Escolher o método no equipamento.

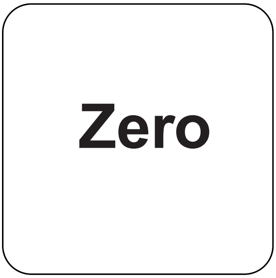
Encher a célula de 24 mm com **10 mL de amostra** .



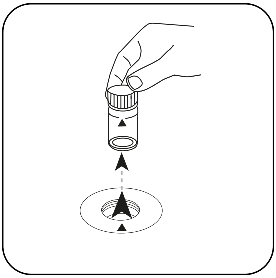
Fechar a(s) célula(s).



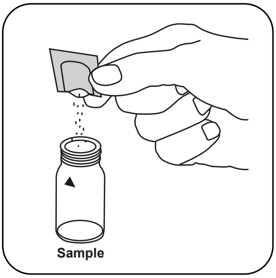
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



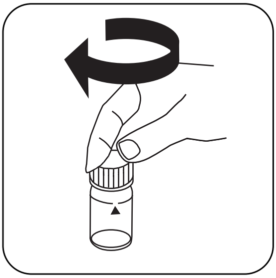
Premir a tecla **ZERO**.



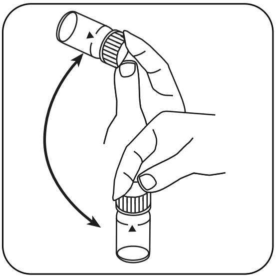
Retirar a célula do compartimento de medição.



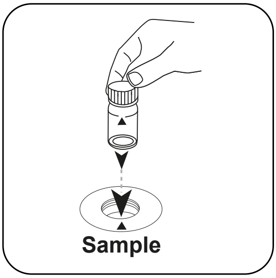
Adicionar um **pacote de pó Vario Sulpha 4/ F10** .



Fechar a(s) célula(s).



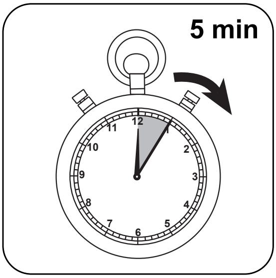
Misturar o conteúdo girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Test

Premir a tecla **TEST** (XD: **START**).



Aguardar **5 minuto(s) de tempo de reação**.

Decorrido o tempo de reação, a medição é efetuada automaticamente.

No visor aparece o resultado em mg/L Sulfato.

Método Químico

Turbidez de Sulfato de Bário

Apêndice

De acordo com

Standard Method 4500-SO42- E
US EPA 375.4

Derivado de

DIN ISO 15923-1 D49

Triazole PP M388

1 - 16 mg/L Benzotriazole or Tolyltriazole tri

Digestão Catalizada por UV

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
VARIO Triazole RGT Powder Pack F25	Pó / 100 pc.	532200
Solução de sal VARIO Rochelle, 30 ml $^{h)}$	30 mL	530640

São necessários os seguintes acessórios.

Acessórios	Unidade de Embalagem	Código do Produto
Lâmpada UV tipo caneta, 254 nm	1 pc.	400740
Óculos de protecção UV, laranja	1 pc.	400755

Notas de Perigo

Enquanto a lâmpada UV está em funcionamento, tem de usar óculos de proteção UV.

Amostragem

1. Medir a amostra de água logo após a recolha da amostra.

Preparação

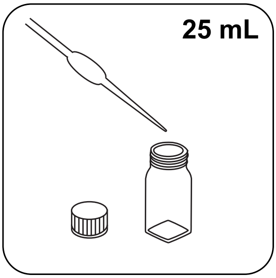
1. Para conseguir resultados de análise precisos, a temperatura da amostra deve ser mantida entre 20 °C e 25 °C.
2. As águas com nitrito ou bórax devem, antes da análise, ser ajustadas para um valor pH entre 4 e 6 (com 1N de ácido sulfúrico).
3. Se a amostra tiver uma dureza superior a 500 mg/L $CaCO_3$, adicionam-se 10 gotas de solução salina Rochelle.

Notas

1. O pacote de pó reagente de triazol e lâmpada UV podem ser obtidos sob consulta.
2. Para manusear a lâmpada UV deve observar as instruções do fabricante. Não pode tocar na superfície da lâmpada UV. As dedadas arranham o vidro. Limpar a lâmpada UV entre as medições com um pano macio e limpo.
3. O teste não distingue entre toliltriazol e benzotriazol.

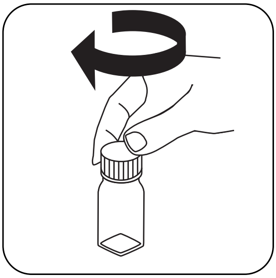
Realização da determinação Benzotriazol/toliltriazol com pacote de pó Vario

Escolher o método no equipamento.

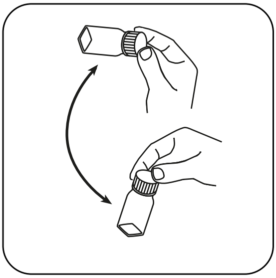


Encher um recipiente de digestao com **25 mL** de amostra.

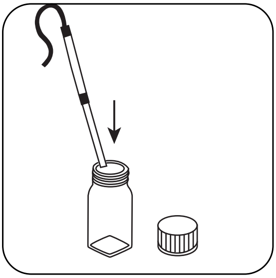
Adicionar um **pacote de pó** .



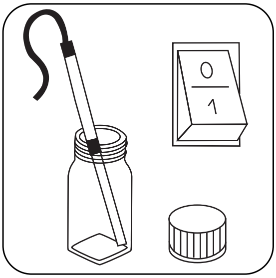
Fechar a recipiente de digestão.



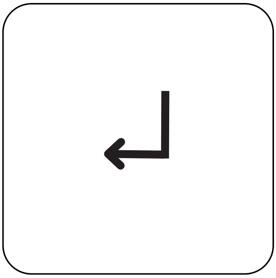
Dissolver o pó girando.



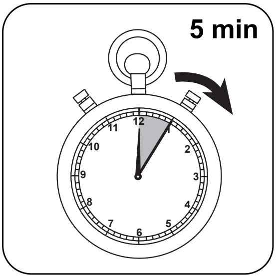
Manter a lâmpada UV na amostra. **Atenção: Usar óculos de proteção UV!**



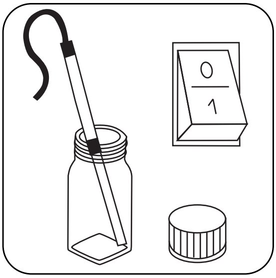
Ligar a lâmpada UV.



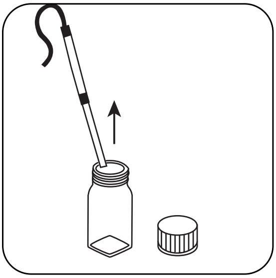
Premir a tecla **ENTER**.



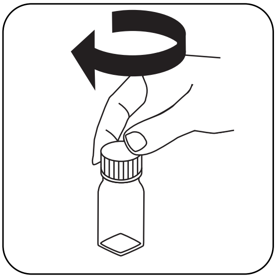
Aguardar **5 minuto(s) de tempo de reação**.



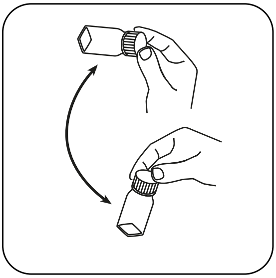
Desligar a lâmpada UV quando o Count-Down estiver terminado.



Retirar a lâmpada UV da amostra.

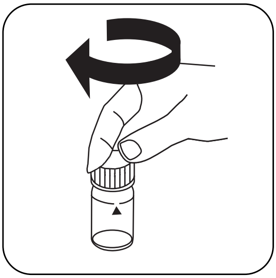


Fechar a recipiente de digestão.

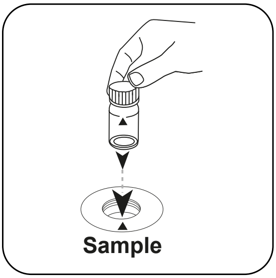


Misturar o conteúdo girando.

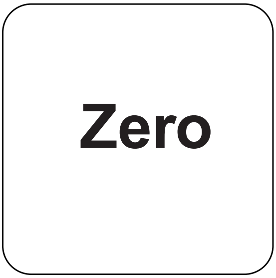
Encher a célula de 24 mm com **10 mL de água desmineralizada**.



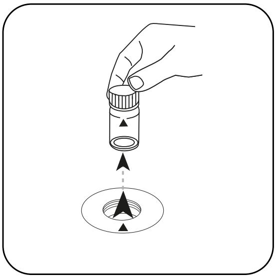
Fechar a(s) célula(s).



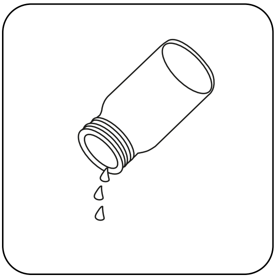
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



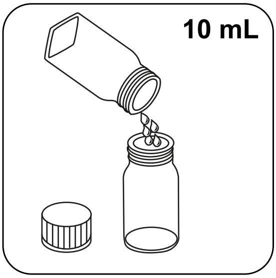
Premir a tecla **ZERO**.



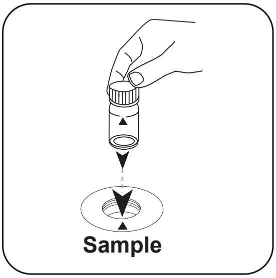
Retirar a célula do compartimento de medição.



Esvaziar a célula.



Encher a célula de 24 mm com **10 mL de amostra preparada**.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Test

Premir a tecla **TEST** (XD: **START**).

No visor aparece o resultado em mg/L Benzotriazol ou Tolyltriazol (Alternar entre formas de citação premindo a seta para cima/para baixo.).

Análises

A tabela a seguir identifica os valores de saída que podem ser convertidos em outras formas de citação.

Unidade	Forma de citação	Fator de conversão
mg/l	Benzotriazole	1
mg/l	Tolyltriazole	1.1177

Método Químico

Digestão Catalizada por UV

Apêndice

Texto de Interferências

Interferências Pesistentes

- Se a fotólise for realizada durante mais ou menos 5 minutos, pode causar resultados demasiado baixos.

Bibliografia

Harp, D., Proceedings 45th International Water Conference, 299 (October 22-24, 1984)

[h)] Reagente auxiliar, também é usado para amostras com dureza superior a 300 mg / l $CaCO_3$

Zinco L M405

0.1 - 2.5 mg/L Zn Zn

Zincon / EDTA

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
KS 89 - Supressor catiónico	65 mL	56L008965
Zinc LR Reagent Set	1 pc.	56R023965
Tampão de Zinco Z1B	65 mL	56L024365
KP244-Zinco Reagente 2	Pó / 20 g	56P024420

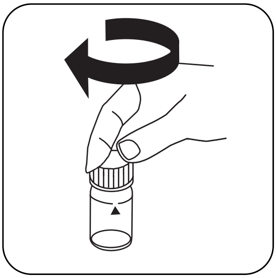
Notas

1. Para a dosagem correta tem de usar a colher medida fornecida com os reagentes.
2. Este teste destina-se a determinar o zinco livre solúvel. O zinco que não está ligado a fortes agentes complexantes não é detetado.

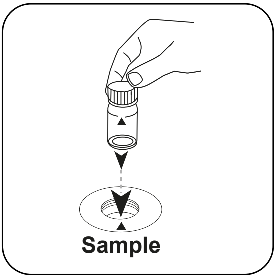
Realização da determinação Zinco com reagente líquido e pó

Escolher o método no equipamento.

Encher a célula de 24 mm com **10 mL de amostra** .



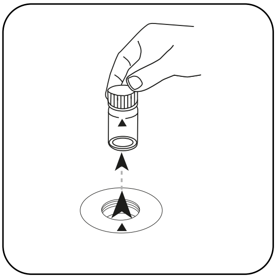
Fechar a(s) célula(s).



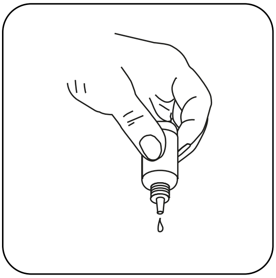
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Zero

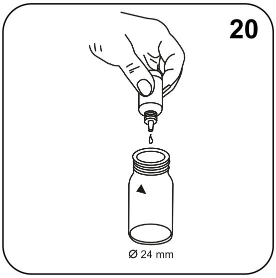
Premir a tecla **ZERO**.



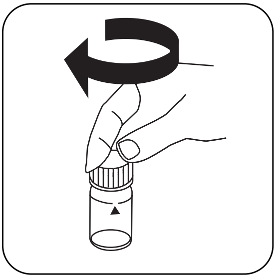
Retirar a célula do compartimento de medição.



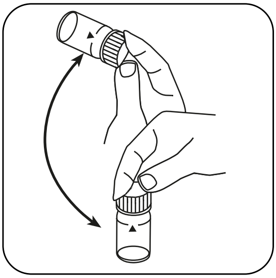
Manter os frascos conta gotas na vertical e pressionar lentamente para adicionar gotas de igual dimensão.



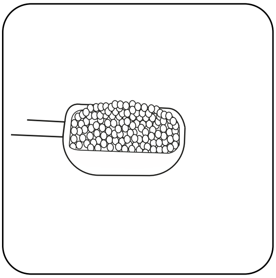
Adicionar **20 gotas Zinc Buffer Z1B**.



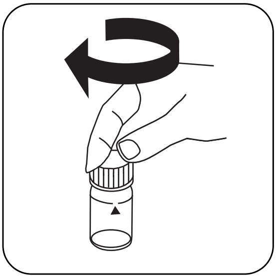
Fechar a(s) célula(s).



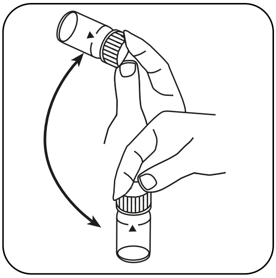
Misturar o conteúdo girando.



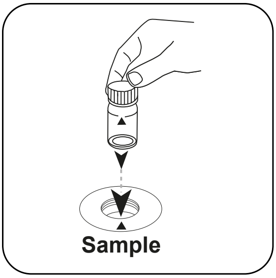
Adicionar **uma colher medida Zinc Indicator Z4P** .



Fechar a(s) célula(s).



Dissolver o pó girando.



Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Test

Premir a tecla **TEST** (XD: **START**).

No visor aparece o resultado em mg/L Zinco.

Método Químico

Zincon / EDTA

Apêndice

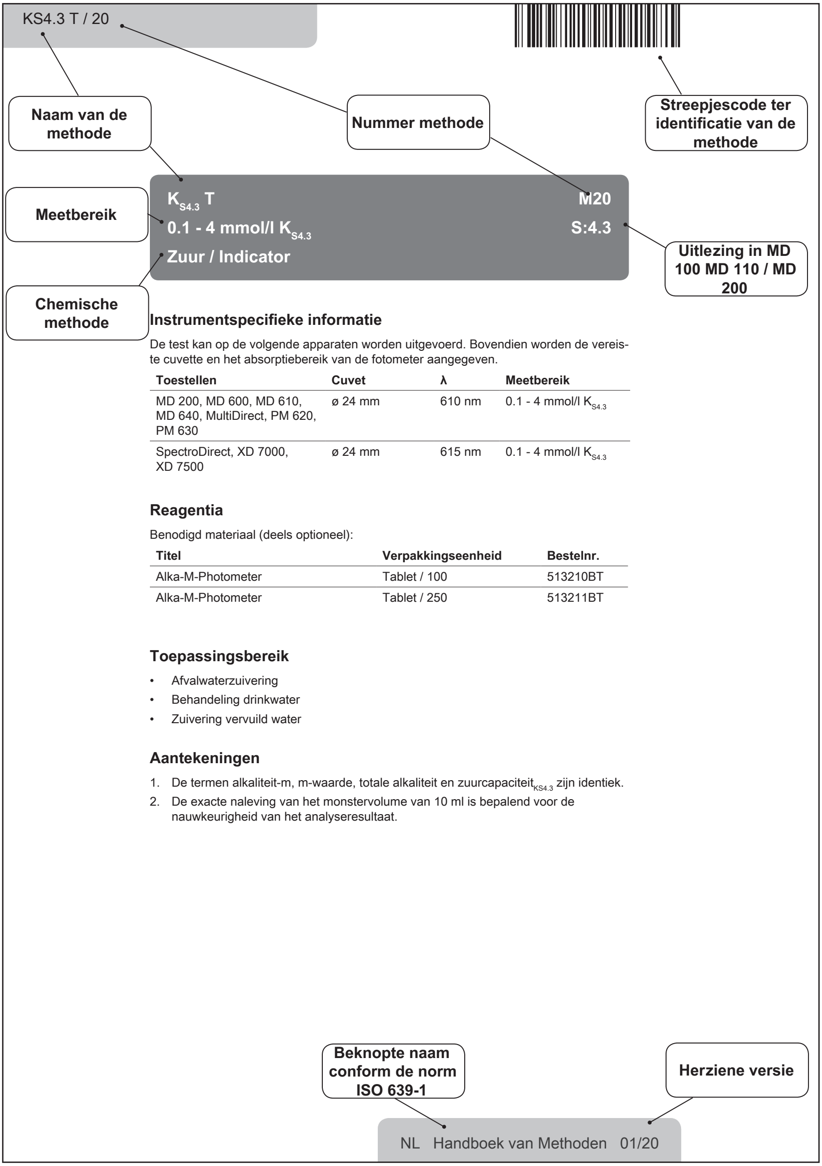
Texto de Interferências

Interferências Removíveis

- Os catiões, tais como compostos de amónio quaternários, causam uma alteração de cor de vermelho-rosa para violeta, em função da presente concentração de cobre. Neste caso, adicione à amostra gota a gota KS89 (cationic surpressor) até ver uma cor laranja/azul. Atenção: Ao adicionar cada gota, agite a amostra.

Bibliografia

Processo de análise fotométrico, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989
S.M. Khopkar, Basic Concepts of Analytical Chemistry (2004), New Age International Ltd. Publishers, New Dheli, p. 75



KS4.3 T / 20

$K_{S4.3}$ T **M20**

0.1 - 4 mmol/l $K_{S4.3}$ **S:4.3**

Zuur / Indicator

Instrumentspecifieke informatie

De test kan op de volgende apparaten worden uitgevoerd. Bovendien worden de vereiste cuvette en het absorptiebereik van de fotometer aangegeven.

Toestellen	Cuvet	λ	Meetbereik
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630	ø 24 mm	610 nm	0.1 - 4 mmol/l $K_{S4.3}$
SpectroDirect, XD 7000, XD 7500	ø 24 mm	615 nm	0.1 - 4 mmol/l $K_{S4.3}$

Reagentia

Benodigd materiaal (deels optioneel):

Titel	Verpakkingseenheid	Bestelnr.
Alka-M-Photometer	Tablet / 100	513210BT
Alka-M-Photometer	Tablet / 250	513211BT

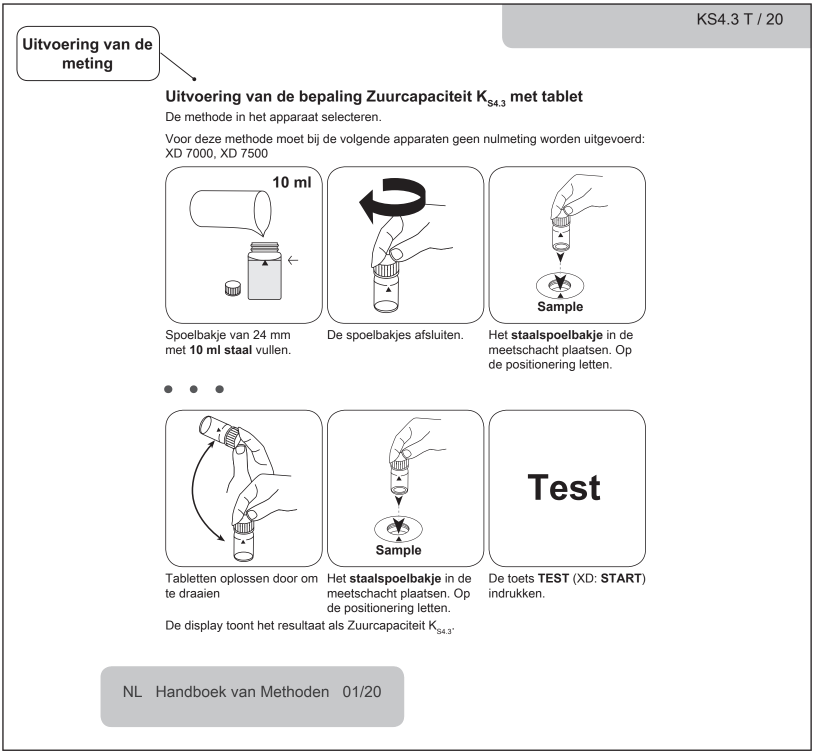
Toepassingsbereik

- Afvalwaterzuivering
- Behandeling drinkwater
- Zuivering vervuild water

Aantekeningen

1. De termen alkaliteit-m, m-waarde, totale alkaliteit en zuurcapaciteit$_{KS4.3}$ zijn identiek.
2. De exacte naleving van het monstervolume van 10 ml is bepalend voor de nauwkeurigheid van het analyseresultaat.

NL Handboek van Methoden 01/20



KS4.3 T / 20

Uitvoering van de meting

Uitvoering van de bepaling Zuurcapaciteit $K_{S4.3}$ met tablet

De methode in het apparaat selecteren.

Voor deze methode moet bij de volgende apparaten geen nulmeting worden uitgevoerd: XD 7000, XD 7500

Spoelbakje van 24 mm met **10 ml staal** vullen.

De spoelbakjes afsluiten.

Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

• • •

Tabletten oplossen door om te draaien

Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

De toets **TEST** (XD: **START**) indrukken.

De display toont het resultaat als Zuurcapaciteit $K_{S4.3}$.

NL Handboek van Methoden 01/20

Aluminium PP M50

0.01 - 0.25 mg/L Al AL

Eriochromocyanine R

Reagentia

Benodigd materiaal (deels optioneel):

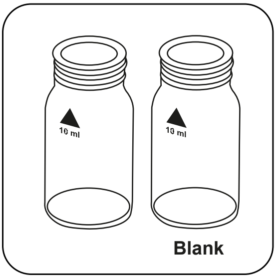
Reagentia	Verpakkingseenheid	Bestelnr.
VARIO aluminium set 20 ml	1 St.	535000

Voorbereiding

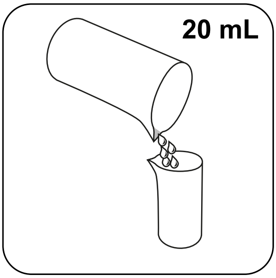
1. Om nauwkeurige analyseresultaten te bekomen, moet een monstertemperatuur van 20 tot 25 °C worden aangehouden.
2. Om fouten als gevolg van onzuiverheden te voorkomen, spoelt u het spoelbakje en toebehoren voor de analyse met zoutzuuroplossing (ca. 20 %) en vervolgens met gedeïoniseerd water.

Uitvoering van de bepaling Aluminium met Vario-poederpakje

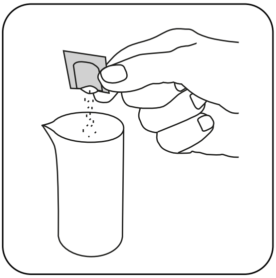
De methode in het apparaat selecteren.



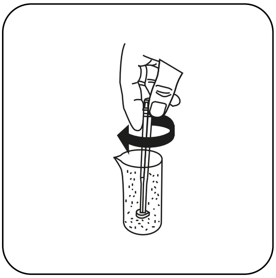
Twee propere spoelbakjes van 24 mm klaarzetten. Een als nulspoelbakje kenmerken.



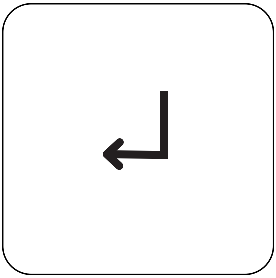
20 mL staal in een maatbeker van 100 mL doen.



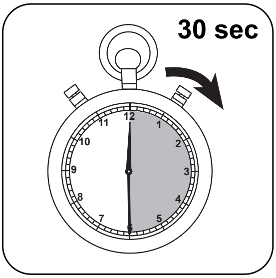
Een **Vario ALUMINIUM ECR F20 poederpakje** toevoegen.



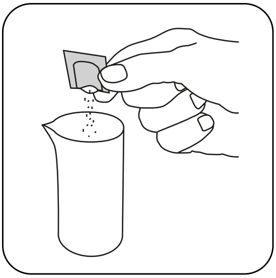
Poeder oplossen door te roeren.



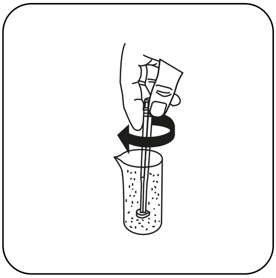
De toets **ENTER** indrukken.



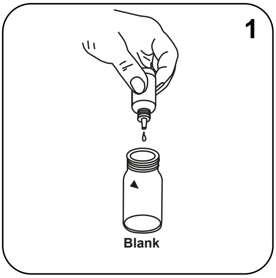
De reactietijd van 30 seconden afwachten.



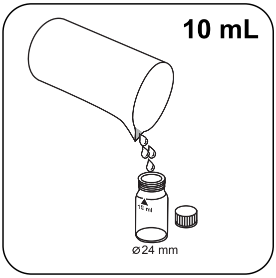
Een **Vario HEXAMINE F20 poederpakje** toevoegen.



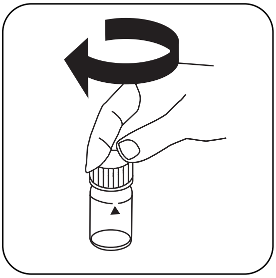
Poeder oplossen door te roeren.



1 druppels Vario ALUMINIUM ECR Masking Reagent in het nulspoelbakje doen.



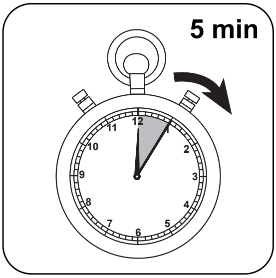
In elk spoelbakje **10 mL voorbehandeld staal** doen.



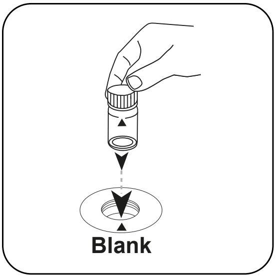
De spoelbakjes afsluiten.

↵

De toets **ENTER** indrukken.



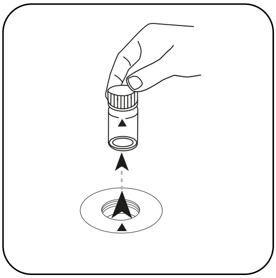
De reactietijd van 5 minuten afwachten.



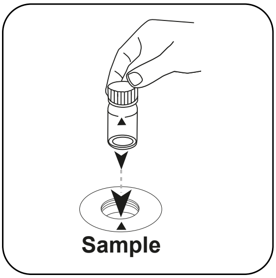
Het **nulspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Zero

De toets **NUL** indrukken.



Het spoelbakje uit de meetschacht nemen.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Test

De toets **TEST** (XD: **START**) indrukken.

De display toont het resultaat in mg/L Aluminium.

Evaluatie

De volgende tabel geeft aan dat de uitvoerwaarden kunnen worden geconverteerd naar andere citatievormen.

Eenheid	Dagvaardingsformulier	Omrekeningsfactor
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Chemische methode

Eriochromocyanine R

Aanhangsel

Verstoringen

Uit te sluiten verstoringen

- Door de aanwezigheid van fluoriden en polyfosfaten kunnen de analyseresultaten te laag zijn. Deze invloed is over het algemeen niet significant, tenzij het water kunstmatig isgefluoreerd. In dit geval kan de onderstaande tabel worden gebruikt om de werkelijke aluminiumconcentratie te bepalen.

Fluoride	Waarde in het display: Aluminium [mg/L]					
[mg/L F]	**0,05**	**0,10**	**0,15**	**0,20**	**0,25**	**0,30**
0,2	0,05	0,11	0,16	0,21	0,27	0,32
0,4	0,06	0,11	0,17	0,23	0,28	0,34
0,6	0,06	0,12	0,18	0,24	0,30	0,37
0,8	0,06	0,13	0,20	0,26	0,32	0,40
1,0	0,07	0,13	0,21	0,28	0,36	0,45
1,5	0,09	0,20	0,29	0,37	0,48	---

Literatuurverwijzing

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

Overeenkomstig

APHA-methode 3500-Al B

Broom T M80

0.05 - 13 mg/L Br_2 Br

DPD

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
DPD Nr.1	Tablet / 100	511050BT
DPD Nr. 1	Tablet / 250	511051BT
DPD Nr. 1	Tablet / 500	511052BT
DPD Nr. 1 hoog calcium e)	Tablet / 100	515740BT
DPD Nr. 1 hoog calcium e)	Tablet / 250	515741BT
DPD Nr. 1 hoog calcium e)	Tablet / 500	515742BT

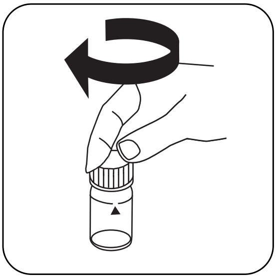
Voorbereiding

1. Het schoonmaken van de spoelbakjes:
   Aangezien veel huishoudelijke reinigingsmiddelen (bijv. afwasmiddelen) reducerende stoffen bevatten, kan de latere bepaling van oxidatiemiddelen (bijv. ozon, chloor) tot verminderde resultaten leiden. Om deze meetfout uit te sluiten, moeten de glasapparaten chloorvrij zijn. Hiertoe wordt het glaswerk gedurende één uur onder natriumhypochlorietoplossing (0,1 g/L) bewaard en vervolgens grondig gespoeld met gedeïoniseerd water.
2. Tijdens de monstervoorbereiding moet worden vermeden dat het broom wordt uitgestoten, bijvoorbeeld door pipetteren en schudden. De analyse moet onmiddellijk na de bemonstering worden uitgevoerd.
3. Sterk alkalisch of zuur water moet vóór de analyse in een pH-gebied tussen 6 en 7 (met 0,5 mol/l zwavelzuur of 1 mol/l-natriumhydroxideoplossing) worden gebracht.

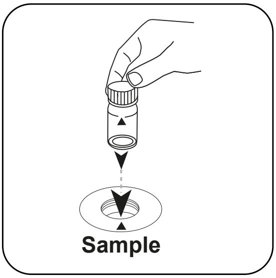
Uitvoering van de bepaling Broom met tablet

De methode in het apparaat selecteren.

Spoelbakje van 24 mm met **10 mL staal** vullen.



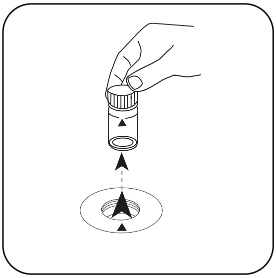
De spoelbakjes afsluiten.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

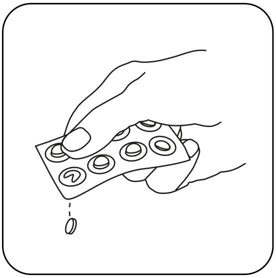
Zero

De toets **NUL** indrukken.

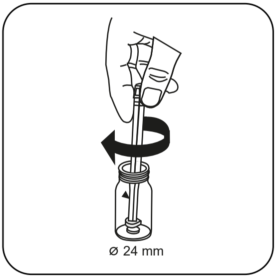


Het spoelbakje uit de meetschacht nemen.

Het spoelbakje tot op enkele druppels ledigen.

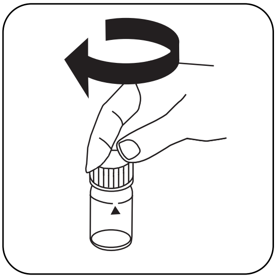


Een DPD Nr. 1 tablet toevoegen.

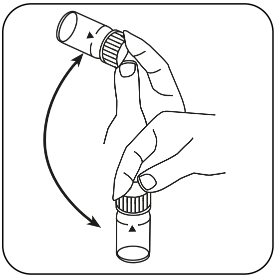


De tabletten onder lichte rotatie verpletteren.

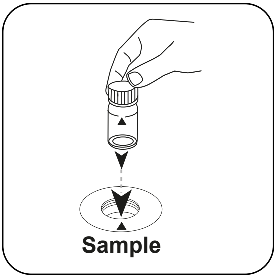
Het spoelbakje tot aan de **markering van 10 mL** met het **staal** vullen.



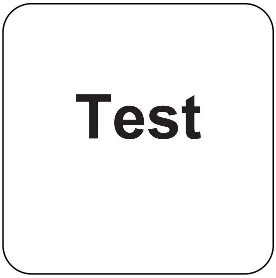
De spoelbakjes afsluiten.



Tabletten oplossen door om te draaien



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



De toets **TEST** (XD: **START**) indrukken.

De display toont het resultaat in mg/L Broom.

Chemische methode

DPD

Aanhangsel

Verstoringen

Permanente verstoringen

1. Alle oxidatiemiddelen in de monsters reageren als broom, wat tot extra resultaten leidt.
2. Concentraties boven de 22 mg/L broom kunnen leiden tot resultaten binnen het meetbereik tot 0 mg/L. In dit geval moet het watermonster worden verdund. Voeg reagens toe aan 10 ml van het verdunde monster en herhaal de meting (plausibiliteitstest).

Afgeleid van

ONS EPA 330.5 (1983)
APHA-methode 4500 Cl-G

[e)] hulpreagens, alternatief voor DPD-nr. 1 / nr. 3 in geval van troebelheid van het monster als gevolg van een hoog calciumionengehalte en/of een hoge geleidbaarheid

Chloor T

M100

0.01 - 6.0 mg/L Cl_2 [a)]

CL6

DPD

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
DPD Nr.1	Tablet / 100	511050BT
DPD Nr. 1	Tablet / 250	511051BT
DPD Nr. 1	Tablet / 500	511052BT
DPD Nr. 3	Tablet / 100	511080BT
DPD Nr. 3	Tablet / 250	511081BT
DPD Nr. 3	Tablet / 500	511082BT
DPD Nr. 1 hoog calcium [e)]	Tablet / 100	515740BT
DPD Nr. 1 hoog calcium [e)]	Tablet / 250	515741BT
DPD Nr. 1 hoog calcium [e)]	Tablet / 500	515742BT
DPD Nr. 3 hoog calcium [e)]	Tablet / 100	515730BT
DPD Nr. 3 hoog calcium [e)]	Tablet / 250	515731BT
DPD Nr. 3 hoog calcium [e)]	Tablet / 500	515732BT
DPD Nr. 4	Tablet / 100	511220BT
DPD Nr. 4	Tablet / 250	511221BT
DPD Nr. 4	Tablet / 500	511222BT
DPD No. 3 Evo	Tablet / 100	511420BT
DPD No. 3 Evo	Tablet / 250	511421BT
DPD No. 3 Evo	Tablet / 500	511422BT
DPD Nr.4 Evo	Tablet / 100	511970BT
DPD Nr. 4 Evo	Tablet / 250	511971BT
DPD Nr. 4 Evo	Tablet / 500	511972BT

Beschikbare standaarden

Omschrijving	Verpakkingseenheid	Bestelnr.
ValidCheck Chloor 1,5 mg/l	1 St.	48105510

Bemonstering

1. Tijdens de monstervoorbereiding moet worden vermeden dat het chloor wordt uitgestoten, bijvoorbeeld door pipetteren en schudden.
2. De analyse moet onmiddellijk na de bemonstering worden uitgevoerd.

Voorbereiding

1. Het schoonmaken van de spoelbakjes:
   Aangezien veel huishoudelijke reinigingsmiddelen (bijv. afwasmiddelen) minder schadelijke stoffen bevatten, kan de bepaling van chloor leiden tot minder goede resultaten. Om deze meetfout uit te sluiten, moeten de glasapparaten chloorvrij zijn. Hiertoe wordt het glaswerk gedurende één uur onder natriumhypochlorietoplossing (0,1 g/L) bewaard en vervolgens grondig gespoeld met gedeïoniseerd water.
2. Voor de individuele bepaling van vrij chloor en totaal chloor is het zinvol om een aparte set spoelbakjes te gebruiken (zie EN ISO 7393-2, paragraaf 5.3).
3. De DPD-kleurontwikkeling vindt plaats bij een pH-waarde van 6,2 tot 6,5. De reagentia bevatten daarom een buffer voor de aanpassing van de pH-waarde. Sterk alkalisch of zuur water moet echter vóór de analyse in een pH-gebied tussen 6 en 7 (met 0,5 mol/L-zwavelzuur of 1 mol/L-natriumhydroxideoplossing) worden geplaatst.

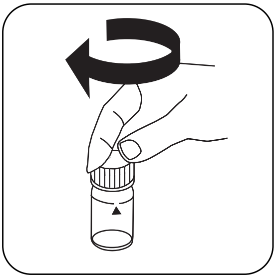
Aantekeningen

1. Evo-tabletten kunnen worden gebruikt als alternatief voor de overeenkomstige standaardtabletten (bv. DPD nr. 3 Evo in plaats van DPD nr. 3).

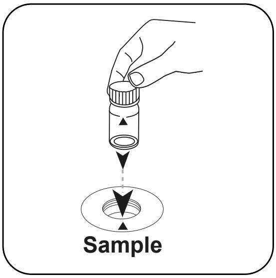
Uitvoering van de bepaling vrij chloor met tablet

De methode in het apparaat selecteren.

Spoelbakje van 24 mm met **10 mL staal** vullen.



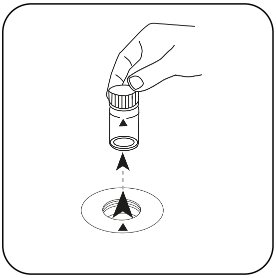
De spoelbakjes afsluiten.



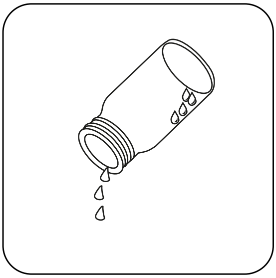
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Zero

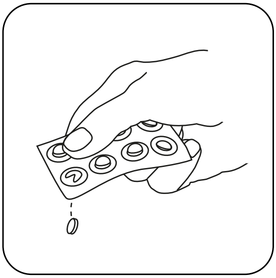
De toets **NUL** indrukken.



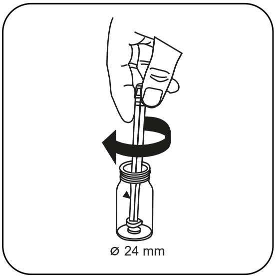
Het spoelbakje uit de meetschacht nemen.



Het spoelbakje tot op enkele druppels ledigen.

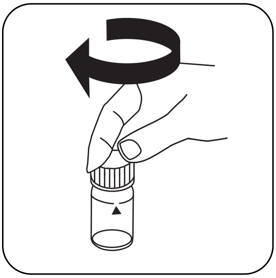


Een DPD Nr. 1 tablet toevoegen.

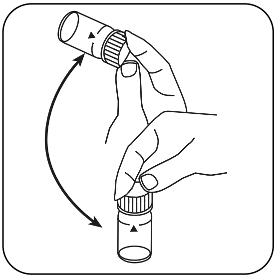


De tabletten onder lichte rotatie verpletteren.

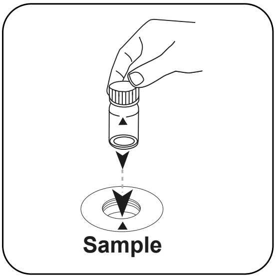
Het spoelbakje tot aan de **markering van 10 mL** met het **staal** vullen.



De spoelbakjes afsluiten.



Tabletten oplossen door om te draaien



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Test

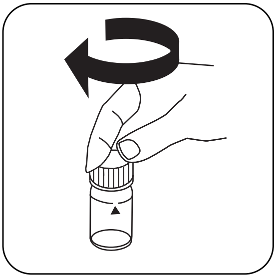
De toets **TEST** (XD: **START**) indrukken.

De display toont het resultaat in mg/L vrij chloor.

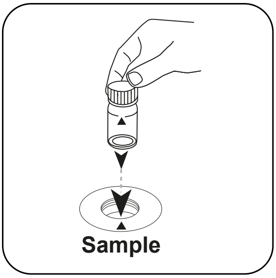
Uitvoering van de bepaling totaal chloor met tablet

De methode in het apparaat selecteren.

Spoelbakje van 24 mm met **10 mL staal** vullen.



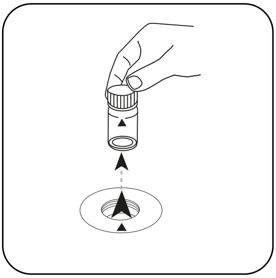
De spoelbakjes afsluiten.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

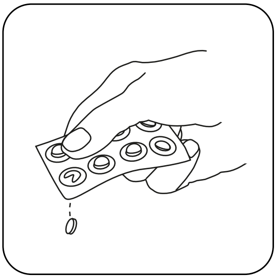
Zero

De toets **NUL** indrukken.

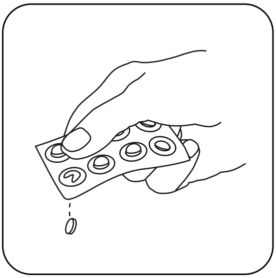


Het spoelbakje uit de meetschacht nemen.

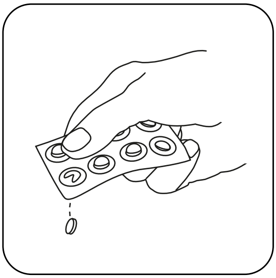
Het spoelbakje tot op enkele druppels ledigen.



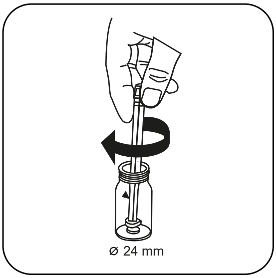
Een DPD Nr. 1 tablet toevoegen.



Een DPD Nr. 3 tablet toevoegen.

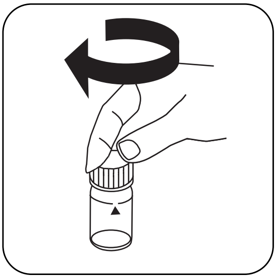


Als alternatief voor DPD nr. 1 en nr. 3 tabletten kan 1 DPD nr. 4 tablet worden toegevoegd.

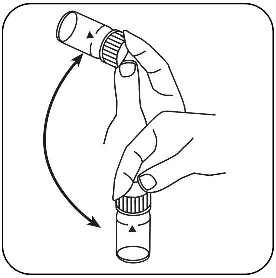


De tabletten onder lichte rotatie verpletteren.

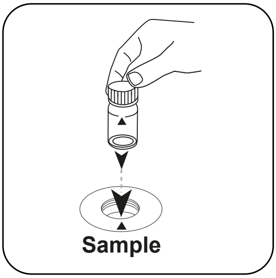
Het spoelbakje tot aan de **markering van 10 mL** met het **staal** vullen.



De spoelbakjes afsluiten.



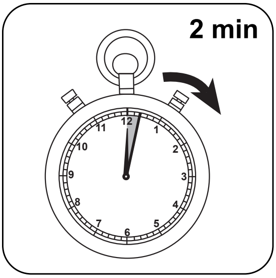
Tabletten oplossen door om te draaien



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Test

De toets **TEST** (XD: **START**) indrukken.



De reactietijd van 2 minuten afwachten.

Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

De display toont het resultaat in mg/L Totaal chloor.

Chemische methode

DPD

Aanhangsel

Verstoringen

Permanente verstoringen

- Alle oxidatiemiddelen in de monsters reageren als chloor, wat tot extra resultaten leidt.

Uit te sluiten verstoringen

- Storingen veroorzaakt door koper en ijzer(III) worden door EDTA geëlimineerd.
- Bij monsters met een hoog calciumgehalte* en/of een hoge geleidbaarheid* kan het gebruik van reagenstabletten leiden tot vertroebeling van het monster en de daarmee samenhangende onjuiste meting. In dit geval zijn de reagenstabletten DPD-nr. 1 High Calcium en het reagenstablet DPD-nr. 3 High Calcium te gebruiken.
  *exacte waarden kunnen niet worden gegeven omdat de troebelheidsvorming afhankelijk is van de aard en samenstelling van het monsterwater.
- Concentraties van meer dan 10 mg/L chloor, bij gebruik van tabletten, kunnen leiden tot resultaten binnen het meetbereik tot 0 mg/L. Als de chloorconcentratie te hoog is, moet het monster worden verdund met chloorvrij water. Voeg reagens toe aan 10 mL van het verdunde monster en herhaal de meting (plausibiliteitstest).

Verstoringen	verstoort vanaf
CrO_4^{2-}	0.01
MnO_2	0.01

Validatie van de methodes

Aantoonbaarheidsgrens	0.02 mg/L
Bepaalbaarheidsgrens	0.06 mg/L
Einde meetbereik	6 mg/L
Gevoeligheid	2.05 mg/L / Abs
Betrouwbaarheidsgrenzen	0.04 mg/L
Standaardafwijking procedure	0.019 mg/L
Variatiecoefficient procedure	0.87 %

Conform

EN ISO 7393-2

[a] bepaling van de vrije, gebonden, totaal mogelijke | [e] hulpreagens, alternatief voor DPD-nr. 1 / nr. 3 in geval van troebelheid van het monster als gevolg van een hoog calciumionengehalte en/of een hoge geleidbaarheid

Chloor L

M101

$0.02 - 4.0$ mg/L Cl_2 [a)]

CL6

DPD

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
DPD 1 bufferoplossing, blauw flesje	15 mL	471010
DPD 1-bufferoplossing	100 mL	471011
DPD 1 bufferoplossing in verpakking van 6 stuks	1 St.	471016
DPD 1 reagensoplossing, groen flesje	15 mL	471020
DPD 1-reagensoplossing	100 mL	471021
DPD 1 reagensoplossing in verpakking van 6 stuks	1 St.	471026
DPD 3 oplossing, rood flesje	15 mL	471030
DPD 3 oplossing	100 mL	471031
DPD 3 oplossing in verpakking van 6 stuks	1 St.	471036
DPD reagentia set	1 St.	471056

Beschikbare standaarden

Omschrijving	Verpakkingseenheid	Bestelnr.
ValidCheck Chloor 1,5 mg/l	1 St.	48105510

Bemonstering

1. Tijdens de monstervoorbereiding moet worden vermeden dat het chloor wordt uitgestoten, bijvoorbeeld door pipetteren en schudden.
2. De analyse moet onmiddellijk na de bemonstering worden uitgevoerd.

Voorbereiding

1. Het schoonmaken van de spoelbakjes:
   Aangezien veel huishoudelijke reinigingsmiddelen (bijv. afwasmiddelen) minder schadelijke stoffen bevatten, kan de bepaling van chloor leiden tot minder goede resultaten. Om deze meetfout uit te sluiten, moeten de glasapparaten chloorvrij zijn. Hiertoe wordt het glaswerk gedurende één uur onder natriumhypochlorietoplossing (0,1 g/L) bewaard en vervolgens grondig gespoeld met gedeïoniseerd water.
2. Voor de individuele bepaling van vrij chloor en totaal chloor is het zinvol om een aparte set spoelbakjes te gebruiken (zie EN ISO 7393-2, paragraaf 5.3).
3. De DPD-kleurontwikkeling vindt plaats bij een pH-waarde van 6,2 tot 6,5. De reagentia bevatten daarom een buffer voor de aanpassing van de pH-waarde. Sterk alkalisch of zuur water moet echter vóór de analyse in een pH-gebied tussen 6 en 7 (met 0,5 mol/l-zwavelzuur of 1 mol/l-natriumhydroxideoplossing) worden geplaatst.

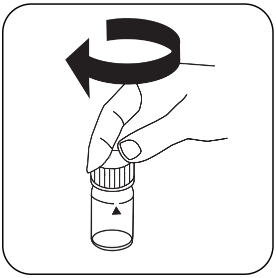
Aantekeningen

1. Na gebruik moeten de druppelflacons onmiddellijk worden gesloten met de schroefdop van dezelfde kleur.
2. Bewaar het reagens ingesteld op +6 °C tot +10 °C op een koele plaats.

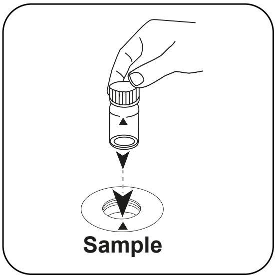
Uitvoering van de bepaling vrij chloor met vloeibaar reagens

De methode in het apparaat selecteren.

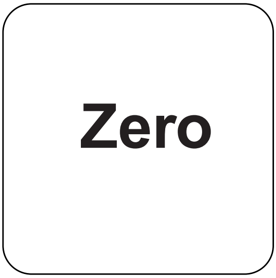
Spoelbakje van 24 mm met **10 mL staal** vullen.



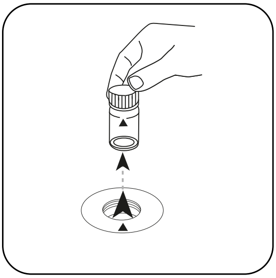
De spoelbakjes afsluiten.



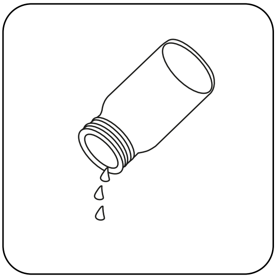
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



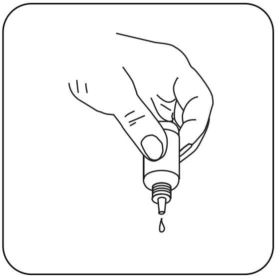
De toets **NUL** indrukken.



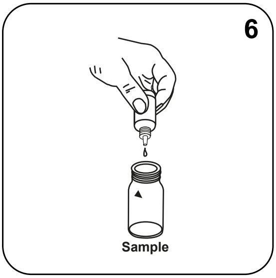
Het spoelbakje uit de meetschacht nemen.



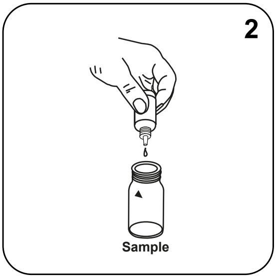
Het spoelbakje ledigen.



De druppelflessen verticaal houden en even grote druppels toevoegen door langzaam te drukken.

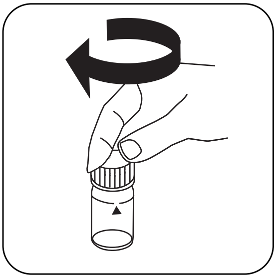


6 druppels DPD
1 bufferoplossing in het staalspoelbakje doen.

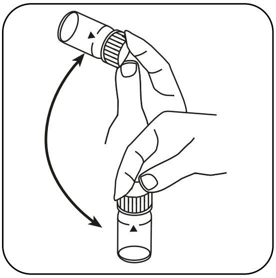


2 druppels DPD
1 reagensoplossing in het staalspoelbakje doen.

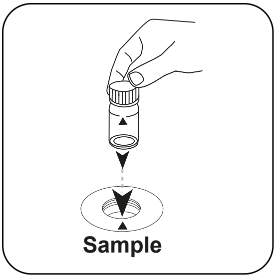
Het spoelbakje tot aan de **markering van 10 mL** met het **staal** vullen.



De spoelbakjes afsluiten.



De inhoud mengen door om te draaien.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Test

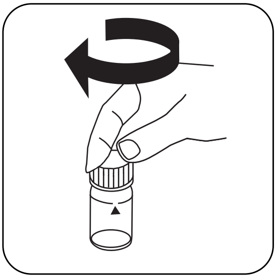
De toets **TEST** (XD: **START**) indrukken.

De display toont het resultaat in mg/L vrij chloor.

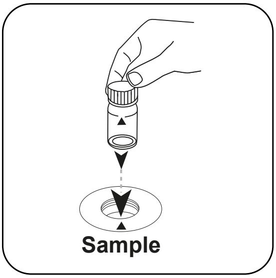
Uitvoering van de bepaling totaal chloor met vloeibaar reagens

De methode in het apparaat selecteren.

Spoelbakje van 24 mm met **10 mL staal** vullen.



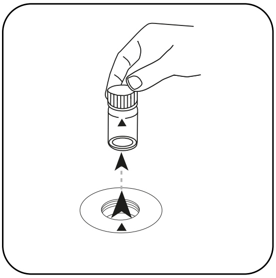
De spoelbakjes afsluiten.



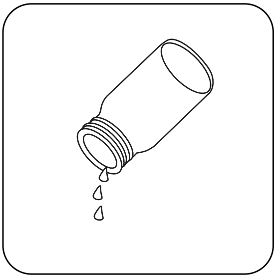
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Zero

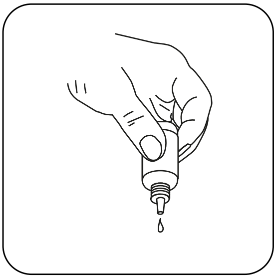
De toets **NUL** indrukken.



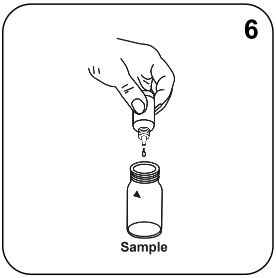
Het spoelbakje uit de meetschacht nemen.



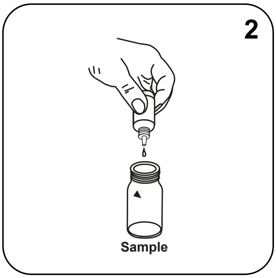
Het spoelbakje ledigen.



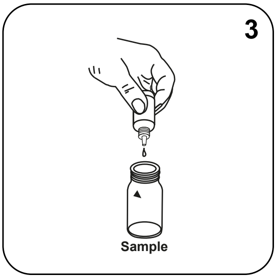
De druppelflessen verticaal houden en even grote druppels toevoegen door langzaam te drukken.



6 druppels DPD 1 bufferoplossing in het staalspoelbakje doen.

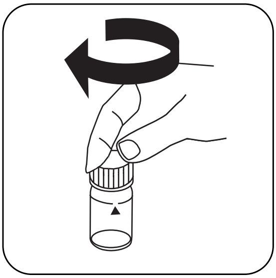


2 druppels DPD 1 reagensoplossing in het staalspoelbakje doen.

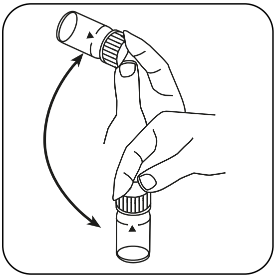


3 druppels DPD 3 oplossing in het staalspoelbakje doen.

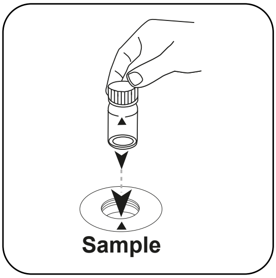
Het spoelbakje tot aan de **markering van 10 mL** met het **staal** vullen.



De spoelbakjes afsluiten.



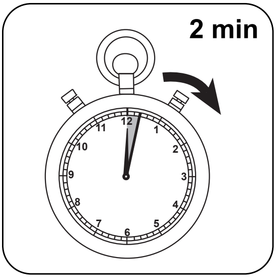
De inhoud mengen door om te draaien.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Test

De toets **TEST** (XD: **START**) indrukken.



De reactietijd van 2 minuten afwachten.

Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

De display toont het resultaat in mg/L Totaal chloor.

Chemische methode

DPD

Aanhangsel

Verstoringen

Permanente verstoringen

- Alle oxidatiemiddelen in de monsters reageren als chloor, wat tot extra resultaten leidt.

Uit te sluiten verstoringen

- Storingen veroorzaakt door koper en ijzer(III) worden door EDTA geëlimineerd.
- Concentraties van meer dan 4 mg/L chloor, bij gebruik van vloeibare reagentia, kunnen leiden tot resultaten binnen het meetbereik tot 0 mg/L. In dit geval moet het monster worden verdund met chloorvrij water. Voeg reagens toe aan 10 ml van het verdunde monster en herhaal de meting (plausibiliteitstest).

Verstoringen	verstoort vanaf
CrO_4^{2-}	0,01
MnO_2	0,01

Conform

EN ISO 7393-2

[a] bepaling van de vrije, gebonden, totaal mogelijke

Chloor HR (KI) T

M105

5 - 200 mg/L Cl_2

CLHr

AI / Zuur

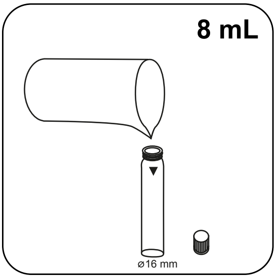
Reagentia

Benodigd materiaal (deels optioneel):

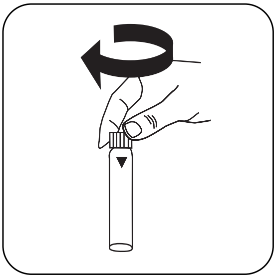
Reagentia	Verpakkingseenheid	Bestelnr.
Chloor HR (KI)	Tablet / 100	513000BT
Chloor HR (KI)	Tablet / 250	513001BT
Acidifying GP	Tablet / 100	515480BT
Acidifying GP	Tablet / 250	515481BT
Set chloor HR (KI)/Acidifying GP#	per 100	517721BT
Set chloor HR (KI)/Acidifying GP#	per 250	517722BT
Chloor HR (KI)	Tablet / 100	501210
Chloor HR (KI)	Tablet / 250	501211

Uitvoering van de bepaling Chloor HR (KI) met tablet

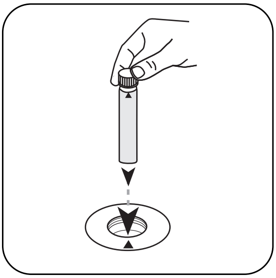
De methode in het apparaat selecteren.



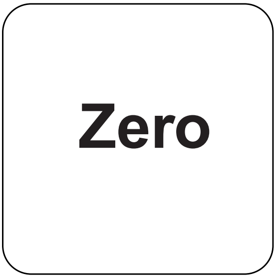
Spoelbakje van 16 mm met **8 mL staal** vullen.



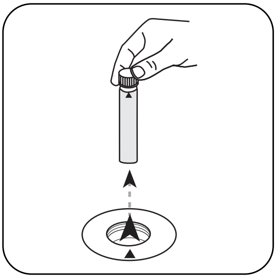
De spoelbakjes afsluiten.



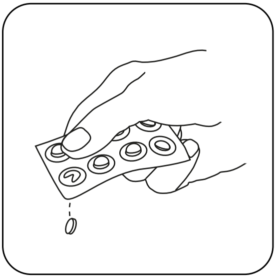
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



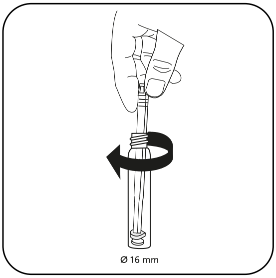
De toets **NUL** indrukken.



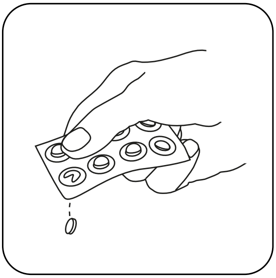
Het **spoelbakje** uit de meetschacht nemen.



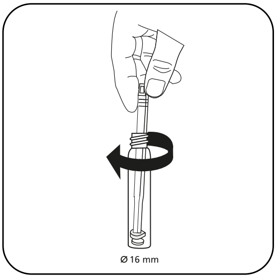
Een Chloor HR (KI) tablet toevoegen.



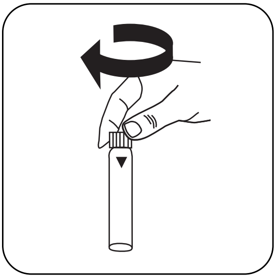
De tabletten onder lichte rotatie verpletteren.



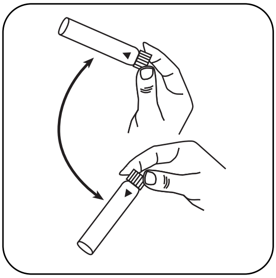
Een ACIDIFYING GP tablet toevoegen.



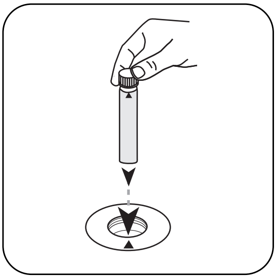
De tabletten onder lichte rotatie verpletteren.



De spoelbakjes afsluiten.



Tabletten oplossen door om te draaien



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Test

De toets **TEST** (XD: **START**) indrukken.

De display toont het resultaat in mg/L Chloor.

Chemische methode

AI / Zuur

Aanhangsel

Verstoringen

Permanente verstoringen

- Alle oxidatiemiddelen in de monsters reageren als chloor, wat tot extra resultaten leidt.

Validatie van de methodes

Aantoonbaarheidsgrens	1.29 mg/L
Bepaalbaarheidsgrens	3.86 mg/L
Einde meetbereik	200 mg/L
Gevoeligheid	83.96 mg/L / Abs
Betrouwbaarheidsgrenzen	1.14 mg/L
Standaardafwijking procedure	0.45 mg/L
Variatiecoefficient procedure	0.45 %

Afgeleid van

EN ISO 7393-3

met inbegrip van de mengstaaf

Chloordioxide T M120

0.02 - 11 mg/L ClO_2 CLO2

DPD/Glycine

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
DPD Nr.1	Tablet / 100	511050BT
DPD Nr. 1	Tablet / 250	511051BT
DPD Nr. 1	Tablet / 500	511052BT
DPD Nr. 3	Tablet / 100	511080BT
DPD Nr. 3	Tablet / 250	511081BT
DPD Nr. 3	Tablet / 500	511082BT
Glycine f)	Tablet / 100	512170BT
Glycine f)	Tablet / 250	512171BT
DPD Nr. 3 hoog calcium e)	Tablet / 100	515730BT
DPD Nr. 3 hoog calcium e)	Tablet / 250	515731BT
DPD Nr. 3 hoog calcium e)	Tablet / 500	515732BT
DPD Nr. 1 hoog calcium e)	Tablet / 100	515740BT
DPD Nr. 1 hoog calcium e)	Tablet / 250	515741BT
DPD Nr. 1 hoog calcium e)	Tablet / 500	515742BT
Set DPD nr. 1/Nr. 3#	per 100	517711BT
Set DPD nr. 1/Nr. 3#	per 250	517712BT
Set DPD nr. 1/glycine #	per 100	517731BT
Set DPD nr. 1/glycine #	per 250	517732BT
Set DPD nr. 1/Nr. 3 hoog calcium#	per 100	517781BT
Set DPD nr. 1/Nr. 3 hoog calcium#	per 250	517782BT
DPD No. 3 Evo	Tablet / 100	511420BT
DPD No. 3 Evo	Tablet / 250	511421BT
DPD No. 3 Evo	Tablet / 500	511422BT

Bemonstering

1. Tijdens de monstervoorbereiding moet worden vermeden dat wordt uitgestoten, bijvoorbeeld door pipetteren en schudden.
2. De analyse moet onmiddellijk na de bemonstering worden uitgevoerd.

Voorbereiding

1. Het schoonmaken van de spoelbakjes:
   Aangezien veel huishoudelijke reinigingsmiddelen (bijv. afwasmiddelen) minder schadelijke stoffen bevatten, kan de bepaling van Chloordioxide leiden tot minder goede resultaten. Om deze meetfout uit te sluiten, moeten de glasapparaten chloorvrij zijn. Hiertoe wordt het glaswerk gedurende één uur onder natriumhypochlorietoplossing (0,1 g/L) bewaard en vervolgens grondig gespoeld met gedeïoniseerd water.
2. Sterk alkalisch of zuur water moet vóór de analyse in een pH-gebied tussen 6 en 7 (met 0,5 mol/l zwavelzuur of 1 mol/l-natriumhydroxideoplossing) worden gebracht.

Aantekeningen

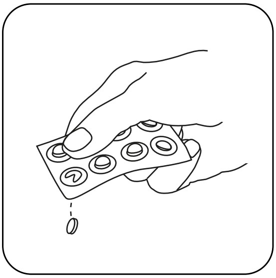
1. EVO-tabletten kunnen worden gebruikt als alternatief voor de overeenkomstige standaardtabletten (bv. DPD nr. 3 EVO in plaats van DPD nr. 3).

Uitvoering van de bepaling Chloordioxide, naast chloor, met tablet

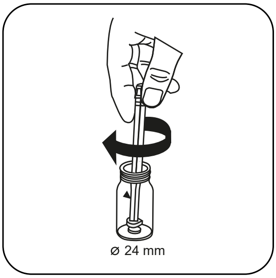
De methode in het apparaat selecteren.

Selecteer bovendien de bepaling: naast chloor

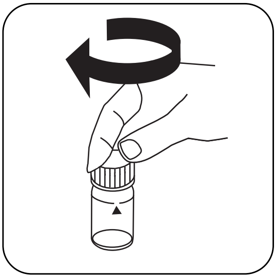
Spoelbakje van 24 mm met **10 mL staal** vullen.



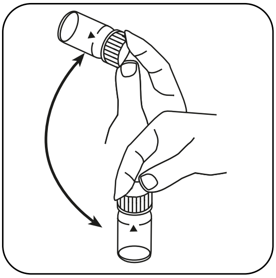
Een GLYCINE tablet toevoegen.



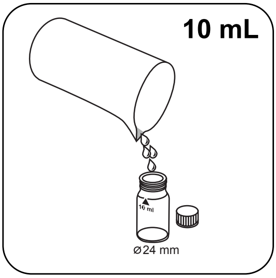
De tabletten onder lichte rotatie verpletteren.



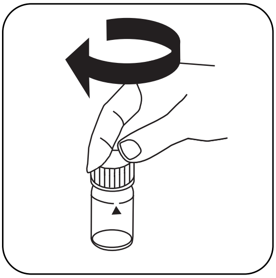
De spoelbakjes afsluiten.



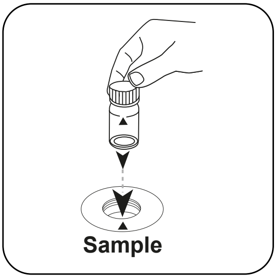
Tabletten oplossen door om te draaien



Een **tweede spoelbakje** met **10 mL staal** vullen.



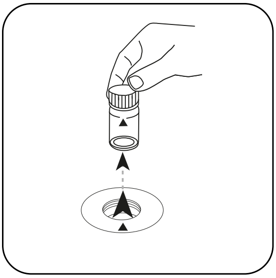
De spoelbakjes afsluiten.



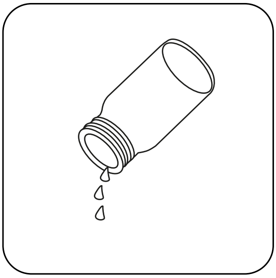
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Zero

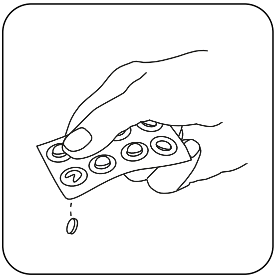
De toets **NUL** indrukken.



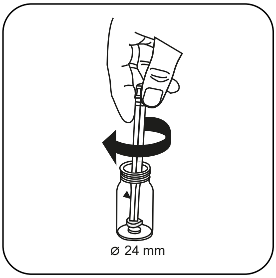
Het spoelbakje uit de meetschacht nemen.



Het spoelbakje ledigen.

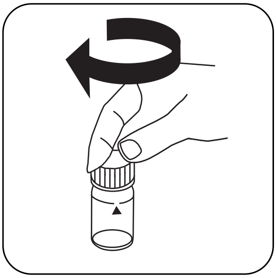


Een DPD Nr. 1 tablet toevoegen.

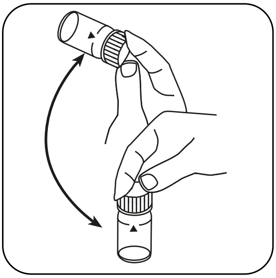


De tabletten onder lichte rotatie verpletteren.

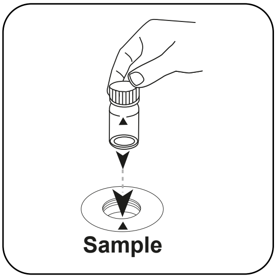
De voorbereide **glycineoplossing** in het voorbereide spoelbakje doen.



De spoelbakjes afsluiten.



Tabletten oplossen door om te draaien



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Test

De toets **TEST** (XD: **START**) indrukken.

De display toont het resultaat in mg/L Chloordioxide.

Evaluatie

De volgende tabel geeft aan dat de uitvoerwaarden kunnen worden geconverteerd naar andere citatievormen.

Eenheid	Dagvaardingsformulier	Omrekeningsfactor
mg/l	ClO_2	1
mg/l	Cl_2 frei	0.525
mg/l	Cl_2 geb.	0.525
mg/l	ges. Cl_2	0.525

Chemische methode

DPD/Glycine

Aanhangsel

Verstoringen

Permanente verstoringen

1. Alle oxidatiemiddelen in de monsters leiden tot meerdere resultaten.

Uit te sluiten verstoringen

1. Concentraties boven de 19 mg/L chloordioxide kan leiden tot resultaten binnen het meetbereik tot 0 mg/L. Verdun in dit geval het watermonster met chloordioxidevrij water. Voeg reagens toe aan 10 ml van het verdunde monster en herhaal de meting.

Afgeleid van

DIN 38408, deel 5

[e] hulpreagens, alternatief voor DPD-nr. 1 / nr. 3 in geval van troebelheid van het monster als gevolg van een hoog calciumionengehalte en/of een hoge geleidbaarheid | [f] hulpreagens, extra nodig voor de bepaling van broom, chloordioxide of ozon in aanwezigheid van chloor | [#] met inbegrip van de mengstaaf

Koper T M150

0.05 - 5 mg/L Cu[a)] Cu

Biquinoline

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
Koper Nr. 1	Tablet / 100	513550BT
Koper Nr. 1	Tablet / 250	513551BT
Koper Nr. 2	Tablet / 100	513560BT
Koper Nr. 2	Tablet / 250	513561BT
Set koper nr. 1/Nr. 2#	per 100	517691BT
Set koper nr. 1/Nr. 2#	per 250	517692BT
ValidCheck koper 2 mg/l	1 St.	48141525

Voorbereiding

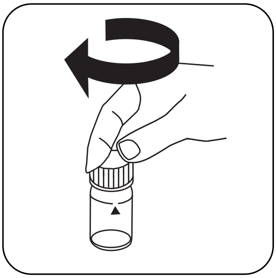
1. Sterk alkalisch of zuur water moet vóór de analyse op een pH-waarde van 4 tot 6 worden ingesteld.

Uitvoering van de bepaling Koper, vrij met tablet

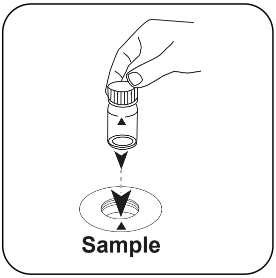
De methode in het apparaat selecteren.

Selecteer bovendien de bepaling: vrij

Spoelbakje van 24 mm met **10 mL staal** vullen.



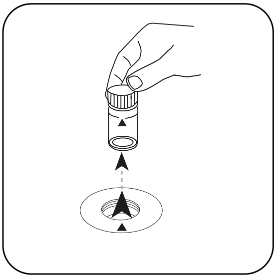
De spoelbakjes afsluiten.



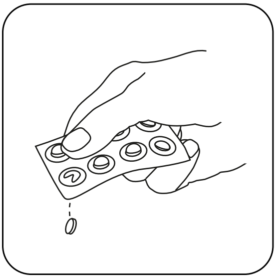
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Zero

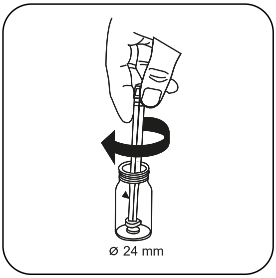
De toets **NUL** indrukken.



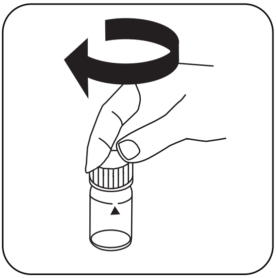
Het spoelbakje uit de meetschacht nemen.



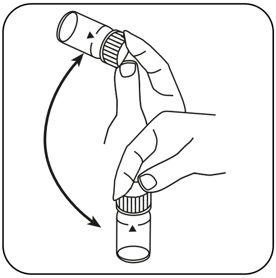
Een COPPER Nr. 1 tablet toevoegen.



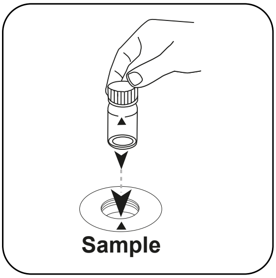
De tabletten onder lichte rotatie verpletteren.



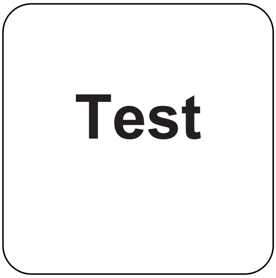
De spoelbakjes afsluiten.



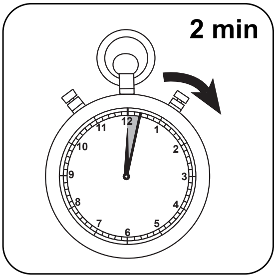
Tabletten oplossen door om te draaien



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



De toets **TEST** (XD: **START**) indrukken.



De reactietijd van 2 minuten afwachten.

Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

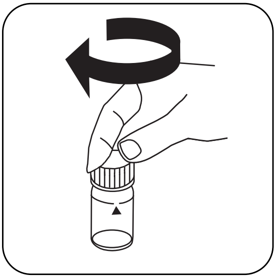
De display toont het resultaat in mg/L vrij koper.

Uitvoering van de bepaling Koper, totaal met tablet

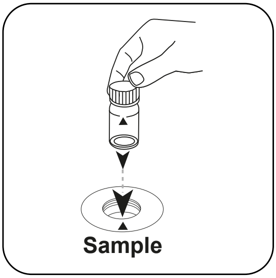
De methode in het apparaat selecteren.

Selecteer bovendien de bepaling: totaal

Spoelbakje van 24 mm met **10 mL staal** vullen.



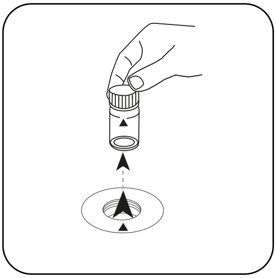
De spoelbakjes afsluiten.



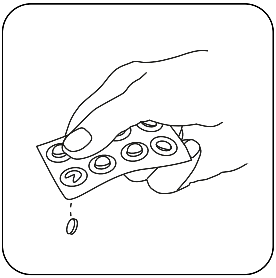
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Zero

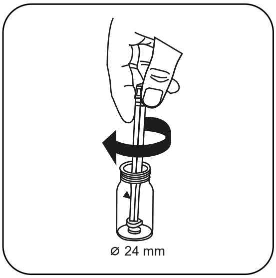
De toets **NUL** indrukken.



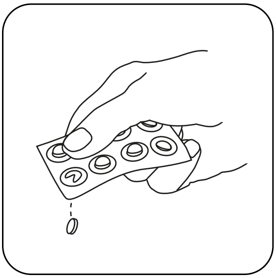
Het spoelbakje uit de meetschacht nemen.



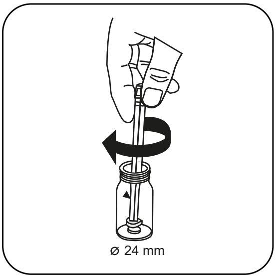
Een COPPER Nr. 1 tablet toevoegen.



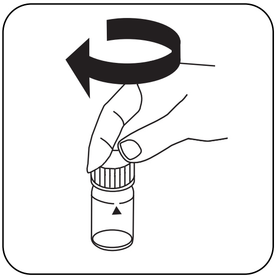
De tabletten onder lichte rotatie verpletteren en oplossen.



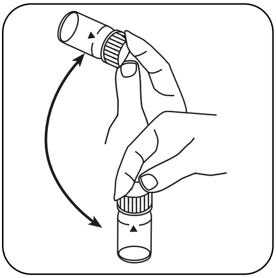
Een COPPER Nr. 2 tablet toevoegen.



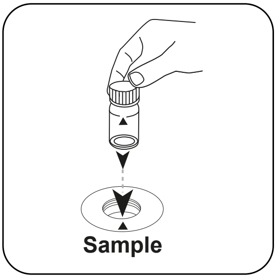
De tabletten onder lichte rotatie verpletteren.



De spoelbakjes afsluiten.



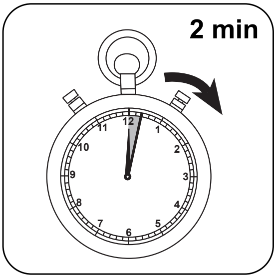
Tabletten oplossen door om te draaien



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Test

De toets **TEST** (XD: **START**) indrukken.



De reactietijd van 2 minuten afwachten.

Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

De display toont het resultaat in mg/L totaal koper.

Chemische methode

Biquinoline

Aanhangsel

Verstoringen

Permanente verstoringen

1. Cyanide CN^- en Zilver Ag^+ beïnvloeden de bepaling.

Validatie van de methodes

Aantoonbaarheidsgrens	0.05 mg/L
Bepaalbaarheidsgrens	0.15 mg/L
Einde meetbereik	5 mg/L
Gevoeligheid	3.8 mg/L / Abs
Betrouwbaarheidsgrenzen	0.026 mg/L
Standaardafwijking procedure	0.011 mg/L
Variatiecoefficient procedure	0.42 %

Literatuurverwijzing

Photometrische Analyse, Lange/Vedjelek, Verlag Chemie 1980

[a)] bepaling van de vrije, gebonden, totaal mogelijke | [#] met inbegrip van de mengstaaf

IJzer in Mo PP M224

0.01 - 1.8 mg/L Fe FEM

TPTZ

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
VARIO Fe in MO reagensset	1 Zin	536010

Bemonstering

1. Voer de bemonstering uit in gereinigde glazen of plastic flessen. Deze hadden moeten worden gereinigd met 6 N (1:1) zoutzuur en vervolgens met gedeïoniseerd water.
2. Om het monster voor latere analyse te bewaren, moet de pH tot minder dan 2 worden verlaagd. Voeg ca. 2 ml geconcentreerde zoutoplossing per liter monster toe. Indien het monster rechtstreeks wordt geanalyseerd, is deze toevoeging niet nodig.
3. Om het opgeloste ijzer te bepalen, moet het monster onmiddellijk na de bemonstering en vóór de aanzuring door een 0,45µm-filter of iets dergelijks worden gefiltreerd.
4. Bewaarde monsters mogen niet langer dan 6 maanden bij kamertemperatuur worden bewaard.
5. Vóór de analyse moet de pH-waarde op een waarde tussen 3 en 5 worden gebracht door toevoeging van 5 N natriumhydroxideoplossing. Een pH-waarde van 5 mag niet worden overschreden, omdat dit tot ijzerneerslag kan leiden.
6. Het resultaat moet worden gecorrigeerd op basis van de volumetoevoegingen.

Voorbereiding

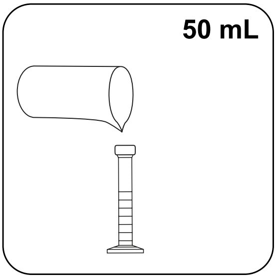
1. Reinig al het glaswerk met afwasmiddel en spoel het vervolgens af met leidingwater. Daarna opnieuw reinigen met zoutzuur (1:1) en gedeïoniseerd water. Deze stappen verwijderen afzettingen die kunnen leiden tot iets hogere resultaten.
2. Als het monster 100 mg/L of meer molybdaten (MoO_4^{2-}) bevat, moet het monster onmiddellijk na de nulmeting worden gemeten.
3. Voor nauwkeurigere resultaten kan voor elke nieuwe batch reagentia een blanco reagenswaarde worden bepaald. Ga hiervoor te werk zoals beschreven, maar gebruik gedeïoniseerd water in plaats van het monster. De ontvangen meetwaarde wordt afgetrokken van de met deze batch bepaalde meetwaarden.

Aantekeningen

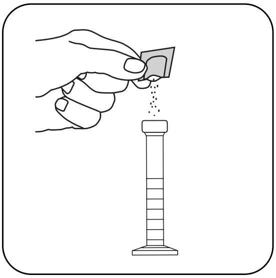
1. Als er ijzer aanwezig is, ontstaat er een blauwe kleur. Een kleine hoeveelheid onopgelost poeder heeft geen effect op het resultaat.

Uitvoering van de bepaling IJzer, totaal (Fe in Mo) in aanwezigheid van molybdaat met Vario-poederpakje

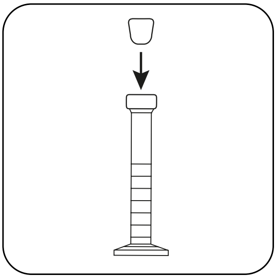
De methode in het apparaat selecteren.



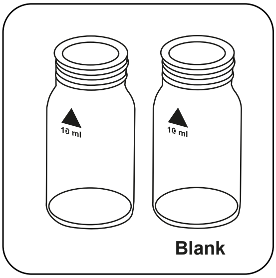
50 mL staal in een mengcilinder van 50 mL doen.



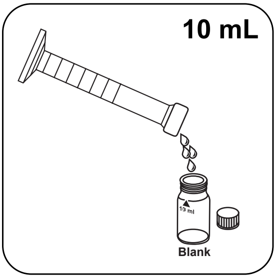
Een **Vario (Fe in Mo) Rgt 1 poederpakje** toevoegen.



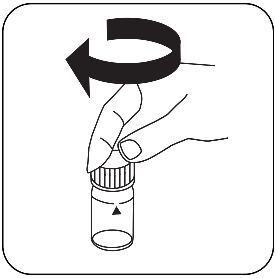
De mengcilinder met een stop afsluiten. Het poeder oplossen door om te draaien.



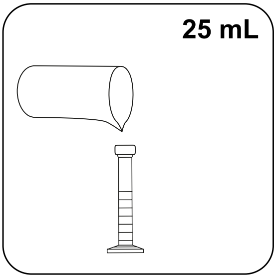
Twee propere spoelbakjes van 24 mm klaarzetten. Een als nulspoelbakje kenmerken.



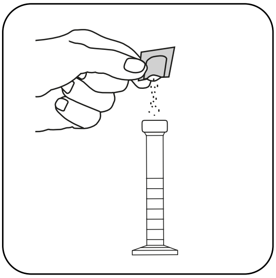
10 mL voorbereid staal in het nulspoelbakje doen.



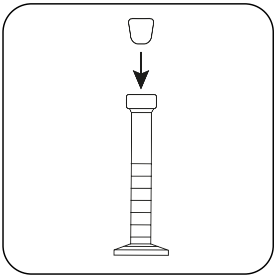
De spoelbakjes afsluiten.



25 mL voorbereid staal in een mengcilinder van 25 mL doen.



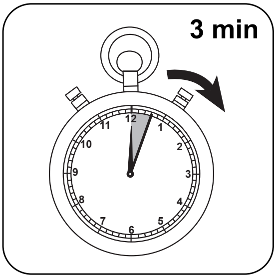
Een **Vario (Fe in Mo) Rgt 2 poederpakje** toevoegen.



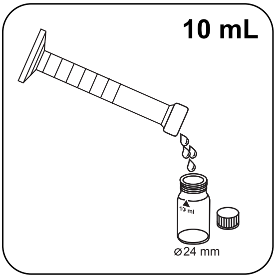
De mengcilinder met een stop afsluiten. Het poeder oplossen door om te draaien.

↵

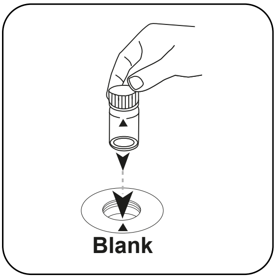
De toets **ENTER** indrukken.



De reactietijd van 3 minuten afwachten.



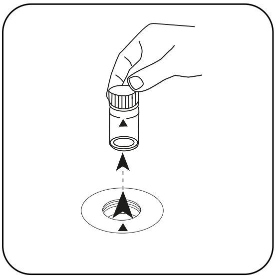
10 mL staal in het staalspoelbakje doen.



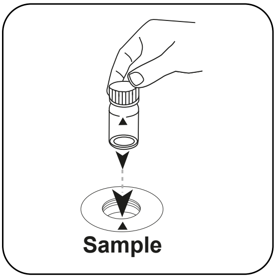
Het **nulspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Zero

De toets **NUL** indrukken.



Het spoelbakje uit de meetschacht nemen.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Test

De toets **TEST** (XD: **START**) indrukken.

De display toont het resultaat in mg/L Fe.

Chemische methode

TPTZ

Aanhangsel

Verstoringen

Uit te sluiten verstoringen

1. pH-waardefout: Een pH van minder dan 3 of meer dan 4 na toevoeging van het reagens kan de kleurvorming belemmeren omdat de resulterende kleur te snel vervaagt of vertroebeling kan optreden. Daarom moet de pH-waarde worden ingesteld op een pH-waarde tussen 3 en 5 in de maatcilinder voordat het reagens wordt toegevoegd:
   Voeg druppelsgewijs een geschikte hoeveelheid ijzervrij zuur of base zoals 1 N zwavelzuur of 1 N natriumhydroxideoplossing toe.
   Een volumecorrectie moet worden uitgevoerd als een significante hoeveelheid zuur of base is toegevoegd.

Literatuurverwijzing

G. Frederic Smith Chemical Co., The Iron Reagents, 3rd ed. (1980)

IJzer LR L (A) M225

0.03 - 2 mg/L Fe FE

Ferrozine / Thioglycolaat

Reagentia

Benodigd materiaal (deels optioneel):

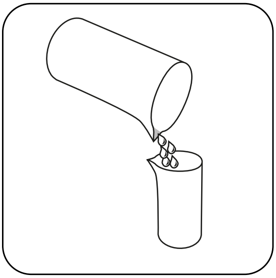
Reagentia	Verpakkingseenheid	Bestelnr.
Zuurgraad / Alkaliteit P-indicator PA1	65 mL	56L013565
Calciumhardheidsbuffer CH2	65 mL	56L014465
KP962-Ammonium persulfaat poeder	Poeder / 40 g	56P096240
KS63-FE6-Thioglycolaat/Molybdaat HR RGT	30 mL	56L006330
KS63-FE6-Thioglycolaat/Molybdaat HR RGT	65 mL	56L006365
KS61-FE5-Ferrozine/Thioglycolaat	65 mL	56L006165

Voorbereiding

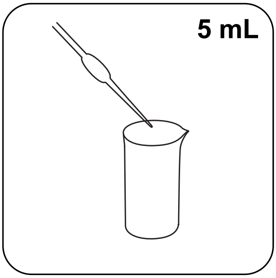
1. Als er sterke complexvormers in het monster aanwezig zijn, moet de reactietijd worden verlengd tot er geen verdere kleurontwikkeling zichtbaar is. Zeer sterke ijzercomplexen worden echter niet gedetecteerd tijdens de meting. In dit geval moeten de complexvormers door oxidatie met zuur/perssulfaat worden vernietigd en moet het monster door neutralisatie op pH 6 - 9 worden gebracht.
2. Om de totale hoeveelheid opgelost en gesuspendeerd ijzer te bepalen, moet het monster worden gekookt met zuur/perssulfaat. Vervolgens neutraliseren tot pH 6 - 9 en met gedeïoniseerd water tot het oorspronkelijke volume bijvullen.

Ontsluiting

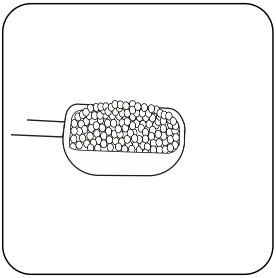
Totaal ijzer bestaat uit oplosbaar, complex en gesuspendeerd ijzer. Het staal mag voor de meting niet worden gefilterd. Om een homogenisering van het staal te garanderen, moeten neergeslagen deeltjes onmiddellijk voor de afname van het staal gelijkmatig worden verdeeld door krachtig te schudden. Voor de bepaling van het totaal oplosbare ijzer (inclusief de complexe ijzerverbindingen) is het noodzakelijk om het staal te filteren. De apparaten en reagentia die nodig zijn voor de bepaling van het totaal ijzer zijn niet in de standaardlevering inbegrepen.



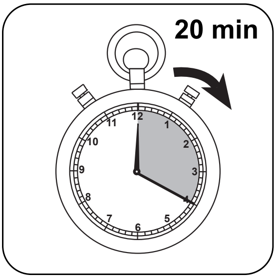
Een geschikte ontsluitingsbeker met **50 mL gehomogeniseerd staal** vullen.



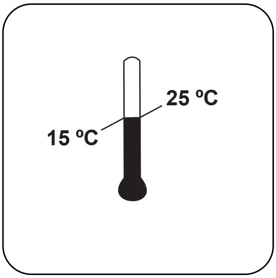
5 mL 1:1 zoutzuur toevoegen.



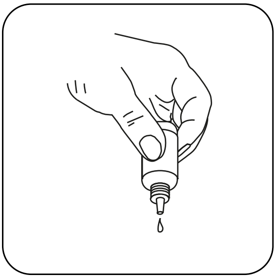
Een maatlepel KP 962 (Ammonium Persulfat Powder) toevoegen.



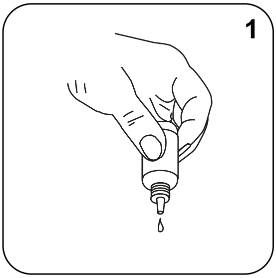
Het staal gedurende **20 minuten koken**. Er moet een staalvolume van 25 mL worden behouden, eventueel met gedeïoniseerd water vullen.



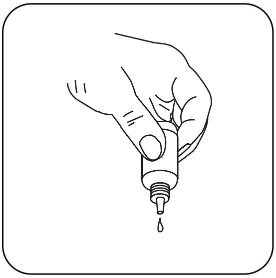
Het staal laten afkoelen tot **kamertemperatuur**.



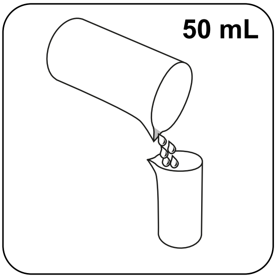
De druppelflessen verticaal houden en even grote druppels toevoegen door langzaam te drukken.



1 druppels KS135 (Phenolphthalein Substitute Indikator) toevoegen.



Hardness Calcium Buffer CH2 druppelgewijs aan hetzelfde staal toevoegen tot een licht roze tot rode kleur ontstaat. **(Opgelet: het staal na elke druppel draaien!)**



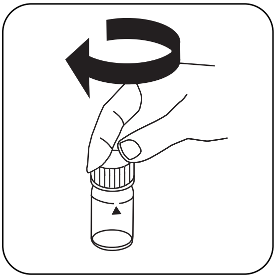
Het staal met **gedeïoniseerd water tot 50 mL** vullen.

Uitvoering van de bepaling IJzer, totaal LR (A) met vloeibaar reagens

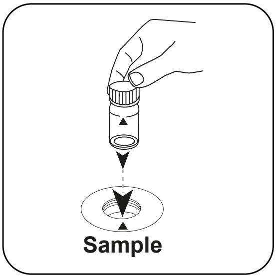
De methode in het apparaat selecteren.

Voor de bepaling van **IJzer, totaal LR** de beschreven **ontsluiting** uitvoeren.

Spoelbakje van 24 mm met **10 mL gedeïoniseerd water** vullen.



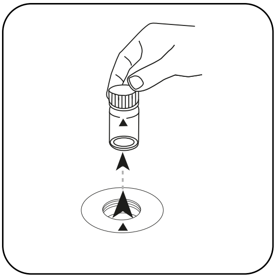
De spoelbakjes afsluiten.



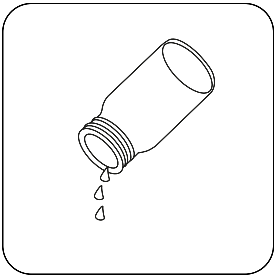
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Zero

De toets **NUL** indrukken.

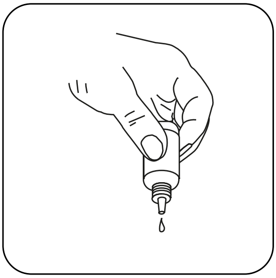


Het spoelbakje uit de meetschacht nemen.

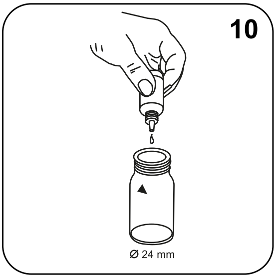


Het spoelbakje ledigen.

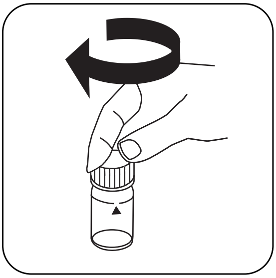
Spoelbakje van 24 mm met **10 mL voorbereid staal** vullen.



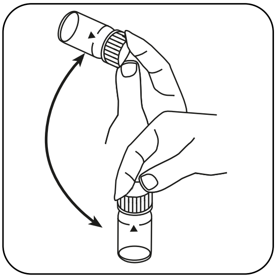
De druppelflessen verticaal houden en even grote druppels toevoegen door langzaam te drukken.



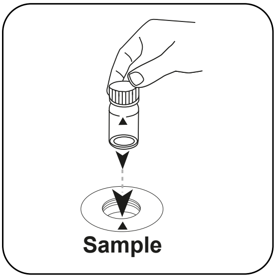
10 druppels KS61 (Ferrozine/ Thioglycolat) toevoegen.



De spoelbakjes afsluiten.



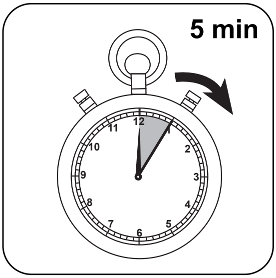
De inhoud mengen door om te draaien.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Test

De toets **TEST** (XD: **START**) indrukken.



De reactietijd van 5 minuten afwachten.

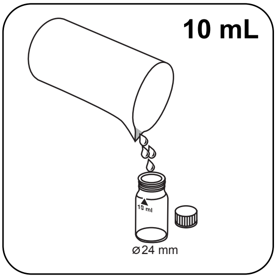
Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

De display toont het resultaat in mg/L Totaal ijzer of, bij gebruik van een gefilterd staal, in mg/l totaal oplosbaar ijzer.

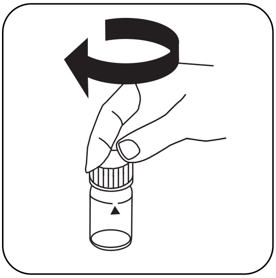
Uitvoering van de bepaling IJzer LR (A) met vloeibaar reagens

De methode in het apparaat selecteren.

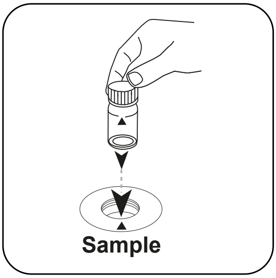
Voor een bepaling van het totaal opgeloste ijzer moet het staal voor de bepaling worden gefilterd (poriegrootte 0,45 µm). Anders worden ijzerdeeltjes en gesuspendeerd ijzer mee bepaald.



Spoelbakje van 24 mm met **10 mL voorbereid staal** vullen.



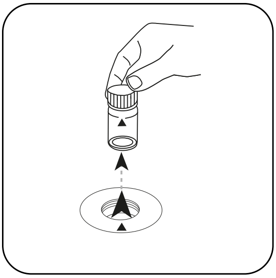
De spoelbakjes afsluiten.



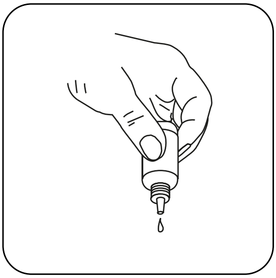
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Zero

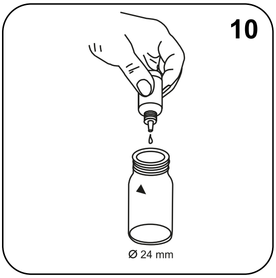
De toets **NUL** indrukken.



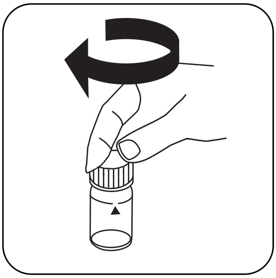
Het spoelbakje uit de meetschacht nemen.



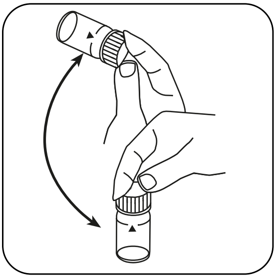
De druppelflessen verticaal houden en even grote druppels toevoegen door langzaam te drukken.



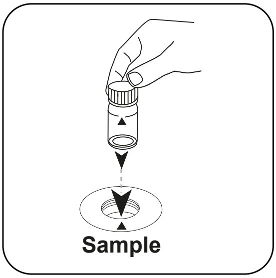
10 druppels KS61 (Ferrozine/ Thioglycolat) toevoegen.



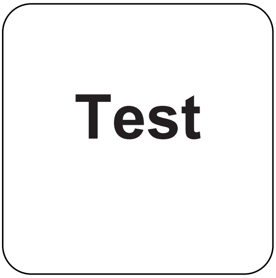
De spoelbakjes afsluiten.



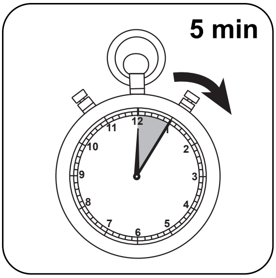
De inhoud mengen door om te draaien.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



De toets **TEST** (XD: **START**) indrukken.



De reactietijd van
5 minuten afwachten.

Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

De display toont het resultaat in mg/L IJzer.

Chemische methode

Ferrozine / Thioglycolaat

Aanhangsel

Verstoringen

Uit te sluiten verstoringen

1. Een hoge concentratie molybdaat veroorzaakt bij gebruik van KS61 (Ferrozine/Thioglycolaat) een intens gele kleur. In dit geval is een lege chemische waarde vereist:

- Zorg voor twee schone **24 mm-spoelbakjes**.
- Markeer één spoelbakje als een nulspoelbakje.
- Giet **10 ml van het monster** in een schoon 24 mm-spoelbakje (nulspoelbakje).
- Voeg **10 druppels KS63 (thioglycolaat)** toe aan de flacon.
- Sluit het spoelbakje goed af met de dop en draai het spoelbakje rond tot de inhoud volledig is opgelost.
- Plaats het nulspoelbakje in de meetschacht. Op de positionering letten.
- Druk op de toets **ZERO** .
- Verwijder het spoelbakje van de meetschacht.
- Voeg in een tweede schoon spoelbakje van 24 mm 10 ml van het monster (monsterspoelbakje).
- Voeg **10 druppels KS61 (Ferrozine/Thioglycolaat)** toe en ga verder zoals beschreven in de procedure.

Verstoringen	verstoort vanaf
Co	8
Cu	2
Oxalat	500
CN^-	10
NO_2^-	

Literatuurverwijzing

D. F. Boltz and J. A. Howell, eds., Colorimetric Determination of Nonmetals, 2nd ed., Vol. 8, p. 304 (1978). Carpenter, J.F. "A New Field Method for Determining the Levels of Iron Contamination in Oilfield Completion Brine", SPE International Symposium (2004)

Molybdaat LR PP M251

0.03 - 3 mg/L Mo Mo1

Ternair Complex

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
VARIO molybdeen LR, set	1 St.	535450

De volgende toebehoren zijn eveneens vereist.

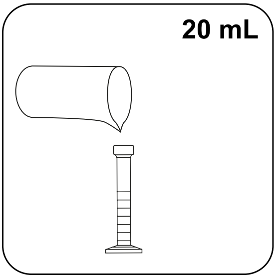
Toebehoren	Verpakkingseenheid	Bestelnr.
Mengcilinder met stop noodzakelijk voor het bepalen van molybdeen LR met MD 100 (276140)	1 St.	19802650

Voorbereiding

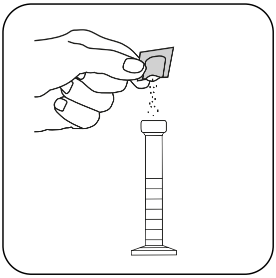
1. Sterk alkalisch of zuur water moet vóór de analyse in een pH-gebied tussen 3 en 5 (met 0,5 mol/l zwavelzuur of 1 mol/l-natriumhydroxideoplossing) worden gebracht.
2. Om fouten als gevolg van afzettingen te voorkomen, spoelt u het laboratoriumglas voor de analyse met zoutzuuroplossing (ca. 20% ig) en vervolgens met gedeïoniseerd water.

Uitvoering van de bepaling Molybdaat LR met Vario-poederpakje

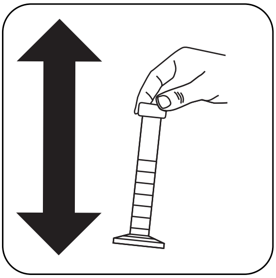
De methode in het apparaat selecteren.



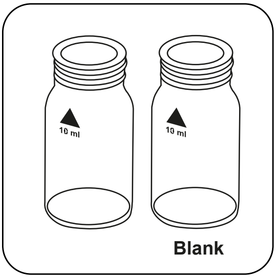
20 mL staal in een mengcilinder van 25 mL doen.



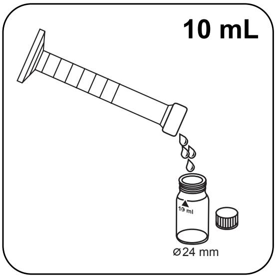
Een **Vario Molybdenum 1 LR F20 poederpakje** toevoegen.



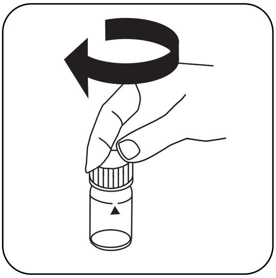
De mengcilinder met een stop afsluiten. Het poeder oplossen door te schudden.



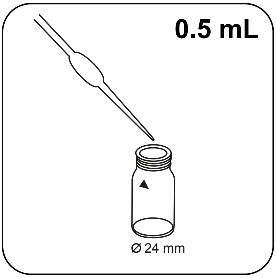
Twee propere spoelbakjes van 24 mm klaarzetten. Een als nulspoelbakje kenmerken.



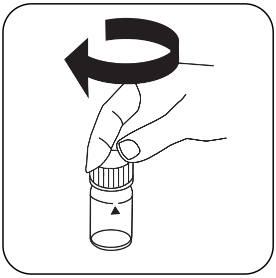
In elk spoelbakje **10 mL staal** doen.



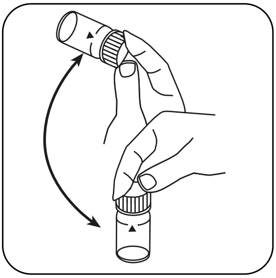
Het **nulspoelbakje** vast afsluiten.



0.5 mL Molybdenum 2 LR oplossing in het staalspoelbakje doen.



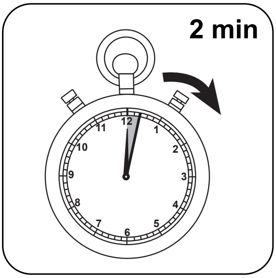
De spoelbakjes afsluiten.



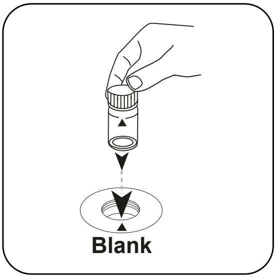
De inhoud mengen door om te draaien.

↵

De toets **ENTER** indrukken.



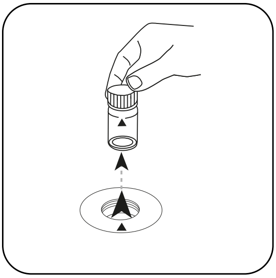
De reactietijd van 2 minuten afwachten.



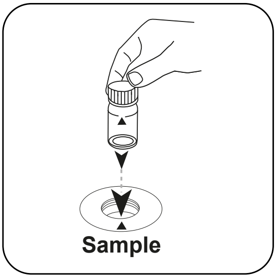
Het **nulspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Zero

De toets **NUL** indrukken.



Het spoelbakje uit de meetschacht nemen.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Test

De toets **TEST** (XD: **START**) indrukken.

De display toont het resultaat in mg/L Molybdaat/Molybdeen.

Evaluatie

De volgende tabel geeft aan dat de uitvoerwaarden kunnen worden geconverteerd naar andere citatievormen.

Eenheid	Dagvaardingsformulier	Omrekeningsfactor
mg/l	MoO_4	1
mg/l	Mo	0.6
mg/l	Na_2MoO_4	1.29

Chemische methode

Ternair Complex

Aanhangsel

Verstoringen

Verstoringen	verstoort vanaf	Invloed
Al	50	
Cr	1000	
Fe	50	
Ni	50	
NO_2^-	in alle hoeveelheden	
Cu	10	Resulteert in hogere meetwaarden met een reactietijd van meer dan 5 minuten

Literatuurverwijzing

Analytische scheikunde, 25(9) 1363 (1953)

Molybdaat HR L M254

1 - 100 mg/L MoO_4 Mo2

Thioglycoleren

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
KS63-FE6-Thioglycolaat/Molybdaat HR RGT	65 mL	56L006365

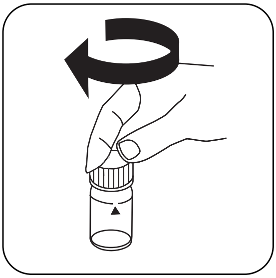
Bemonstering

1. De test moet onmiddellijk na de bemonstering worden uitgevoerd. Molybdaat wordt op de wanden van het bemonsteringsvat gedeponeerd, wat resulteert in lagere meetresultaten.

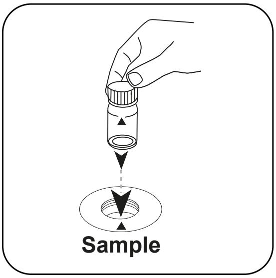
Uitvoering van de bepaling Molybdaat HR met vloeibaar reagens

De methode in het apparaat selecteren.

Spoelbakje van 24 mm met **10 mL staal** vullen.



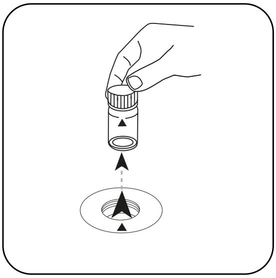
De spoelbakjes afsluiten.



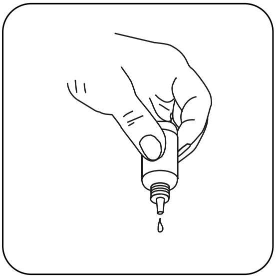
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Zero

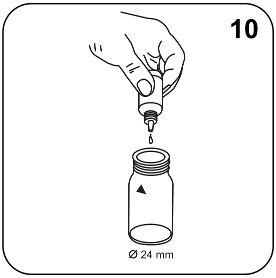
De toets **NUL** indrukken.



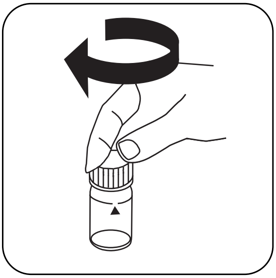
Het spoelbakje uit de meetschacht nemen.



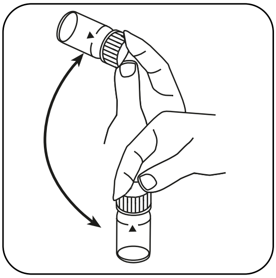
De druppelflessen verticaal houden en even grote druppels toevoegen door langzaam te drukken.



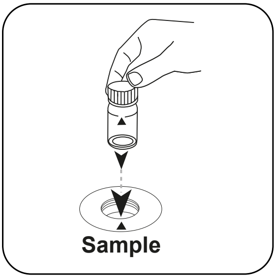
10 druppels KS63 (Thyoglycolate) toevoegen.



De spoelbakjes afsluiten.



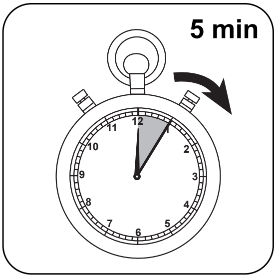
De inhoud mengen door om te draaien.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Test

De toets **TEST** (XD: **START**) indrukken.



De reactietijd van 5 minuten afwachten.

Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

De display toont het resultaat in mg/L Molybdaat/Molybdeen.

Evaluatie

De volgende tabel geeft aan dat de uitvoerwaarden kunnen worden geconverteerd naar andere citatievormen.

Eenheid	Dagvaardingsformulier	Omrekeningsfactor
mg/l	MoO_4	1
mg/l	Mo	0.6
mg/l	Na_2MoO_4	1.29

Chemische methode

Thioglycoleren

Aanhangsel

Verstoringen

Uit te sluiten verstoringen

1. De verstoring van niobium, tantaal, titanium en zirkonium wordt gemaskeerd met citroenzuur.
2. De verstoring van vanadium(V) wordt gemaskeerd met kaliumfluoride.

Literatuurverwijzing

Fotometrische analyse, Lange/ Vjedelek, Chemie-uitgeverij 1980

Ozon T

M300

0.02 - 2 mg/L O_3

O3

DPD/Glycine

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
DPD Nr.1	Tablet / 100	511050BT
DPD Nr. 1	Tablet / 250	511051BT
DPD Nr. 1	Tablet / 500	511052BT
DPD Nr. 3	Tablet / 100	511080BT
DPD Nr. 3	Tablet / 250	511081BT
DPD Nr. 3	Tablet / 500	511082BT
DPD Nr. 1 hoog calcium e)	Tablet / 100	515740BT
DPD Nr. 1 hoog calcium e)	Tablet / 250	515741BT
DPD Nr. 1 hoog calcium e)	Tablet / 500	515742BT
DPD Nr. 3 hoog calcium e)	Tablet / 100	515730BT
DPD Nr. 3 hoog calcium e)	Tablet / 250	515731BT
DPD Nr. 3 hoog calcium e)	Tablet / 500	515732BT
Glycine f)	Tablet / 100	512170BT
Glycine f)	Tablet / 250	512171BT
Set DPD nr. 1/Nr. 3#	per 100	517711BT
Set DPD nr. 1/Nr. 3#	per 250	517712BT
Set DPD nr. 1/Nr. 3 hoog calcium#	per 100	517781BT
Set DPD nr. 1/Nr. 3 hoog calcium#	per 250	517782BT
Set DPD nr. 1/glycine #	per 100	517731BT
Set DPD nr. 1/glycine #	per 250	517732BT

Voorbereiding

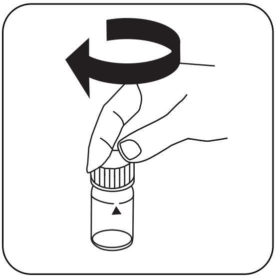
1. Het schoonmaken van de spoelbakjes:
   Aangezien veel huishoudelijke reinigingsmiddelen (bijv. afwasmiddelen) reducerende stoffen bevatten, kan de latere bepaling van oxidatiemiddelen (bijv. ozon, chloor) tot verminderde resultaten leiden. Om deze meetfout uit te sluiten, moeten de glasapparaten chloorvrij zijn. Hiertoe wordt het glaswerk gedurende één uur onder natriumhypochlorietoplossing (0,1 g/L) bewaard en vervolgens grondig gespoeld met gedeïoniseerd water.
2. Tijdens de monstervoorbereiding moet worden vermeden dat er ozon wordt uitgestoten, bijvoorbeeld door pipetteren en schudden. De analyse moet onmiddellijk na de bemonstering worden uitgevoerd.
3. Sterk alkalisch of zuur water moet vóór de analyse in een pH-gebied tussen 6 en 7 (met 0,5 mol/l zwavelzuur of 1 mol/l-natriumhydroxideoplossing) worden gebracht.

Uitvoering van de bepaling Ozon, naast chloor met tablet

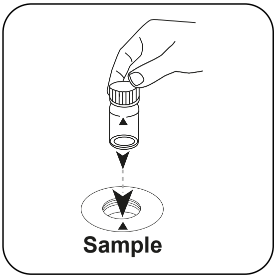
De methode in het apparaat selecteren.

Selecteer bovendien de bepaling: naast chloor

Spoelbakje van 24 mm met **10 mL staal** vullen.



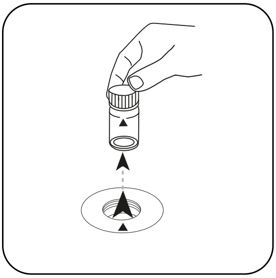
De spoelbakjes afsluiten.



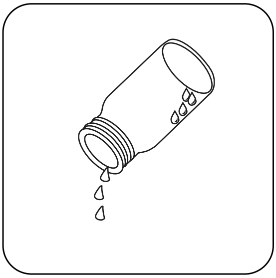
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Zero

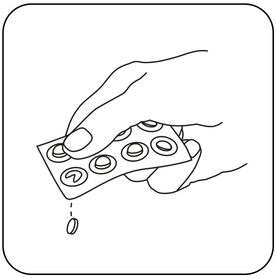
De toets **NUL** indrukken.



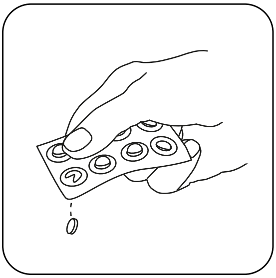
Het spoelbakje uit de meetschacht nemen.



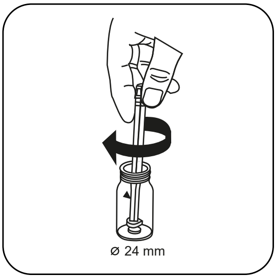
Het spoelbakje tot op enkele druppels ledigen.



Een DPD Nr. 1 tablet toevoegen.

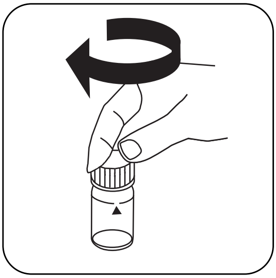


Een DPD Nr. 3 tablet toevoegen.

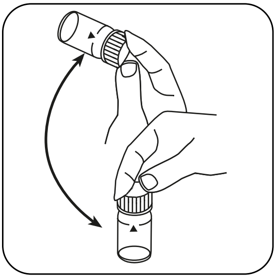


De tabletten onder lichte rotatie verpletteren.

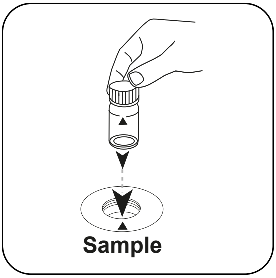
Het spoelbakje tot aan de **markering van 10 mL** met het **staal** vullen.



De spoelbakjes afsluiten.



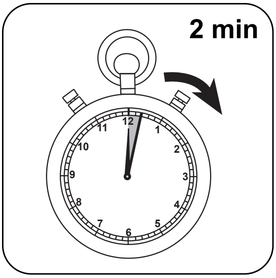
Tabletten oplossen door om te draaien



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

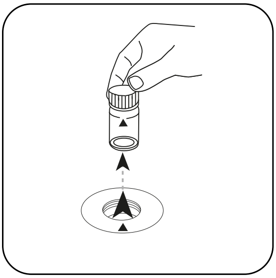
Test

De toets **TEST** (XD: **START**) indrukken.

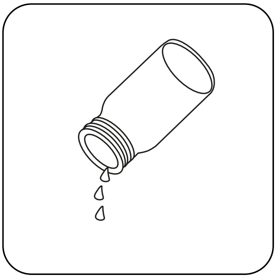


De reactietijd van 2 minuten afwachten.

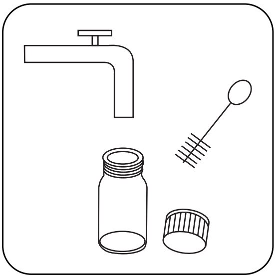
Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.



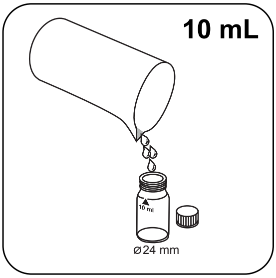
Het spoelbakje uit de meetschacht nemen.



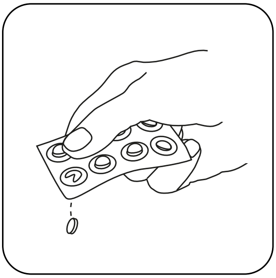
Het spoelbakje ledigen.



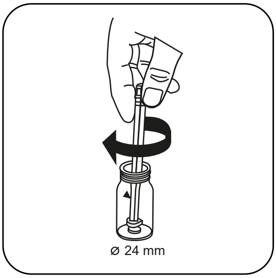
Het spoelbakje en het deksel van het spoelbakje grondig reinigen.



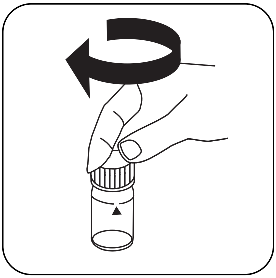
Een **tweede spoelbakje** met **10 mL staal** vullen.



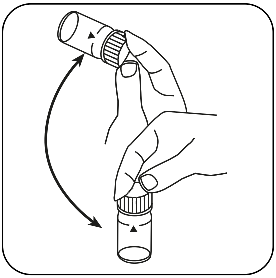
Een GLYCINE tablet toevoegen.



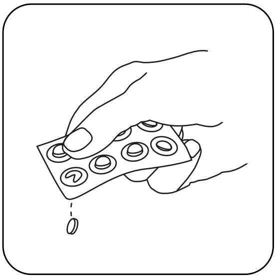
De tabletten onder lichte rotatie verpletteren.



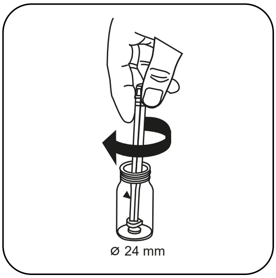
De spoelbakjes afsluiten.



Tabletten oplossen door om te draaien

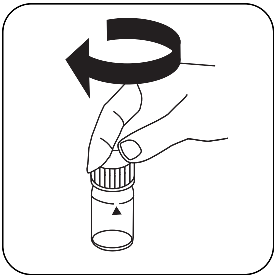


Een DPD Nr. 1 tablet en **een DPD Nr. 3 tablet** rechtstreeks uit de folie in het eerste spoelbakje doen.

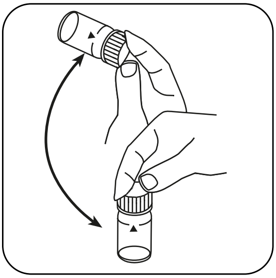


De tabletten onder lichte rotatie verpletteren.

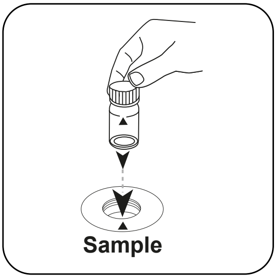
De voorbereide **glycineoplossing** in het voorbereide spoelbakje doen.



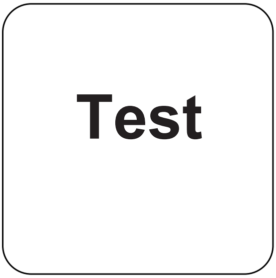
De spoelbakjes afsluiten.



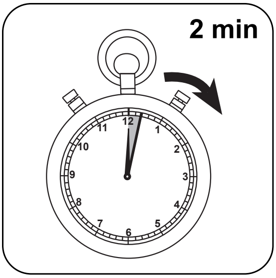
Tabletten oplossen door om te draaien



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



De toets **TEST** (XD: **START**) indrukken.



De reactietijd van
2 minuten afwachten.

Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

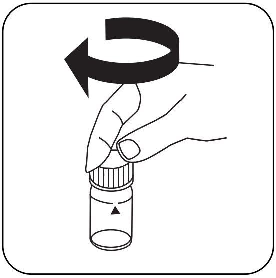
De display toont het resultaat in mg/L Ozon; mg/l totaal chloor.

Uitvoering van de bepaling Ozon, in afwezigheid van chloor met tablet

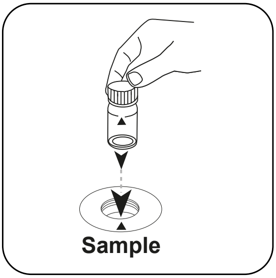
De methode in het apparaat selecteren.

Selecteer bovendien de bepaling: zonder chloor

Spoelbakje van 24 mm met **10 mL staal** vullen.



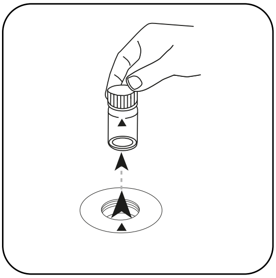
De spoelbakjes afsluiten.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

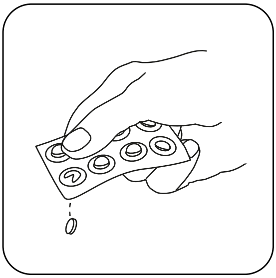
Zero

De toets **NUL** indrukken.

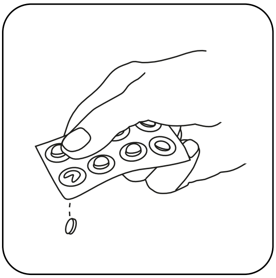


Het spoelbakje uit de meetschacht nemen.

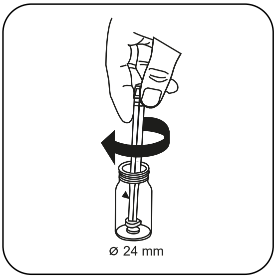
Het spoelbakje tot op enkele druppels ledigen.



Een DPD Nr. 1 tablet toevoegen.

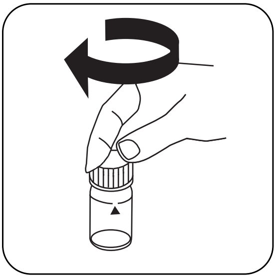


Een DPD Nr. 3 tablet toevoegen.

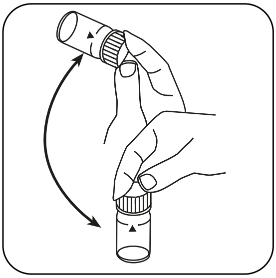


De tabletten onder lichte rotatie verpletteren.

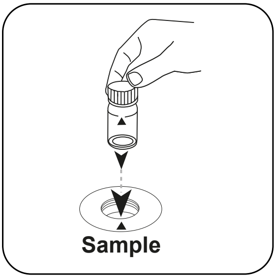
Het spoelbakje tot aan de **markering van 10 mL** met het **staal** vullen.



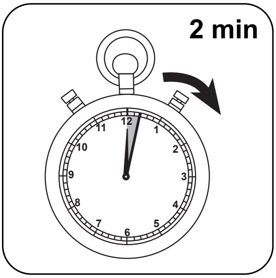
De spoelbakjes afsluiten.



Tabletten oplossen door om te draaien



Test



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

De toets **TEST** (XD: **START**) indrukken.

De reactietijd van 2 minuten afwachten.

Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

De display toont het resultaat in mg/L Ozon.

Evaluatie

De volgende tabel geeft aan dat de uitvoerwaarden kunnen worden geconverteerd naar andere citatievormen.

Eenheid	Dagvaardingsformulier	Omrekeningsfactor
mg/l	O_3	1
mg/l	Cl_2	1.4771

Chemische methode

DPD/Glycine

Aanhangsel

Verstoringen

Permanente verstoringen

1. Alle oxidatiemiddelen in de monsters reageren als chloor, wat tot extra resultaten leidt.
2. Concentraties boven de 6 mg/L ozon kunnen leiden tot resultaten binnen het meetbereik tot 0 mg/L. In dit geval moet het watermonster worden verdund. Voeg reagens toe aan 10 ml van het verdunde monster en herhaal de meting (plausibiliteitstest).

Literatuurverwijzing

Colorimetric Chemical Analytical Methods, 9th Edition, Lovibond

Afgeleid van

DIN 38408-3:2011-04

[e)] hulpreagens, alternatief voor DPD-nr. 1 / nr. 3 in geval van troebelheid van het monster als gevolg van een hoog calciumionengehalte en/of een hoge geleidbaarheid | [f)] hulpreagens, extra nodig voor de bepaling van broom, chloordioxide of ozon in aanwezigheid van chloor | [#] met inbegrip van de mengstaaf

Polyacrylaten L M338

1 - 30 mg/L Polyacryl POLY

Trübung

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
Patroon C18	1 St.	56A020101
KS173-P2-2,4 Dinitrophenol Indicator	65 mL	56L017365
KS183-QA2-QA2-MO1-P3-Salpeterzuur	65 mL	56L018365
Polyacrylate L Reagent Set	1 St.	56R019165
KS336-Propan-2-ol, 65 mL	65 mL	56L033665

De volgende toebehoren zijn eveneens vereist.

Toebehoren	Verpakkingseenheid	Bestelnr.
Pipette, 1000 µl	1 St.	365045
Pipettips, 0,1-1 ml (blauw), 1000 stuks	1 St.	419073

Voorbereiding

- **Voorbereiding van de patroon:**

1. Verwijder de zuiger van een geschikte spuit. Bevestig de C18-patroon aan de spuitcilinder.
2. Voeg 5 ml KS336 (propaan-2-ol) toe aan de spuitcilinder.
3. Gebruik de zuiger om het oplosmiddel druppel voor druppel door de patroon te duwen.
4. Verwijder het doorgestroomde oplosmiddel.
5. Verwijder de zuiger weer. Vul de spuitcilinder met 20 ml gedeïoniseerd water.
6. Gebruik de zuiger om de inhoud druppelsgewijs door de patroon te duwen.
7. Gooi het gedeïoniseerde water dat erdoorheen is gestroomd weg.
8. De patroon is nu klaar voor gebruik.

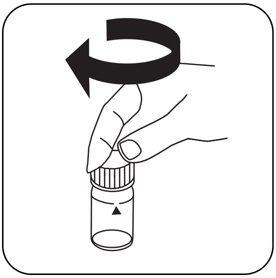
Aantekeningen

1. Indien ondanks een correcte dosering van de monsters en reagentia geen of slechts geringe troebelheid optreedt, moet het monster worden geconcentreerd om de polyacrylaten/polymeren op te sporen.
2. Afwijkende resultaten kunnen optreden als er storingen door monstercomponenten of onzuiverheden aanwezig zijn. In deze gevallen moeten de storingen worden verholpen.
3. De methode werd geregistreerd met behulp van polyacrylzuur 2100 natriumzout in het bereik van 1-30 mg/L. Andere polyacrylaten/polymeren geven afwijkende resultaten, zodat het meetbereik kan variëren.

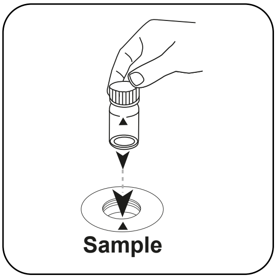
Uitvoering van de bepaling Polyacrylaat met vloeibaar reagens

De methode in het apparaat selecteren.

Spoelbakje van 24 mm met **10 mL staal** vullen.



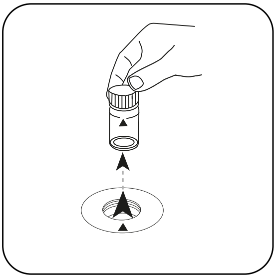
De spoelbakjes afsluiten.



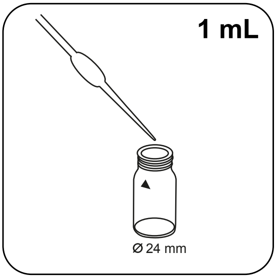
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Zero

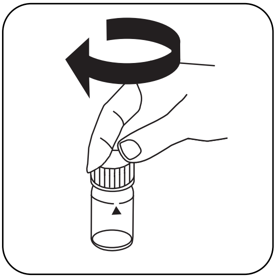
De toets **NUL** indrukken.



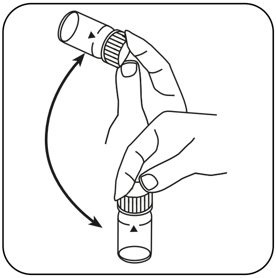
Het spoelbakje uit de meetschacht nemen.



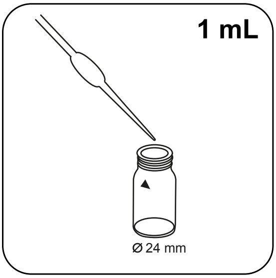
1 mL (25 druppels) KS255 (polyacrylaat reagens 1) oplossing in het staalspoelbakje doen.



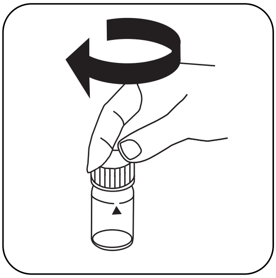
De spoelbakjes afsluiten.



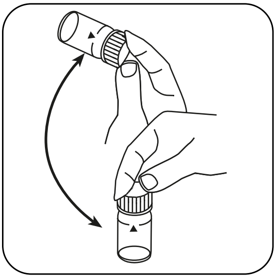
De inhoud mengen door om te draaien.



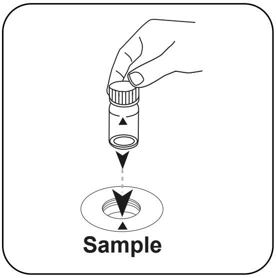
1 mL (25 druppels) Polyacrylate Precipitant A2 oplossing in het staalspoelbakje doen.



De spoelbakjes afsluiten.



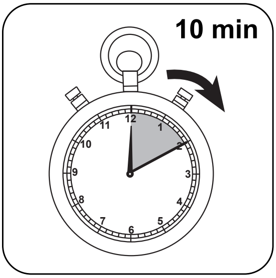
De inhoud mengen door om te draaien.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Test

De toets **TEST** (XD: **START**) indrukken.



De reactietijd van 10 minuten afwachten.

Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

De display toont het resultaat in mg/L Polyacrylzuur 2100 natriumzout.

Chemische methode

Trübung

Aanhangsel

Literatuurverwijzing

W.B. Crummett, R.A. Hummel (1963), The Determination of Polyacrylamides in Water, American Water Works Association, 55 (2), blz. 209-219

Sulfaat PP M360

5 - 100 mg/L SO_4^{2-} SO4

Bariumsulfaattroebelheid

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
VARIO Sulfa 4 F10	Poeder / 100 St.	532160
ValidCheck Sulfaat 75 mg/l	1 St.	48311325

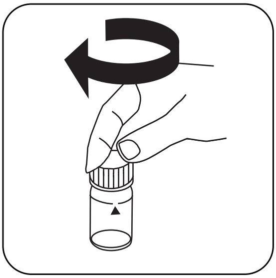
Aantekeningen

1. Sulfaat veroorzaakt fijn verdeelde troebelheid.

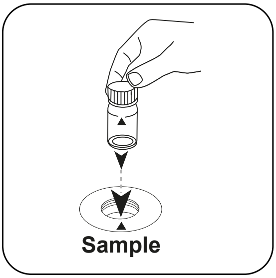
Uitvoering van de bepaling Sulfaat met Vario-poederpakje

De methode in het apparaat selecteren.

Spoelbakje van 24 mm met **10 mL staal** vullen.



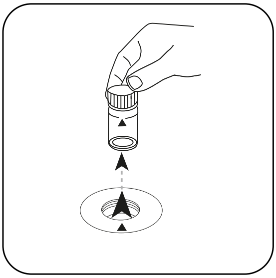
De spoelbakjes afsluiten.



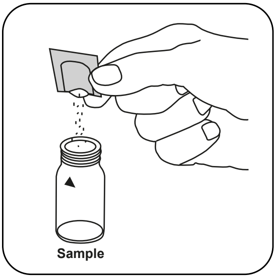
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Zero

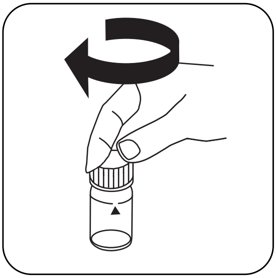
De toets **NUL** indrukken.



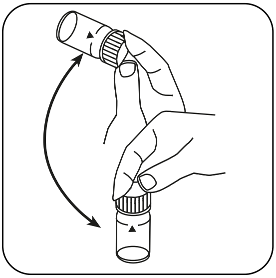
Het spoelbakje uit de meetschacht nemen.



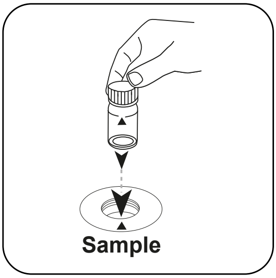
Een **Vario Sulpha 4/ F10 poederpakje** toevoegen.



De spoelbakjes afsluiten.



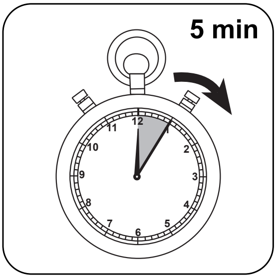
De inhoud mengen door om te draaien.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Test

De toets **TEST** (XD: **START**) indrukken.



De reactietijd van 5 minuten afwachten.

Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

De display toont het resultaat in mg/L Sulfaat.

Chemische methode

Bariumsulfaattroebelheid

Aanhangsel

Overeenkomstig

Standaardmethode 4500-SO42- E
US EPA 375.4

Afgeleid van

DIN ISO 15923-1 D49.

Triazool PP M388

1 - 16 mg/L Benzotriazole or Tolyltriazole tri

Gekatalyseerde UV-ontsluiting

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
VARIO Triazool RGT Powder Pack F25	Poeder / 100 St.	532200
VARIO Rochelle zoutoplossing, 30 ml $^{h)}$	30 mL	530640

De volgende toebehoren zijn eveneens vereist.

Toebehoren	Verpakkingseenheid	Bestelnr.
UV-pennenlamp, 254 nm	1 St.	400740
UV-beschermingsbril, oranje	1 St.	400755

Gevarenwaarschuwingen

Zolang de UV-lamp wordt gebruikt, moet een UV-veiligheidsbril worden gedragen.

Bemonstering

1. Meet het watermonster zo spoedig mogelijk na de bemonstering.

Voorbereiding

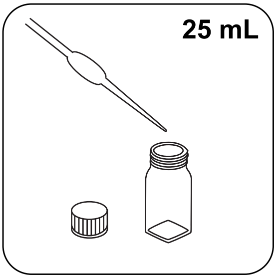
1. Om nauwkeurige analyseresultaten te bekomen, moet een monstertemperatuur van 20 tot 25 °C worden aangehouden.
2. Water dat nitriet of borax bevat, moet vóór de analyse in een pH-gebied tussen 4 en 6 worden gebracht (met 1N zwavelzuur).
3. Als het monster meer dan 500 mg/L $CaCO_3$-hardheid bevat, worden 10 druppels Rochelle-zoutoplossing toegevoegd.

Aantekeningen

1. Triazole Reagent poederverpakkingen en UV-lamp beschikbaar op vraag.
2. Volg de instructies van de fabrikant voor het gebruik van de UV-lamp. Raak het oppervlak van de UV-lamp niet aan. Vingerafdrukken etsen het glas. Veeg de UV-lamp tussen de metingen door af met een zachte, schone doek.
3. De test maakt geen onderscheid tussen tolyltriazolen en benzotriazolen.

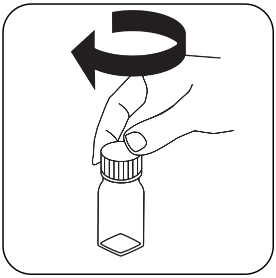
Uitvoering van de bepaling Benzotriazool/Tolyltriazool met Vario-poederpakje

De methode in het apparaat selecteren.

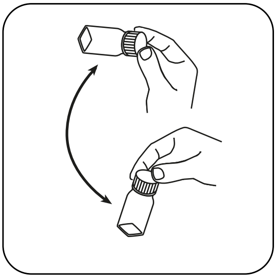


De ontsluitingsbeker met **25 mL** staal vullen.

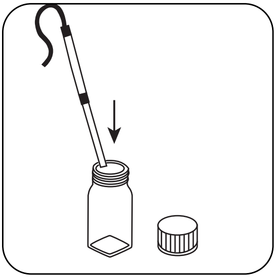
Een **poederpakje** toevoegen.



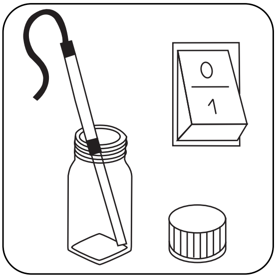
De ontsluitingsbeker afsluiten.



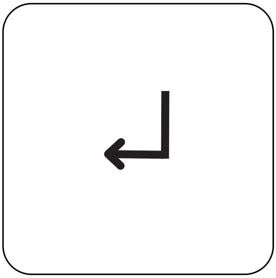
Het poeder oplossen door om te draaien.



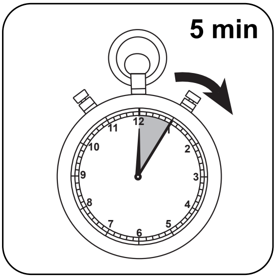
De UV-lamp in het staal houden. **Opgelet: UV-veiligheidsbril dragen!**



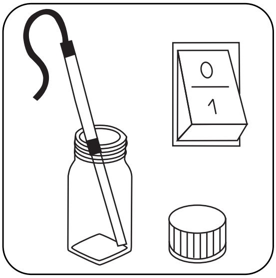
De UV-lamp inschakelen.



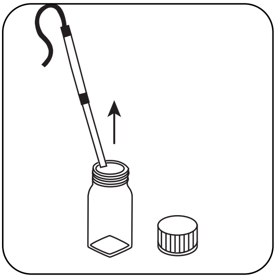
De toets **ENTER** indrukken.



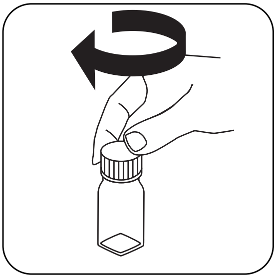
De reactietijd van 5 minuten afwachten.



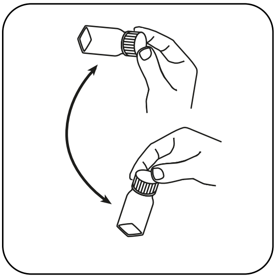
De UV-lamp uitschakelen wanneer de countdown is beëindigd.



De UV-lamp uit het staal nemen.

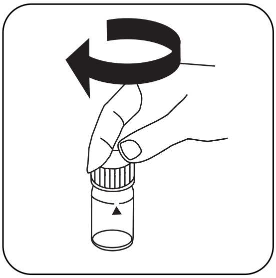


De ontsluitingsbeker afsluiten.

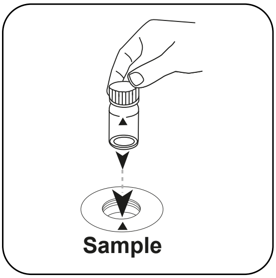


De inhoud mengen door om te draaien.

Spoelbakje van 24 mm met **10 mL gedeïoniseerd water** vullen.



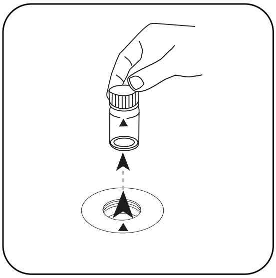
De spoelbakjes afsluiten.



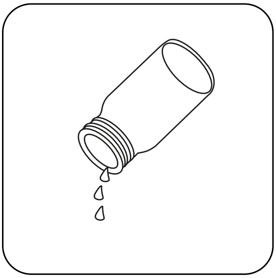
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Zero

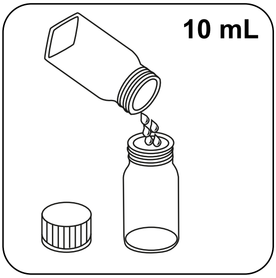
De toets **NUL** indrukken.



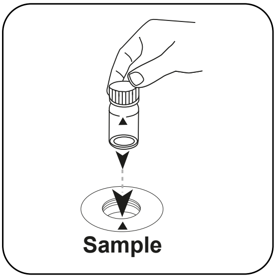
Het spoelbakje uit de meetschacht nemen.



Het spoelbakje ledigen.



Spoelbakje van 24 mm met **10 mL voorbereid staal** vullen.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Test

De toets **TEST** (XD: **START**) indrukken.

De display toont het resultaat in mg/L Benzotriazool of Tolyltriazool (Schakel tussen citatievormen door op de pijl omhoog/omlaag te drukken.).

Evaluatie

De volgende tabel geeft aan dat de uitvoerwaarden kunnen worden geconverteerd naar andere citatievormen.

Eenheid	Dagvaardingsformulier	Omrekeningsfactor
mg/l	Benzotriazole	1
mg/l	Tolyltriazole	1.1177

Chemische methode

Gekatalyseerde UV-ontsluiting

Aanhangsel

Verstoringen

Permanente verstoringen

- Als de fotolyse langer of korter dan 5 minuten wordt uitgevoerd, kan dit leiden tot verminderde resultaten.

Literatuurverwijzing

Harp, D., Proceedings 45th International Water Conference, 299 (October 22-24, 1984)

[h)] hulpreagens, extra gebruikt voor monsters met een hardheid van meer dan 300 mg/l $CaCO_3$

Zink L M405

0.1 - 2.5 mg/L Zn Zn

Zinkoon / EDTA

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
KS 89 - Cationic Suppressor	65 mL	56L008965
Zinc LR Reagent Set	1 St.	56R023965
Zinkbuffer Z1B	65 mL	56L024365
KP244-Zink reagens 2	Poeder / 20 g	56P024420

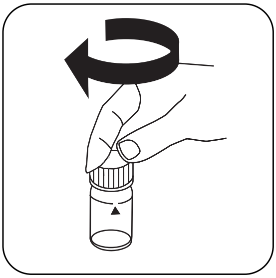
Aantekeningen

1. De bij de reagentia geleverde maatlepel moet worden gebruikt voor de juiste dosering.
2. Deze test is geschikt voor de bepaling van vrij, oplosbaar zink. Zink gebonden aan sterke complexvormers wordt niet gedetecteerd.

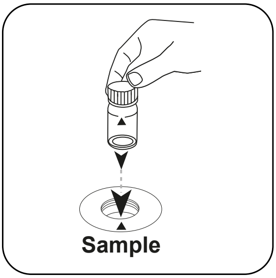
Uitvoering van de bepaling Zink met vloeibaar reagens en poeder

De methode in het apparaat selecteren.

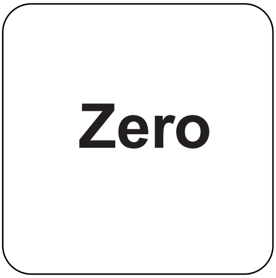
Spoelbakje van 24 mm met **10 mL staal** vullen.



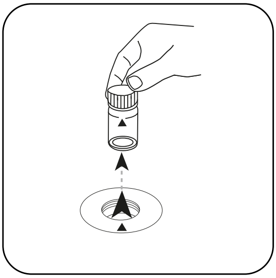
De spoelbakjes afsluiten.



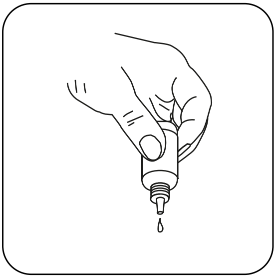
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



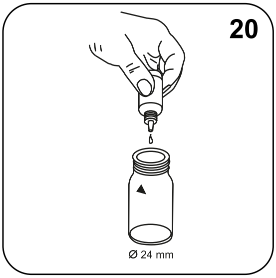
De toets **NUL** indrukken.



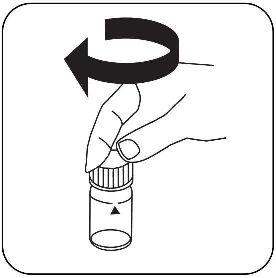
Het spoelbakje uit de meetschacht nemen.



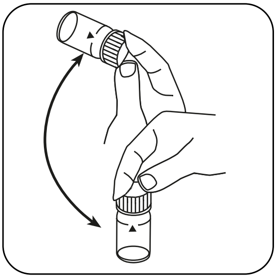
De druppelflessen verticaal houden en even grote druppels toevoegen door langzaam te drukken.



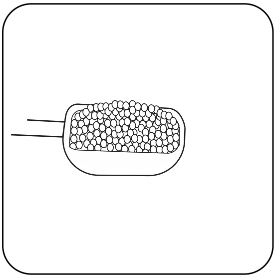
20 druppels KS243 (zink reagens 1) toevoegen.



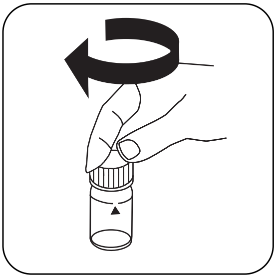
De spoelbakjes afsluiten.



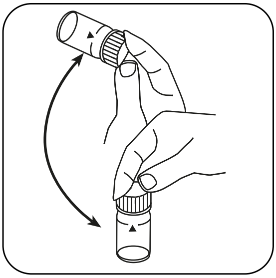
De inhoud mengen door om te draaien.



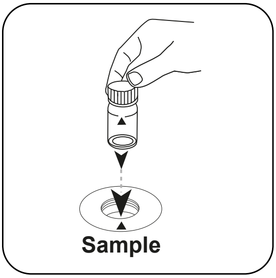
Een maatlepel KP244 (zink reagens 2) toevoegen.



De spoelbakjes afsluiten.



Het poeder oplossen door om te draaien.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Test

De toets **TEST** (XD: **START**) indrukken.

De display toont het resultaat in mg/L Zink.

Chemische methode

Zinkoon / EDTA

Aanhangsel

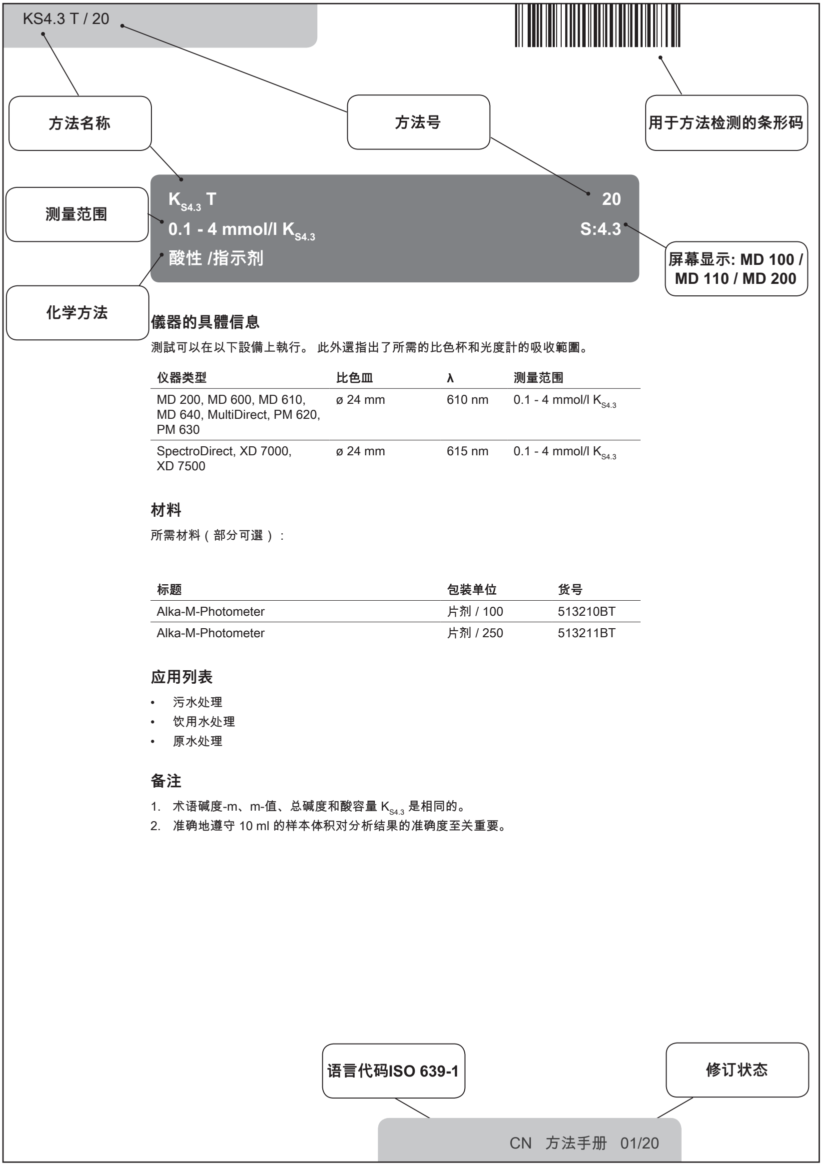
Verstoringen

Uit te sluiten verstoringen

- Afhankelijk van de aanwezige koperconcentratie veroorzaken kationen, zoals quaternaire ammoniumverbindingen, een kleurverandering van roze naar violet. Voeg in dit geval druppelsgewijs KS89 (kationische surpressor) toe aan het monster tot een oranje/blauwe kleur zichtbaar wordt. Opgelet: Roteer het monster telkens wanneer een druppel wordt toegevoegd.

Literatuurverwijzing

Fotometrische analysemethoden, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989
S.M. Khopkar, Basic Concepts of Analytical Chemistry (2004), New Age International Ltd. Publishers, New Dheli, p. 75



KS4.3 T / 20

$K_{S4.3}$ T **20**

0.1 - 4 mmol/l $K_{S4.3}$ **S:4.3**

酸性 /指示剂

儀器的具體信息

測試可以在以下設備上執行。 此外還指出了所需的比色杯和光度計的吸收範圍。

仪器类型	比色皿	λ	测量范围
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630	ø 24 mm	610 nm	0.1 - 4 mmol/l $K_{S4.3}$
SpectroDirect, XD 7000, XD 7500	ø 24 mm	615 nm	0.1 - 4 mmol/l $K_{S4.3}$

材料

所需材料（部分可選）:

标题	包装单位	货号
Alka-M-Photometer	片剂 / 100	513210BT
Alka-M-Photometer	片剂 / 250	513211BT

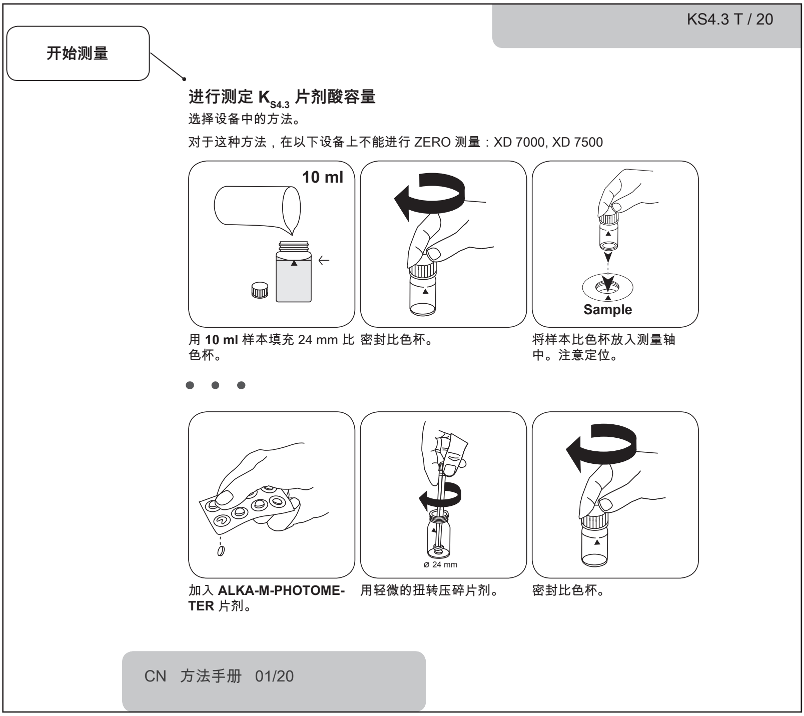
应用列表

- 污水处理
- 饮用水处理
- 原水处理

备注

1. 术语碱度-m、m-值、总碱度和酸容量 $K_{S4.3}$ 是相同的。
2. 准确地遵守 10 ml 的样本体积对分析结果的准确度至关重要。

CN 方法手册 01/20



开始测量

进行测定 $K_{S4.3}$ 片剂酸容量

选择设备中的方法。

对于这种方法，在以下设备上不能进行 ZERO 测量：XD 7000, XD 7500

用 **10 ml** 样本填充 24 mm 比色杯。

密封比色杯。

将样本比色杯放入测量轴中。注意定位。

● ● ●

加入 **ALKA-M-PHOTOMETER** 片剂。

用轻微的扭转压碎片剂。

密封比色杯。

铝 PP M50

0.01 - 0.25 mg/L Al AL

依来铬氰蓝 R

材料
所需材料（部分可選）：

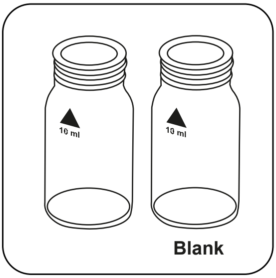
试剂	包装单位	货号
VARIO 铝套件 20 ml	1 片	535000

准备

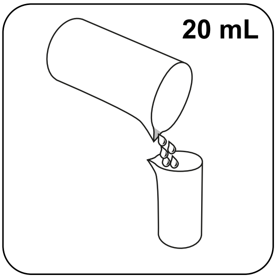
1. 为了获得准确的分析结果，必须保持 20 ℃ 到 25 ℃ 的样本温度。
2. 为避免污染错误，请在分析前用盐酸溶液（约 20%）冲洗比色杯和附件，然后用去离子水冲洗。

进行测定 Vario 铝粉包

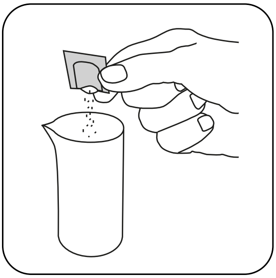
选择设备中的方法。



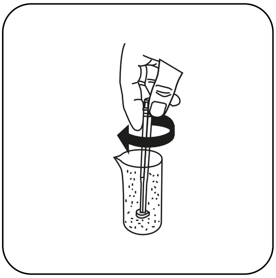
准备两个干净的 24 mm 比色杯。将一个比色杯标记为空白比色杯。



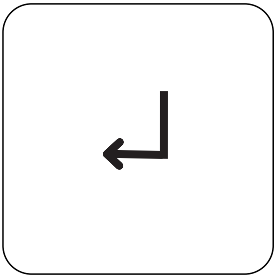
加入 **20 mL 样本**到 100 mL 量杯中。



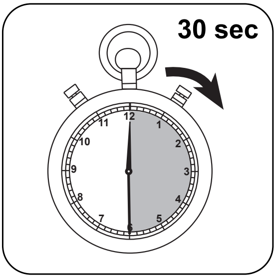
加入 **Vario ALUMINIUM ECR F20 粉包** 。



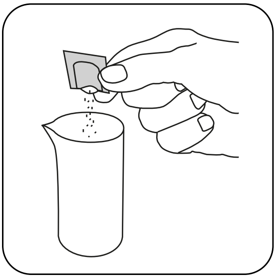
搅拌溶解粉末。



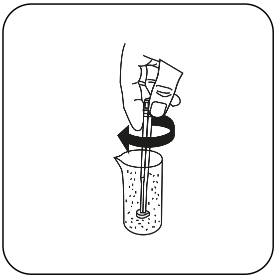
按下 **ENTER** 按钮。



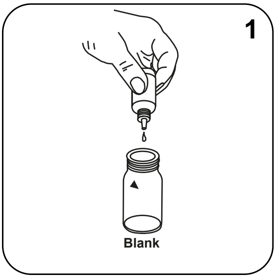
等待 **30 秒反应时间** 。



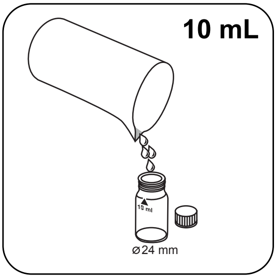
加入 **Vario HEXAMINE F20 粉包** 。



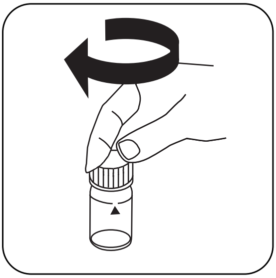
搅拌溶解粉末。



将 **1 滴 Vario ALUMINIUM ECR Masking Reagent** 加入到空白比色杯中。



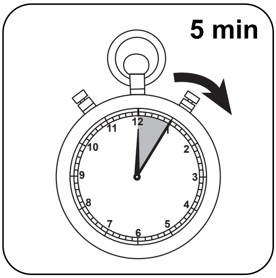
在每个比色杯中加入
10 mL 预处理的样本。



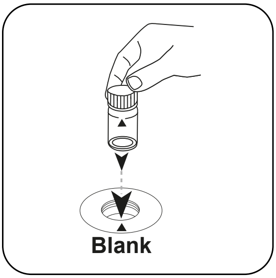
密封比色杯。

↵

按下 **ENTER** 按钮。



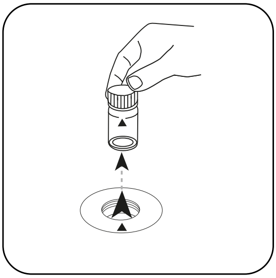
等待 **5 分钟反应时间** 。



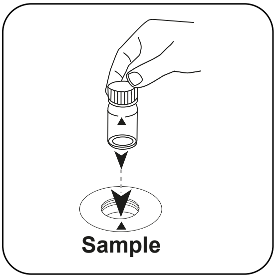
将**空白比色杯**放入测量轴
中。注意定位。

Zero

按下 **ZERO** 按钮。



从测量轴上取下比色杯。



将**样本比色杯**放入测量轴
中。注意定位。

Test

按下 **TEST** (XD: **START**) 按
钮。

结果在显示屏上显示为 mg / l 铝。

分析

下表中输出数据也可转换为其他格式表示.

单位	参考表格	因素
mg/l	Al	1
mg/l	Al_2O_3	1.8894

化学方法

依来铬氰蓝 R

附錄

干扰说明

可消除干扰

- 由于氟化物和多磷酸盐的存在，分析结果可能太低。除非在水中人为加入了少量的氟，否则这种影响一般不重要。在这种情况下，下表可以用来确定实际的铝浓度。

氟化物	显示值：铝 [mg/L]					
[mg/L F]	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**
0.2	0.05	0.11	0.16	0.21	0.27	0.32
0.4	0.06	0.11	0.17	0.23	0.28	0.34
0.6	0.06	0.12	0.18	0.24	0.30	0.37
0.8	0.06	0.13	0.20	0.26	0.32	0.40
1.0	0.07	0.13	0.21	0.28	0.36	0.45
1.5	0.09	0.20	0.29	0.37	0.48	---

参考文献

Richter, F. Fresenius, Zeitschrift f. anal.Chemie (1943) 126: 426

参照

APHA 方法 3500-Al B

T 溴 M80

0.05 - 13 mg/L Br_2 Br

DPD

材料

所需材料（部分可選）：

试剂	**包装单位**	**货号**
DPD No.1	片剂 / 100	511050BT
DPD No.1	片剂 / 250	511051BT
DPD No.1	片剂 / 500	511052BT
DPD No.1 高钙 $^{e)}$	片剂 / 100	515740BT
DPD No.1 高钙 $^{e)}$	片剂 / 250	515741BT
DPD No.1 高钙 $^{e)}$	片剂 / 500	515742BT

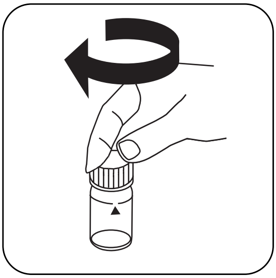
准备

1. 清洗比色杯：
   由于许多家用清洁剂（例如洗碗用洗涤剂）含有还原剂，所以随后测定的氧化剂（例如臭氧、氯）结果可能会不足。为了排除这种测量误差，玻璃器皿应无氯。为此，将玻璃器皿在次氯酸钠溶液（0.1 g/L）下存放 1 小时，然后用去离子水彻底冲洗。
2. 在样本制备中，通过移液和摇动来避免溴的排气。取样后必须立即进行分析。
3. 在分析前（用 0.5 mol/l 硫酸或 1 mol/l 氢氧化钠溶液）必须将强碱性或酸性水的 pH 范围调节到 6 和 7 之间。

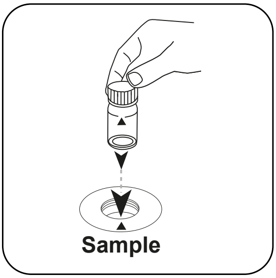
进行测定 硼片剂

选择设备中的方法。

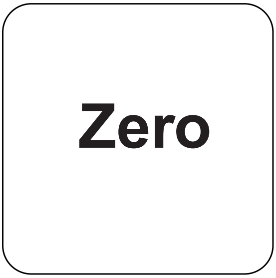
用 **10 mL 样本**填充 24 mm 比色杯。



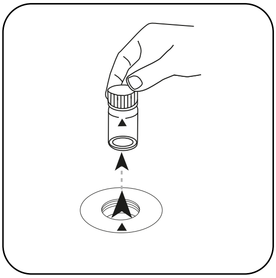
密封比色杯。



将**样本比色杯**放入测量轴中。注意定位。

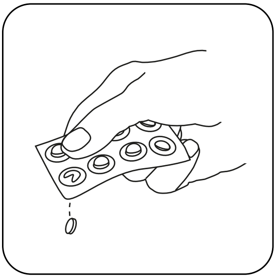


按下 **ZERO** 按钮。

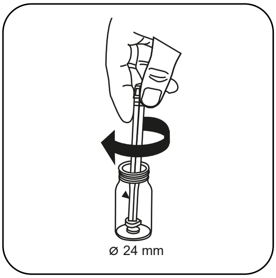


从测量轴上取下比色杯。

将比色杯倒空。

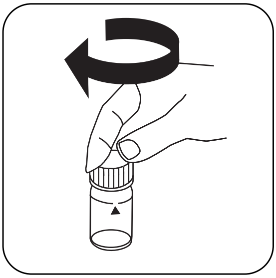


加入 **DPD No. 1 片剂** 。

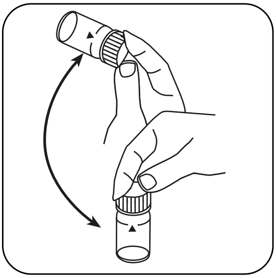


用轻微的扭转压碎片剂。

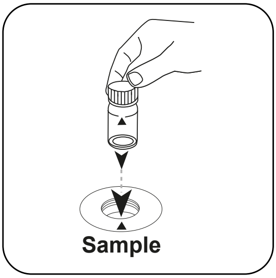
用**样本**将比色杯填充至 **10 mL 刻度**处。



密封比色杯。



通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。

Test

按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 mg / l 溴。

化学方法

DPD

附錄

干扰说明

持续干扰

1. 存在于样本中的所有氧化剂都像溴一样反应，导致多重结果。
2. 高于 22 mg/L 溴的浓度可导致测量范围内的结果高达 0 mg/L。在这种情况下应稀释水样。将 10 ml 稀释的样本与试剂混合并重复测量（可信度测试）。

源于

US EPA 330.5 (1983)
APHA 方法 4500 Cl-G

[e] 替代试剂，取代DPD No.1/No.3试剂，用于由高浓度钙离子和/或高电导率引起的浑浊水样分析

T 氯 M100

0.01 - 6.0 mg/L Cl_2 [a)] CL6

DPD

材料
所需材料（部分可選）：

试剂	包装单位	货号
DPD No.1	片剂 / 100	511050BT
DPD No.1	片剂 / 250	511051BT
DPD No.1	片剂 / 500	511052BT
DPD No.3	片剂 / 100	511080BT
DPD No.3	片剂 / 250	511081BT
DPD No.3	片剂 / 500	511082BT
DPD No.1 高钙 [e)]	片剂 / 100	515740BT
DPD No.1 高钙 [e)]	片剂 / 250	515741BT
DPD No.1 高钙 [e)]	片剂 / 500	515742BT
DPD No.3 高钙 [e)]	片剂 / 100	515730BT
DPD No.3 高钙 [e)]	片剂 / 250	515731BT
DPD No.3 高钙 [e)]	片剂 / 500	515732BT
DPD No.4	片剂 / 100	511220BT
DPD No.4	片剂 / 250	511221BT
DPD No.4	片剂 / 500	511222BT
DPD No.3 Evo	片剂 / 100	511420BT
DPD No.3 Evo	片剂 / 250	511421BT
DPD No.3 Evo	片剂 / 500	511422BT
DPD No.4 Evo	片剂 / 100	511970BT
DPD No.4 Evo	片剂 / 250	511971BT
DPD No.4 Evo	片剂 / 500	511972BT

現有標準

标题	包装单位	货号
ValidCheck 氯 1.5 mg/l	1 片	48105510

取样

1. 在样本制备中，通过移液和摇动来避免氯的排气。
2. 取样后必须立即进行分析。

准备

1. 清洗比色杯：
   由于许多家用清洁剂（例如洗碗用洗涤剂）含有还原剂，所以测定的氯结果可能会不足。为了排除这种测量误差，玻璃器皿应无氯。为此，将玻璃器皿在次氯酸钠溶液（0.1 g/L）下存放 1 小时，然后用去离子水（软化水）彻底冲洗。
2. 对于游离氯和总氯的单独测定，使用一套相应单独的比色杯是有意义的（参见 EN ISO 7393-2，第 5.3 段）。
3. DPD 显色发生在 pH 值在 6.2 至 6.5 时。因此该试剂含有用于调节 pH 值的缓冲液。但在分析前（用 0.5 mol/L 硫酸或 1 mol/L 氢氧化钠溶液）必须将强碱性或酸性水的 pH 范围调节到 6 和 7 之间。

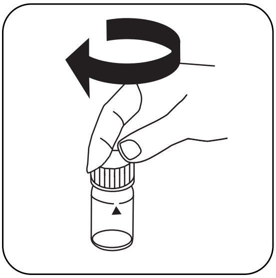
备注

1. Evo片剂可以作为相应标准片剂的替代品（如DPD No.3 Evo代替DPD No.3）。

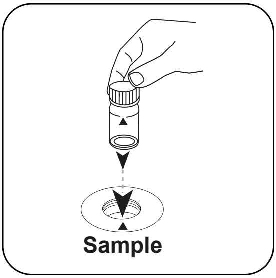
进行测定 余氯 片剂法

选择设备中的方法。

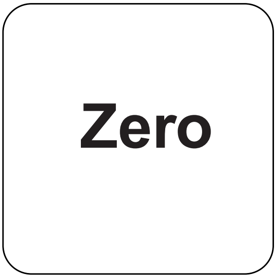
用 **10 mL 样本**填充 24 mm 比色杯。



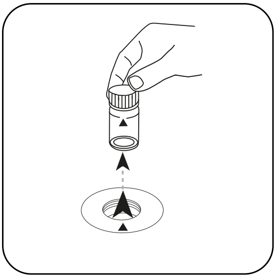
密封比色杯。



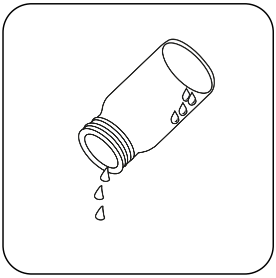
将**样本比色杯**放入测量轴中。注意定位。



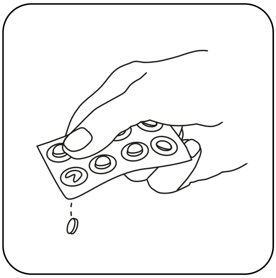
按下 **ZERO** 按钮。



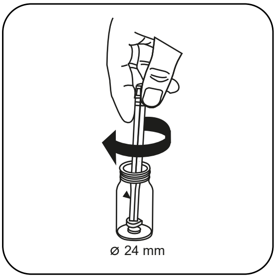
从测量轴上取下比色杯。



将比色杯倒空。

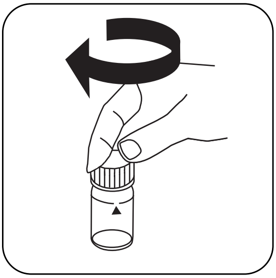


加入 **DPD No. 1 片剂** 。

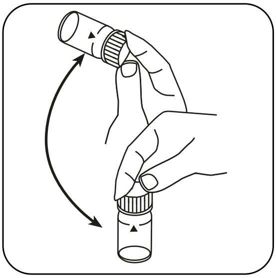


用轻微的扭转压碎片剂。

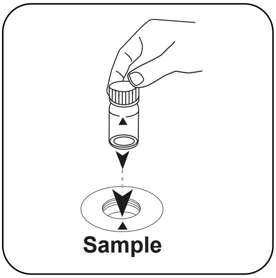
用**样本**将比色杯填充至 **10 mL 刻度**处。



密封比色杯。



通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。

Test

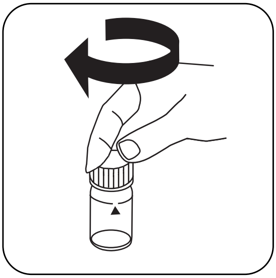
按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 mg / l 余氯。

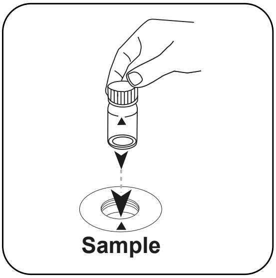
进行测定 总氯 片剂法

选择设备中的方法。

用 **10 mL 样本**填充 24 mm 比色杯。



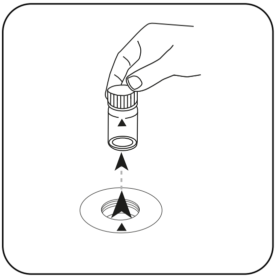
密封比色杯。



将**样本比色杯**放入测量轴中。注意定位。

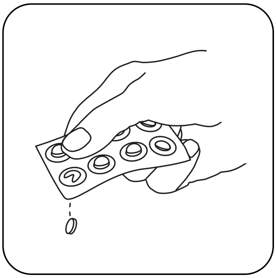
Zero

按下 **ZERO** 按钮。

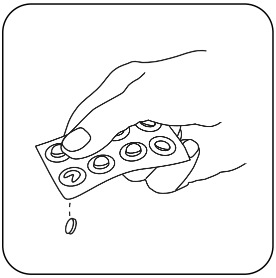


从测量轴上取下比色杯。

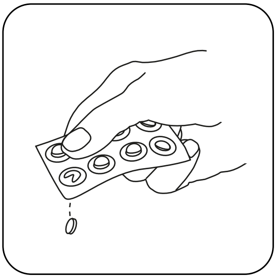
将比色杯倒空。



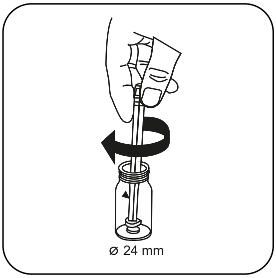
加入 **DPD No. 1 片剂** 。



加入 **DPD No. 3 片剂** 。

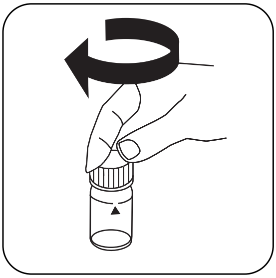


作为DPD 1号和3号片剂的替代品，可以添加1个DPD 4号片剂。

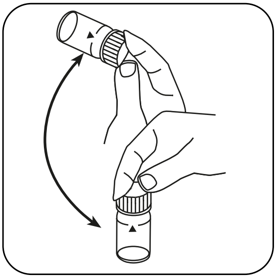


用轻微的扭转压碎片剂。

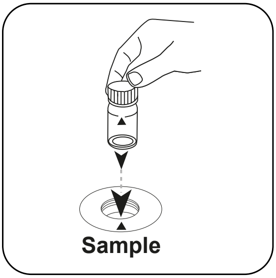
用**样本**将比色杯填充至 **10 mL 刻度**处。



密封比色杯。



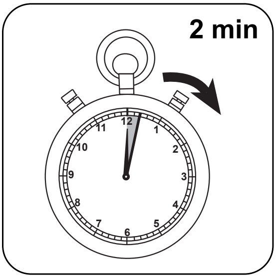
通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。

Test

按下 **TEST** (XD: **START**) 按钮。



等待 **2 分钟反应时间** 。

反应时间结束后，自动进行测量。

结果在显示屏上显示为 mg / l 总氯。

化学方法

DPD

附錄

干扰说明

持续干扰

- 存在于样本中的所有氧化剂都像氯一样反应，导致多重结果。

可消除干扰

- 铜和铁（III）的干扰必须通过 EDTA 消除。
- 对于高钙含量*和/或高电导率*的样本，使用试剂片可能会导致样本浑浊和相关的测量误差。在这种情况下，可选用试剂片 DPD 编号1 高钙和试剂片 DPD 编号3 高钙。
  *不能给出精确值，因为浑浊的形成取决于样本水的类型和组成。
- 在使用片剂时，高于 10 mg/L 氯的浓度可导致测量范围内的结果高达 0 mg/L。氯浓度过高时应用无氯水稀释样本。将 10 mL 稀释的样本与试剂混合并重复测量（可信度测试）。

干擾	從/ [mg/l]
CrO_4^{2-}	0.01
MnO_2	0.01

方法验证

检出限	0.02 mg/L
测定下限	0.06 mg/L
测量上限	6 mg/L
灵敏度	2.05 mg/L / Abs
置信范围	0.04 mg/L
标准偏差	0.019 mg/L
变异系数	0.87 %

一致性

EN ISO 7393-2

[a] 测定余氯，总氯和结合氯 | [e] 替代试剂，取代DPD No.1/No.3试剂，用于由高浓度钙离子和/或高电导率引起的浑浊水样分析

L 氯 M101

0.02 - 4.0 mg/L Cl_2 [a)] CL6

DPD

材料

所需材料（部分可選）：

试剂	包装单位	货号
DPD 1 缓冲溶液，蓝瓶	15 mL	471010
DPD 1 缓冲溶液	100 mL	471011
DPD 1 缓冲溶液，6 件装	1 片	471016
DPD 1 试剂溶液，绿瓶	15 mL	471020
DPD 1 试剂溶液	100 mL	471021
DPD 1 试剂溶液，6 件装	1 片	471026
DPD 3 溶液，红瓶	15 mL	471030
DPD 3 溶液	100 mL	471031
DPD 3 溶液，6 件装	1 片	471036
DPD 试剂套件	1 片	471056

現有標準

标题	包装单位	货号
ValidCheck 氯 1.5 mg/l	1 片	48105510

取样

1. 在样本制备中，通过移液和摇动来避免氯的排气。
2. 取样后必须立即进行分析。

准备

1. 清洗比色杯：
   由于许多家用清洁剂（例如洗碗用洗涤剂）含有还原剂，所以测定的氯结果可能会不足。为了排除这种测量误差，玻璃器皿应无氯。为此，将玻璃器皿在次氯酸钠溶液（0.1 g/L）下存放 1 小时，然后用去离子水（软化水）彻底冲洗。
2. 对于游离氯和总氯的单独测定，使用一套相应单独的比色杯是有意义的（参见 EN ISO 7393-2，第 5.3 段）。
3. DPD 显色发生在 pH 值在 6.2 至 6.5 时。因此该试剂含有用于调节 pH 值的缓冲液。但在分析前（用 0.5 mol/l 硫酸或 1 mol/l 氢氧化钠溶液）必须将强碱性或酸性水的 pH 范围调节到 6 和 7 之间。

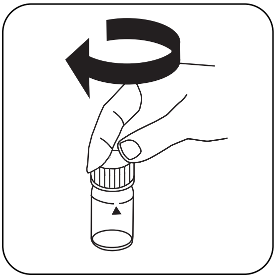
备注

1. 使用后滴瓶必须立即用相同颜色的瓶盖重新密封。
2. 将试剂盒冷藏在 +6 °C至 + 10 °C。

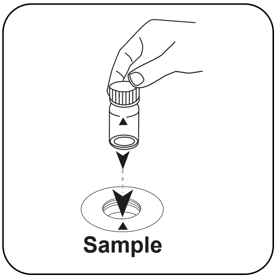
进行测定 余氯 水剂法

选择设备中的方法。

用 **10 mL 样本**填充 24 mm 比色杯。



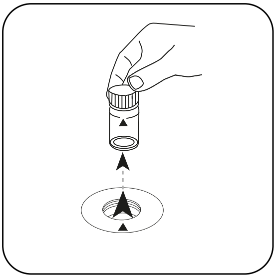
密封比色杯。



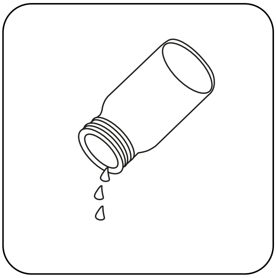
将**样本比色杯**放入测量轴中。注意定位。

Zero

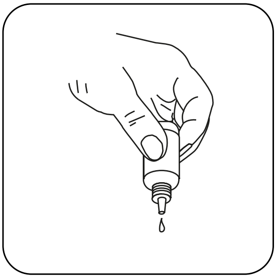
按下 **ZERO** 按钮。



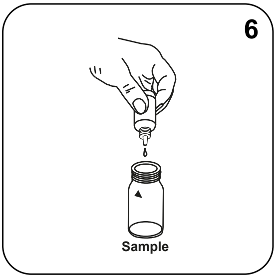
从测量轴上取下比色杯。



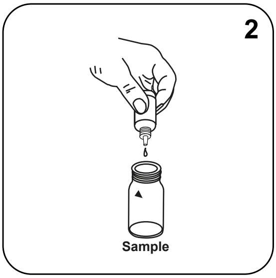
倒空比色杯。



垂直握住滴瓶，慢慢加入相同大小的滴剂。

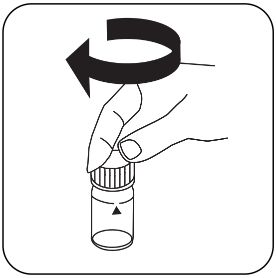


将 **6 滴 DPD 1 Buffer Solution** 添加到样本比色杯中。

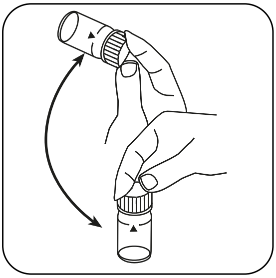


将 **2 滴 DPD 1 Reagent Solution** 添加到样本比色杯中。

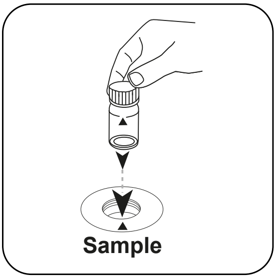
用**样本**将比色杯填充至 **10 mL 刻度**处。



密封比色杯。



通过旋转混合内容物。



将**样本比色杯**放入测量轴中。注意定位。

Test

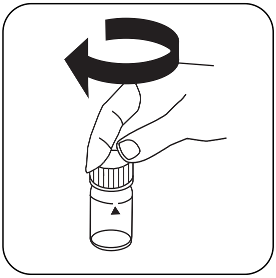
按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 mg / l 余氯。

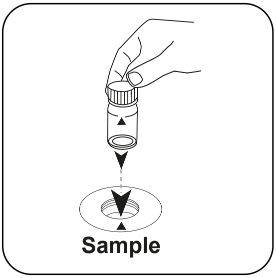
进行测定 总氯 水剂法

选择设备中的方法。

用 **10 mL 样本**填充 24 mm 比色杯。



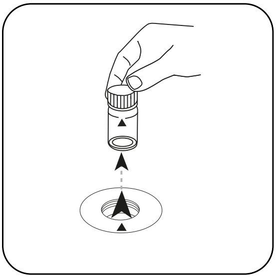
密封比色杯。



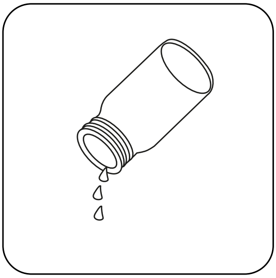
将**样本比色杯**放入测量轴中。注意定位。

Zero

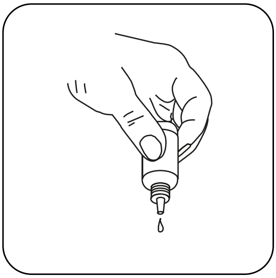
按下 **ZERO** 按钮。



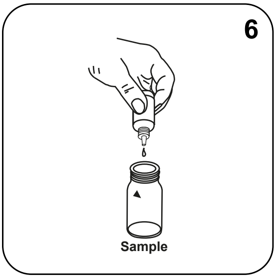
从测量轴上取下比色杯。



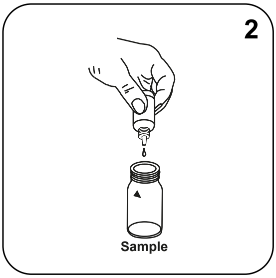
倒空比色杯。



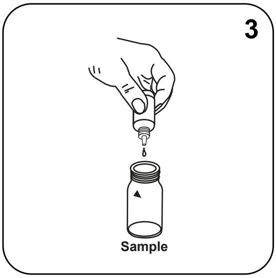
垂直握住滴瓶，慢慢加入相同大小的滴剂。



将 **6 滴 DPD 1 Buffer Solution** 添加到样本比色杯中。

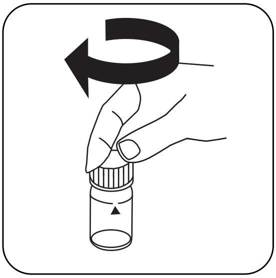


将 **2 滴 DPD 1 Reagent Solution** 添加到样本比色杯中。

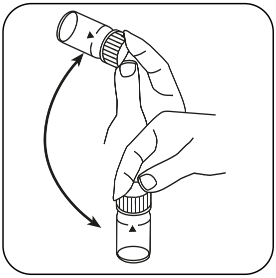


将 **3 滴 DPD 3 Solution** 添加到样本比色杯中。

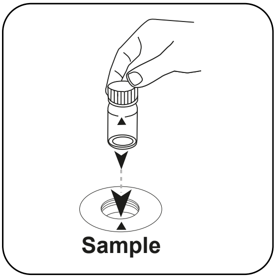
用**样本**将比色杯填充至 **10 mL 刻度**处。



密封比色杯。



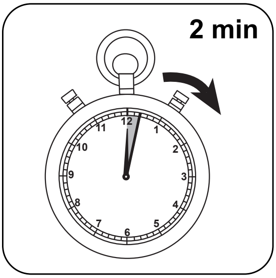
通过旋转混合内容物。



将**样本比色杯**放入测量轴中。注意定位。

Test

按下 **TEST** (XD: **START**) 按钮。



等待 **2 分钟反应时间** 。

反应时间结束后，自动进行测量。

结果在显示屏上显示为 mg / l 总氯。

化学方法

DPD

附錄

干扰说明

持续干扰

- 存在于样本中的所有氧化剂都像氯一样反应，导致多重结果。

可消除干扰

- 铜和铁（III）的干扰必须通过 EDTA 消除。
- 在使用液剂时，高于 4 mg/L 氯的浓度可导致测量范围内的结果高达 0 mg/L。在这种情况下应用无氯水稀释样本。将 10 ml 稀释的样本与试剂混合并重复测量（可信度测试）。

干擾	從/ [mg/l]
CrO_4^{2-}	0,01
MnO_2	0,01

一致性

EN ISO 7393-2

[a] 测定余氯，总氯和结合氯

HR (KI) T 氯 M105

5 - 200 mg/L Cl_2 CLHr

碘化钾 / 酸法

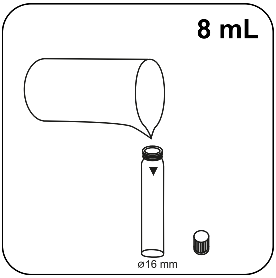
材料

所需材料（部分可選）：

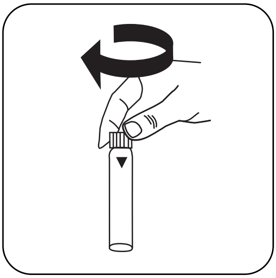
试剂	包装单位	货号
氯 HR (KI)	片剂 / 100	513000BT
氯 HR (KI)	片剂 / 250	513001BT
酸化 GP	片剂 / 100	515480BT
酸化 GP	片剂 / 250	515481BT
套件氯 HR (KI)/酸化 GP#	各100次	517721BT
套件氯 HR (KI)/酸化 GP#	各250次	517722BT
氯 HR (KI)	片剂 / 100	501210
氯 HR (KI)	片剂 / 250	501211

进行测定 HR (KI) 氯片剂

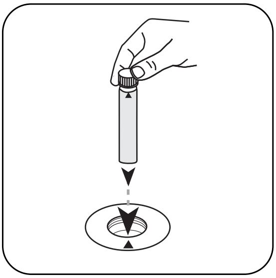
选择设备中的方法。



用 **8 mL 样本**填充 16 mm 比色杯。



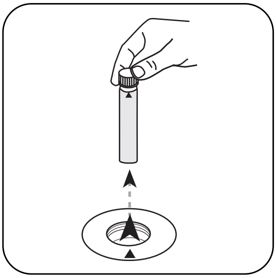
密封比色杯。



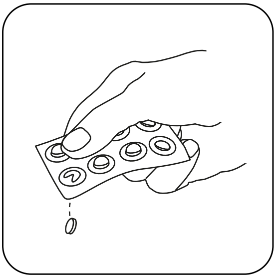
将**样本比色杯**放入测量轴中。注意定位。

Zero

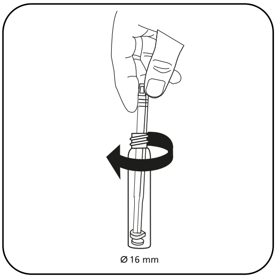
按下 **ZERO** 按钮。



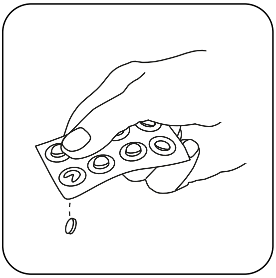
从测量轴上取下**比色杯。**



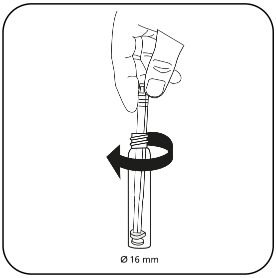
加入 **Chlorine HR (KI) 片剂。**



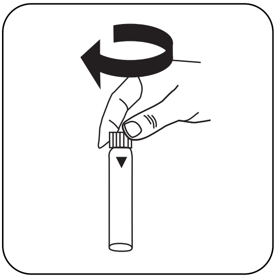
用轻微的扭转压碎片剂。



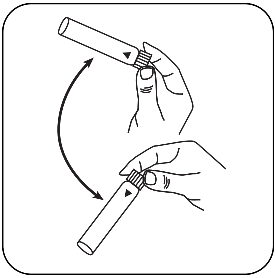
加入 **ACIDIFYING GP 片剂。**



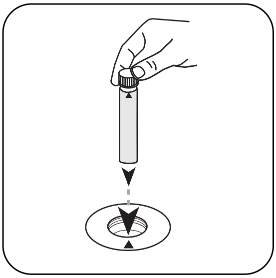
用轻微的扭转压碎片剂。



密封比色杯。



通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。

Test

按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 mg / l 氯。

化学方法

碘化钾 / 酸法

附錄

干扰说明

持续干扰

- 存在于样本中的所有氧化剂都像氯一样反应，导致多重结果。

方法验证

检出限	1.29 mg/L
测定下限	3.86 mg/L
测量上限	200 mg/L
灵敏度	83.96 mg/L / Abs
置信范围	1.14 mg/L
标准偏差	0.45 mg/L
变异系数	0.45 %

源于

EN ISO 7393-3

i含搅拌棒, 10cm

T 二氧化氯 M120

0.02 - 11 mg/L ClO_2 CLO2

DPD / 甘氨酸

材料

所需材料（部分可選）：

试剂	包装单位	货号
DPD No.1	片剂 / 100	511050BT
DPD No.1	片剂 / 250	511051BT
DPD No.1	片剂 / 500	511052BT
DPD No.3	片剂 / 100	511080BT
DPD No.3	片剂 / 250	511081BT
DPD No.3	片剂 / 500	511082BT
甘氨酸 f)	片剂 / 100	512170BT
甘氨酸 f)	片剂 / 250	512171BT
DPD No.3 高钙 e)	片剂 / 100	515730BT
DPD No.3 高钙 e)	片剂 / 250	515731BT
DPD No.3 高钙 e)	片剂 / 500	515732BT
DPD No.1 高钙 e)	片剂 / 100	515740BT
DPD No.1 高钙 e)	片剂 / 250	515741BT
DPD No.1 高钙 e)	片剂 / 500	515742BT
套件 DPD No.1/No.3#	各100次	517711BT
套件 DPD No.1/No.3#	各250次	517712BT
套件 DPD No.1/甘氨酸 #	各100次	517731BT
套件 DPD No.1/甘氨酸 #	各250次	517732BT
套件 DPD No.1/No .3 高钙 #	各100次	517781BT
套件 DPD No.1/No .3 高钙 #	各250次	517782BT
DPD No.3 Evo	片剂 / 100	511420BT
DPD No.3 Evo	片剂 / 250	511421BT
DPD No.3 Evo	片剂 / 500	511422BT

取样

1. 在样本制备中，通过移液和摇动来避免的排气。
2. 取样后必须立即进行分析。

准备

1. 清洗比色杯：
   由于许多家用清洁剂（例如洗碗用洗涤剂）含有还原剂，所以测定的二氧化氯结果可能会不足。为了排除这种测量误差，玻璃器皿应无氯。为此，将玻璃器皿在次氯酸钠溶液（0.1 g/L）下存放 1 小时，然后用去离子水（软化水）彻底冲洗。
2. 在分析前（用 0.5 mol/l 硫酸或 1 mol/l 氢氧化钠溶液）必须将强碱性或酸性水的 pH 范围调节到 6 和 7 之间。

备注

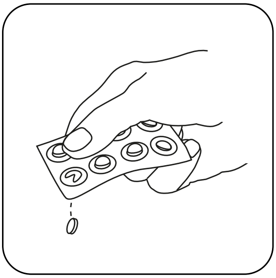
1. EVO片剂可以作为相应标准片剂的替代品（如DPD No.3 EVO代替DPD No.3）。

进行测定 二氧化氯, 有氯存在，片剂法

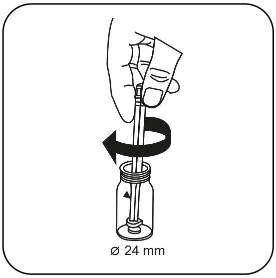
选择设备中的方法。

另外选择测定：含氯

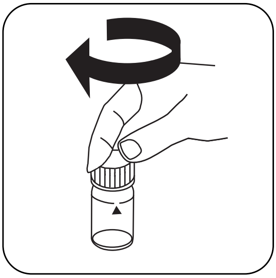
用 **10 mL 样本**填充 24 mm 比色杯。



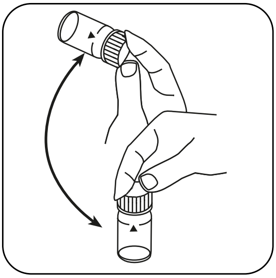
加入 **GLYCINE 片剂**。



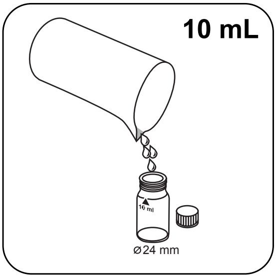
用轻微的扭转压碎片剂。



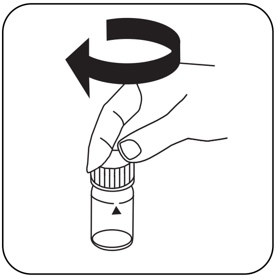
密封比色杯。



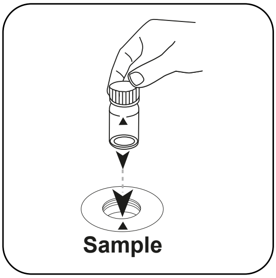
通过旋转溶解片剂。



用 **10 mL 样本填充第二个比色杯**。



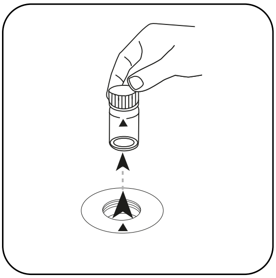
密封比色杯。



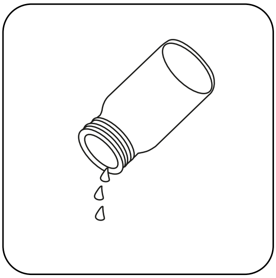
将**样本比色杯**放入测量轴中。注意定位。

Zero

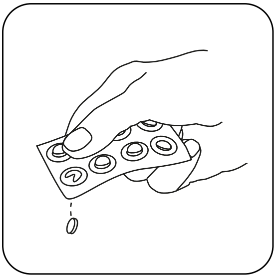
按下 **ZERO** 按钮。



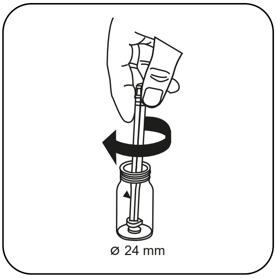
从测量轴上取下比色杯。



倒空比色杯。

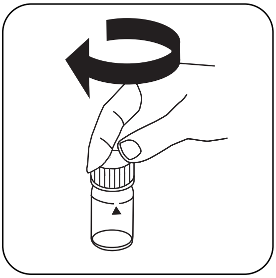


加入 **DPD No. 1 片剂** 。

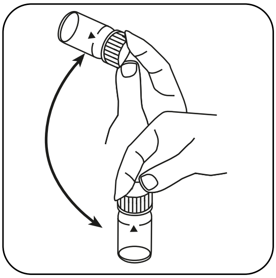


用轻微的扭转压碎片剂。

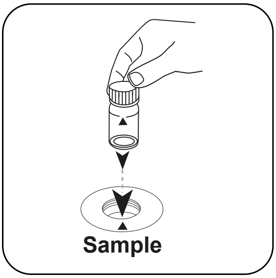
将准备好的**甘氨酸**加入到准备好的比色杯中。



密封比色杯。



通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。

Test

按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 mg / l 二氧化氯。

分析

下表中输出数据也可转换为其他格式表示.

单位	参考表格	因素
mg/l	ClO_2	1
mg/l	Cl_2 frei	0.525
mg/l	Cl_2 geb.	0.525
mg/l	ges. Cl_2	0.525

化学方法

DPD / 甘氨酸

附錄

干扰说明

持续干扰

1. 存在于样本中的所有氧化剂都导致多重结果。

可消除干扰

1. 高于 19 mg/L 二氧化氯的浓度可导致测量范围内的结果高达 0 mg/L。在这种情况下应用不含二氧化氯的水稀释水样。将 10 ml 稀释的样本与试剂混合并重复测量。

源于

DIN 38408, 第 5 部分

[e] 替代试剂，取代DPD No.1/No.3试剂，用于由高浓度钙离子和/或高电导率引起的浑浊水样分析 | [f] 附加试剂，用于含氯水样，进行溴，二氧化氯和臭氧的测定分析 | [#] i含搅拌棒, 10cm

T 铜 M150

0.05 - 5 mg/L Cu[a)] Cu

双喹啉

材料
所需材料（部分可選）：

试剂	**包装单位**	**货号**
铜 No.1	片剂 / 100	513550BT
铜 No.1	片剂 / 250	513551BT
铜 No.2	片剂 / 100	513560BT
铜 No.2	片剂 / 250	513561BT
套件铜 No.1/No.2[#]	各100次	517691BT
套件铜 No.1/No.2[#]	各250次	517692BT
ValidCheck 铜 2 mg/l	1 片	48141525

准备

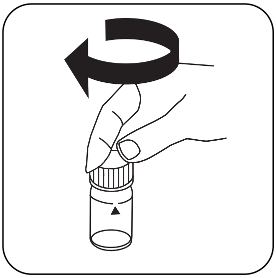
1. 在分析前应将强碱性或酸性水的 pH 从4到6 左右。

进行测定 余铜 片剂法

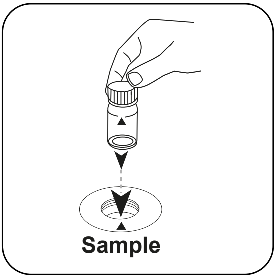
选择设备中的方法。

另外选择测定：余铜

用 **10 mL 样本**填充 24 mm 比色杯。



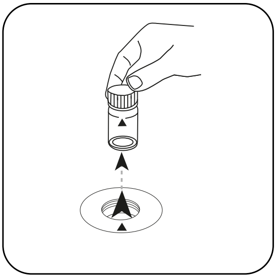
密封比色杯。



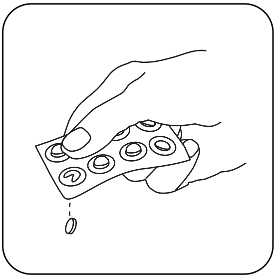
将**样本比色杯**放入测量轴中。注意定位。

Zero

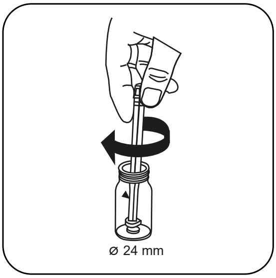
按下 **ZERO** 按钮。



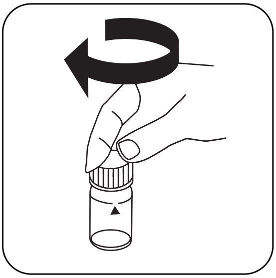
从测量轴上取下比色杯。



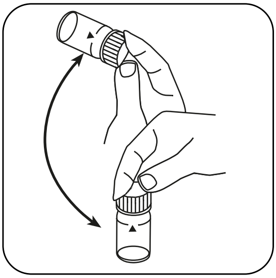
加入 **COPPER No. 1 片剂**。



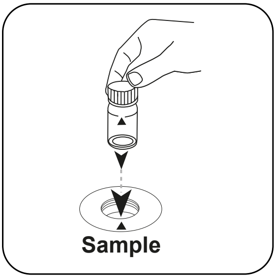
用轻微的扭转压碎片剂。



密封比色杯。



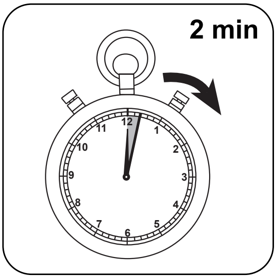
通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。

Test

按下 **TEST** (XD: **START**) 按钮。



等待 **2 分钟反应时间** 。

反应时间结束后，自动进行测量。

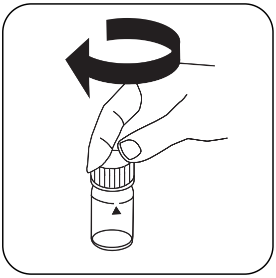
结果在显示屏上显示为 mg / l 余铜。

进行测定 总铜 片剂法

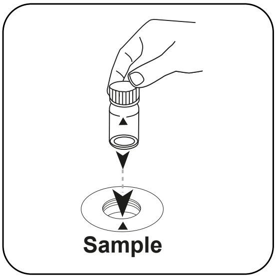
选择设备中的方法。

另外选择测定：总铜

用 **10 mL 样本**填充 24 mm 比色杯。



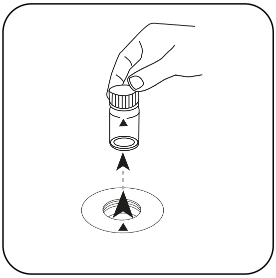
密封比色杯。



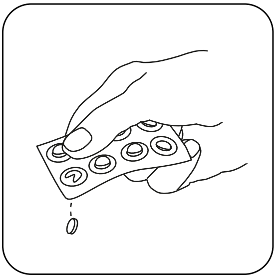
将**样本比色杯**放入测量轴中。注意定位。

Zero

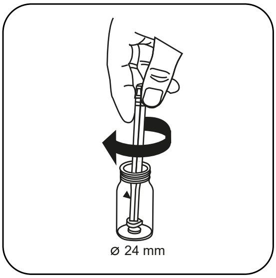
按下 **ZERO** 按钮。



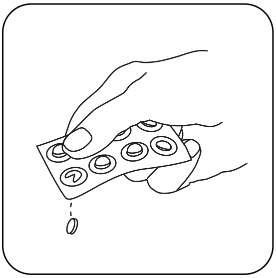
从测量轴上取下比色杯。



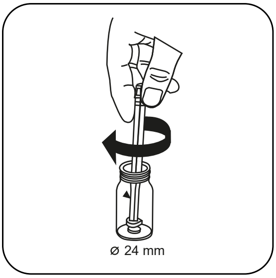
加入 **COPPER No. 1 片剂** 。



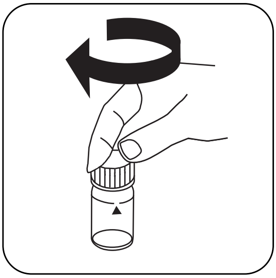
用轻微的扭转压碎片剂并溶解。



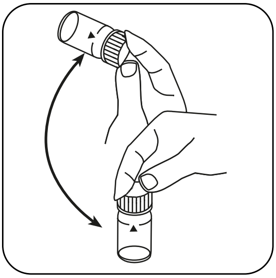
加入 **COPPER No. 2 片剂** 。



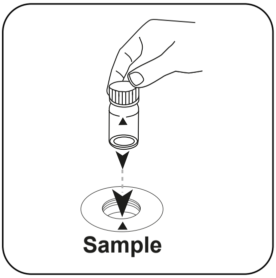
用轻微的扭转压碎片剂。



密封比色杯。



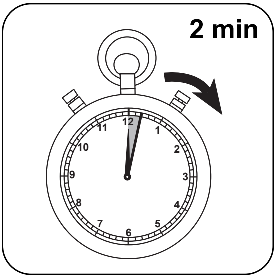
通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。

Test

按下 **TEST** (XD: **START**) 按钮。



等待 **2 分钟反应时间** 。

反应时间结束后，自动进行测量。

结果在显示屏上显示为 mg / l 总铜。

化学方法

双喹啉

附録

干扰说明

持续干扰

1. 氰化物CN^-和银Ag^+会干扰测定。

方法验证

检出限	0.05 mg/L
测定下限	0.15 mg/L
测量上限	5 mg/L
灵敏度	3.8 mg/L / Abs
置信范围	0.026 mg/L
标准偏差	0.011 mg/L
变异系数	0.42 %

参考文献

Photometrische Analyse, Lange/Vedjelek, Verlag Chemie 1980

[a] 测定余氯，总氯和结合氯 | # i含搅拌棒, 10cm

钼 PP 中的铁 M224

0.01 - 1.8 mg/L Fe FEM

TPTZ

材料

所需材料（部分可選）：

试剂	**包装单位**	**货号**
VARIO MO 试剂套件中的 Fe	1 组	536010

取样

1. 在已清洗的玻璃瓶或塑料瓶中进行取样。这些应该用 6 N（1:1）盐酸，然后用去离子水清洗。
2. 为了保存样本以备后续分析，必须将 pH 值降至 2 以下。每升样品加入约 2 ml 浓盐酸。如果直接分析样本，则不需要添加。
3. 为了测定溶解的铁，样本必须在取样之后和酸化之前立即通过 0.45µm 过滤器或类似物进行过滤。
4. 保存的样本不应在室温下储存 6 个月以上。
5. 在分析之前，通过加入 5 N 氢氧化钠溶液将 pH 值调节至 3 和 5 之间。pH 值不得超过 5，否则会导致铁沉淀。
6. 结果必须根据量的增加进行修正。

准备

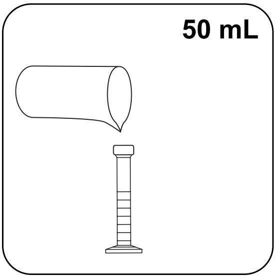
1. 用清洁剂清洗所有玻璃器皿，然后用自来水冲洗。然后再用盐酸（1:1）和去离子水清洗。通过该步骤消除可能导致结果轻微微增加的沉淀。
2. 如果样本含有 100 mg/L 或更多的钼酸盐（MoO_4^{2-}），则必须在零测量后立即进行样本测量。
3. 为了获得更准确的结果，可以为每批新的试剂测定试剂空白值。为此按照说明操作，但用去离子水代替样本。将获得的测量值从该批次所测得的测量值中减去。

备注

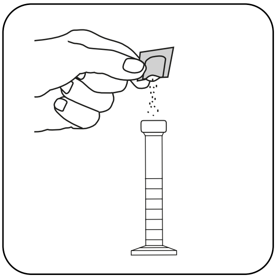
1. 在铁的存在下，蓝色显现。少量未溶解的粉末不影响结果。

进行测定 在钼酸盐 Vario 粉包的存在下的总铁（钼中的铁）

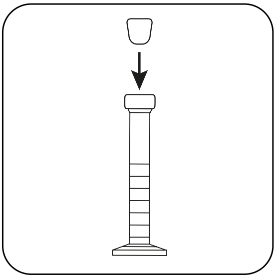
选择设备中的方法。



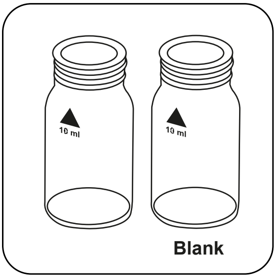
加入 **50 mL 样本**到 50 mL 搅拌缸中。



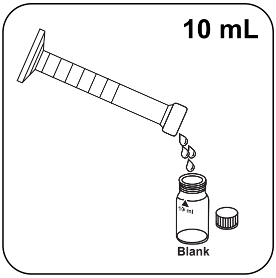
加入 **Vario (Fe in Mo) Rgt 1 粉包** 。



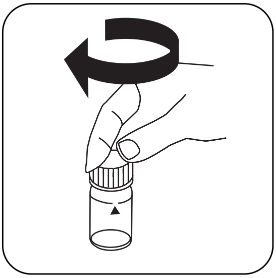
用塞子密封搅拌缸。通过旋转溶解粉末。



准备两个干净的 24 mm 比色杯。将一个比色杯标记为空白比色杯。

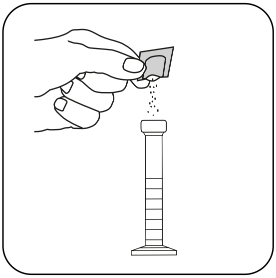


加入 **10 mL 准备好的样本**到空白比色杯中。

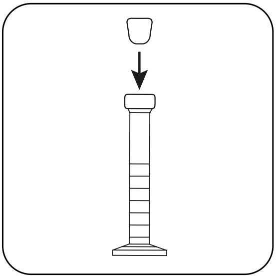


密封比色杯。

加入 **25 mL 准备好的样本**到 25 mL 搅拌缸中。



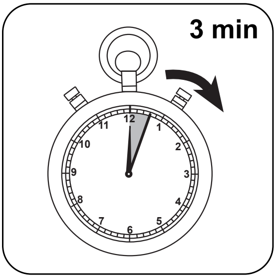
加入 **Vario (Fe in Mo) Rgt 2 粉包** 。



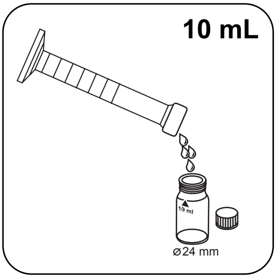
用塞子密封搅拌缸。通过旋转溶解粉末。

↵

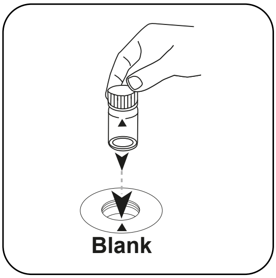
按下 **ENTER** 按钮。



等待 **3 分钟反应时间** 。



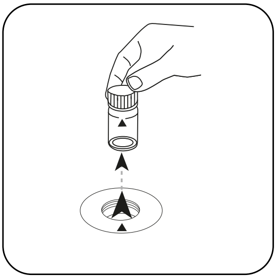
加入 **10 mL 样本**到样本比色杯中。



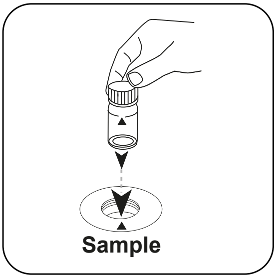
将**空白比色杯**放入测量轴中。注意定位。

Zero

按下 **ZERO** 按钮。



从测量轴上取下比色杯。



将**样本比色杯**放入测量轴中。注意定位。

Test

按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 mg / l Fe。

化学方法

TPTZ

附錄

干扰说明

可消除干扰

1. pH 值干扰：加入试剂后的样本 pH 小于 3 或大于 4 可能会阻碍颜色的形成，因为所得的颜色可能会褪色太快或产生浑浊。因此，在加入试剂之前，必须在量筒中将 pH 值调节至 3 至 5 之间：
   滴加适量不含铁的酸或碱，如 1N 硫酸或 1N 氢氧化钠溶液。
   如果加入大量的酸或碱，必须进行体积校正。

参考文献

G. Frederic Smith Chemical Co., The Iron Reagents, 3rd ed.(1980)

LR L (A) 铁 M225

0.03 - 2 mg/L Fe FE

Ferrozine/巯乙酸盐

材料
所需材料（部分可選）：

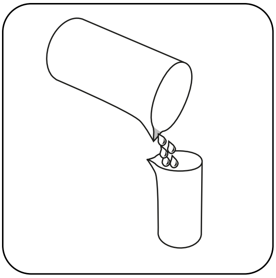
试剂	包装单位	货号
酸度/碱度 P 指标 PA1	65 mL	56L013565
钙硬度缓冲剂 CH2	65 mL	56L014465
KP962 过硫酸铵粉末	粉剂 / 40 g	56P096240
KS63-FE6 硫基乙酸盐/钼酸盐 HR RGT	30 mL	56L006330
KS63-FE6 硫基乙酸盐/钼酸盐 HR RGT	65 mL	56L006365
KS61-FE5 菲洛嗪/硫基乙酸盐	65 mL	56L006165

准备

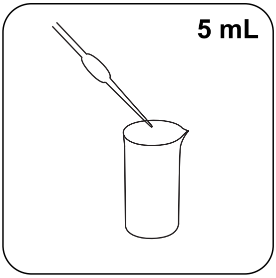
1. 如果样本中存在强结合剂，则反应时间必须延长，直到看不到进一步的颜色变化。然而，在测量过程中未检测到非常强的铁复合物。在这种情况下，结合剂必须用酸/过硫酸盐氧化破坏，然后通过中和使样本达到 pH 6 – 9。
2. 为了测定总溶解的和悬浮的铁，样本必须用酸/过硫酸盐煮沸。随后，中和至 pH 6 – 9，并用去离子水补充至原始体积。

消解

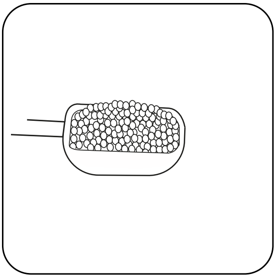
总铁由可溶性复合铁和悬浮铁组成。测量前不应过滤样本。为了确保样本的均匀性，在取样之前，沉积的颗粒必须在剧烈摇动下均匀分布。为了测定全部可溶性铁（包括复合铁化合物），需要过滤样本。确定总铁所需的设备和试剂不包括在标准供货中。



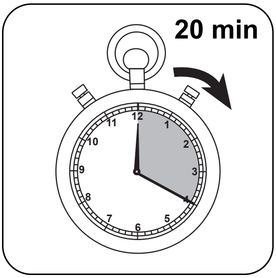
用 **50 mL 均质化的样本填**充合适的消解容器。



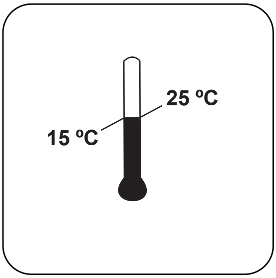
加入 **5 mL 1:1 盐酸** 。



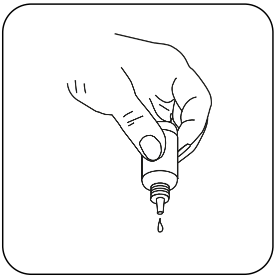
加入一勺 **KP 962 (Ammonium Persulfat Powder)**。



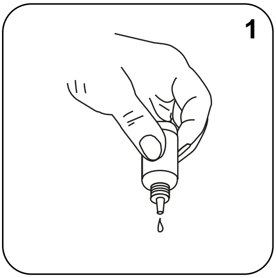
样本**煮沸 20 分钟** 。应保持 25 mL 的样本量；如有必要，加满去离子水。



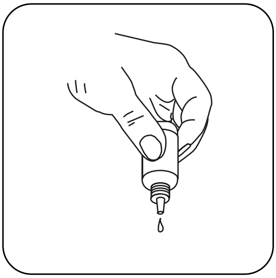
将样本冷却到**室温**。



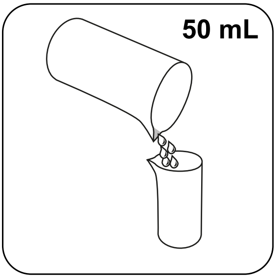
垂直握住滴瓶，慢慢加入相同大小的滴剂。



加入 **1 滴 Acidity / Alkalinity P Indicator PA1**。



将 **Hardness Calcium Buffer CH2**滴加到相同的样本中，直到出现淡粉色向红色转变。**（注意：滴加后摇动样本！）**



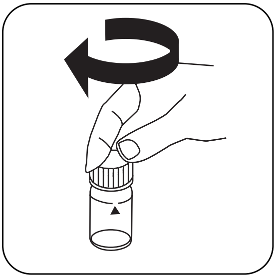
将样本用**去离子水填充至 50 mL** 。

进行测定 总铁 LR (A) 水剂法

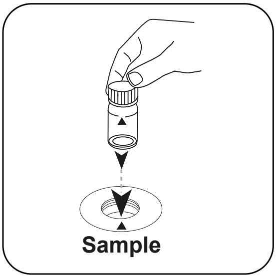
选择设备中的方法。

为了测定 **总铁 LR，进行** 中所述的**消解**。

用 **10 mL 去离子水**填充 24 mm 比色杯。



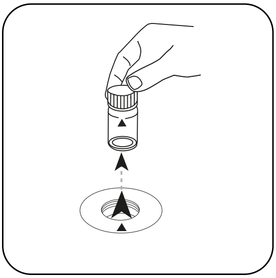
密封比色杯。



将**样本比色杯**放入测量轴中。注意定位。

Zero

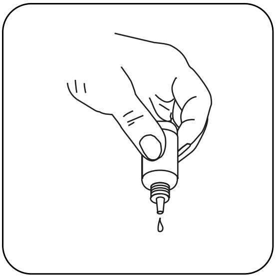
按下 **ZERO** 按钮。



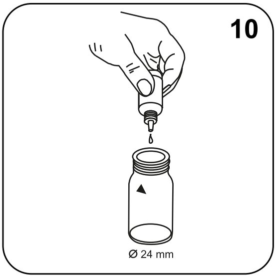
从测量轴上取下比色杯。

倒空比色杯。

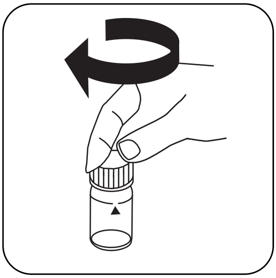
用 **10 mL 准备好的样本**填充 24 mm 比色杯。



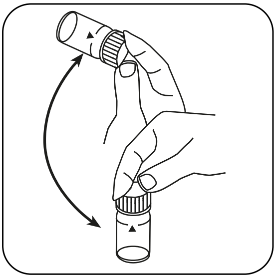
垂直握住滴瓶，慢慢加入相同大小的滴剂。



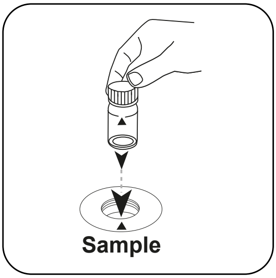
加入 **10 滴 Iron Reagent FE5**。



密封比色杯。



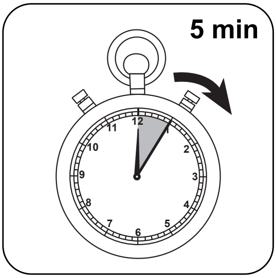
通过旋转混合内容物。



将**样本比色杯**放入测量轴中。注意定位。

Test

按下 **TEST** (XD: **START**) 按钮。



等待 **5 分钟反应时间** 。

反应时间结束后，自动进行测量。

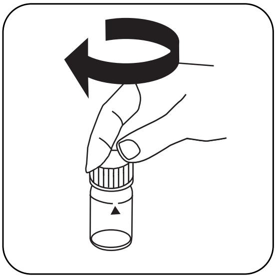
结果在显示屏上显示为 mg / l 总铁或对于过滤样品测试为总溶解铁 mg/l 。

进行测定 铁 LR (A) 水剂法

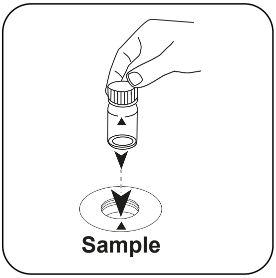
选择设备中的方法。

为了测定总溶解铁，必须在测定之前过滤样本（ 孔径 0.45µm ）。否则，铁颗粒和悬浮铁一起测定。

用 **10 mL 准备好的样本**填充 24 mm 比色杯。



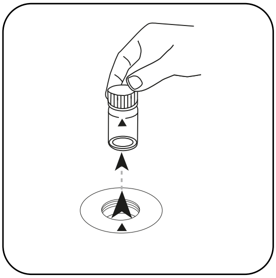
密封比色杯。



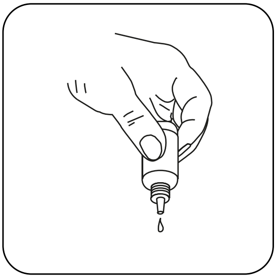
将**样本比色杯**放入测量轴中。注意定位。

Zero

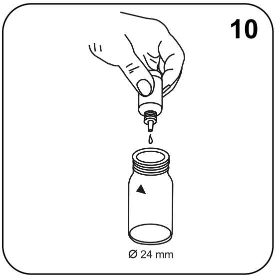
按下 **ZERO** 按钮。



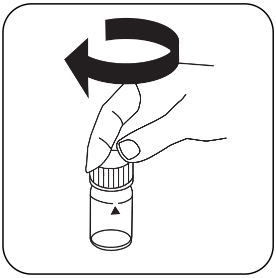
从测量轴上取下比色杯。



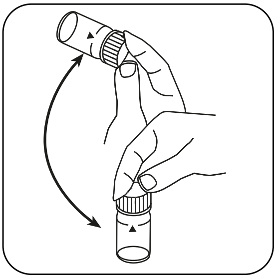
垂直握住滴瓶，慢慢加入相同大小的滴剂。



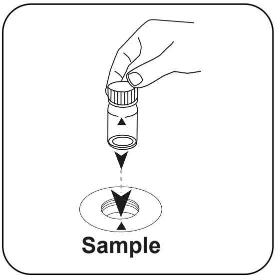
加入 **10 滴 Iron Reagent FE5**。



密封比色杯。



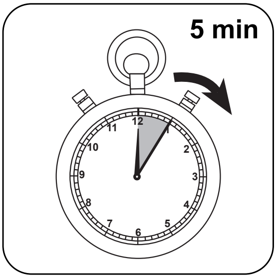
通过旋转混合内容物。



将**样本比色杯**放入测量轴中。注意定位。

Test

按下 **TEST** (XD: **START**) 按钮。



等待 **5 分钟反应时间** 。

反应时间结束后，自动进行测量。

结果在显示屏上显示为 mg / l 铁。

化学方法

Ferrozine/巯乙酸盐

附錄

干扰说明

可消除干扰

1. 当使用 KS61（菲洛嗪/硫基乙酸盐）时，高浓度的钼酸盐会引起强烈的黄色。在这种情况下，需要化学空白值：
   - 准备两个干净的 **24 mm 比色杯。**
   - 将一个比色杯标记为空白比色杯。
   - 将 **10 ml 样本**加入干净的 24 mm 比色杯（空白比色杯）中。
   - 加入 **10 滴 KS63（硫基乙酸盐）**到比色杯中。
   - 用比色杯盖盖上比色杯，旋转直至内容物混合。
   - 将空白比色杯放入测量轴中。注意定位。
   - 按下 **零** 按钮。
   - 从测量轴上取下比色杯。
   - 将 **10 ml 样本**加入第二个干净的 24 mm 比色杯（样本比色杯）中。
   - 加入 **10 滴 KS61（菲洛嗪/硫基乙酸盐）**并按照程序中所述继续。

干擾	**從/ [mg/l]**
Co	8
Cu	2
Oxalat	500
CN^-	10
NO_2^-	

参考文献

D. F. Boltz and J. A. Howell, eds., Colorimetric Determination of Nonmetals, 2nd ed., Vol. 8, p. 304 (1978).Carpenter, J.F."A New Field Method for Determining the Levels of Iron Contamination in Oilfield Completion Brine", SPE International Symposium (2004)

LR PP 钼酸 M251

0.03 - 3 mg/L Mo Mo1

Ternary Complex

材料

所需材料（部分可選）：

试剂	包装单位	货号
VARIO 钼 LR，套件	1 片	535450

它還需要以下配件。

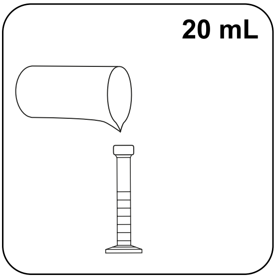
附件	包装单位	货号
带塞混合缸，必要附件，用于利用 MD 100 测定钼 LR（276140）	1 片	19802650

准备

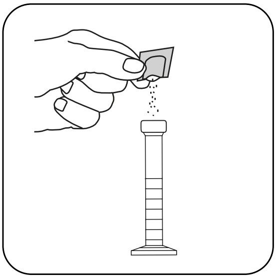
1. 在分析前（用 0.5 mol/l 硫酸或 1 mol/l 氢氧化钠溶液）必须将强碱性或酸性水的 pH 范围调节到 3 和 5 之间。
2. 为避免沉积造成的错误，请在分析前用盐酸溶液（约 20%）冲洗玻璃器皿，然后用去离子水冲洗。

进行测定 LR 钼酸 Vario 粉包

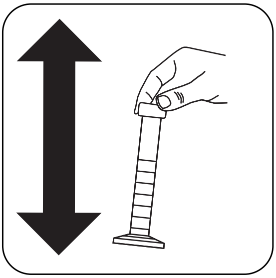
选择设备中的方法。



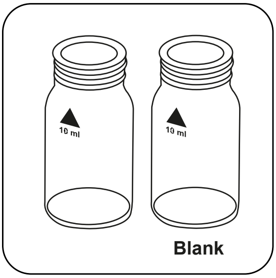
加入 **20 mL 样本**到 25 mL 搅拌缸中。



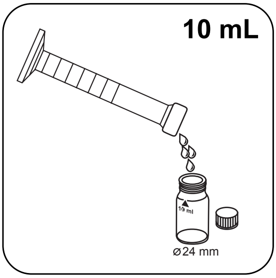
加入 **Vario Molybdenum 1 LR F20 粉包** 。



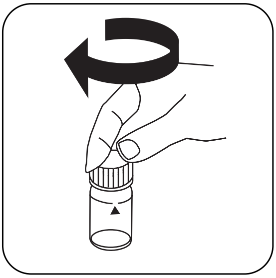
用塞子密封搅拌缸。通过摇晃溶解粉末。



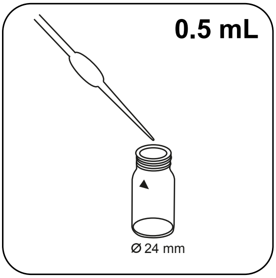
准备两个干净的 24 mm 比色杯。将一个比色杯标记为空白比色杯。



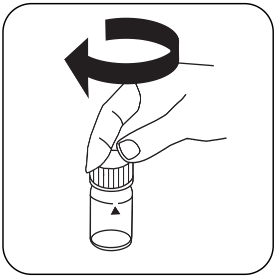
在每个比色杯中加入 **10 mL 样本**。



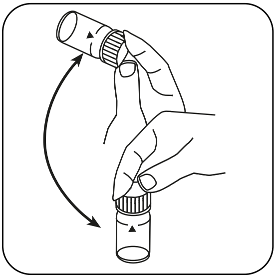
密封**空白比色杯**。



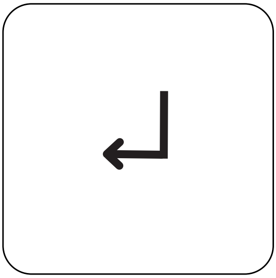
将 **0.5 mL Molybdenum 2 LR 溶液**加入到样本比色杯中。



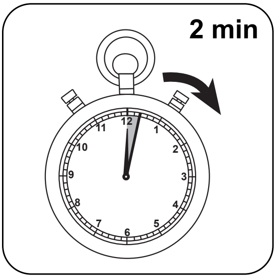
密封比色杯。



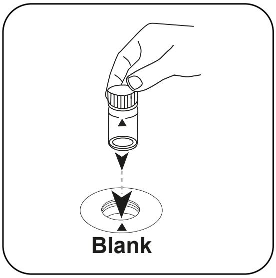
通过旋转混合内容物。



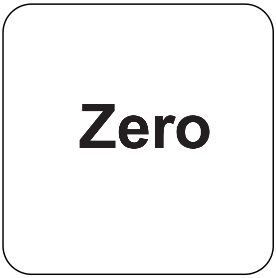
按下 **ENTER** 按钮。



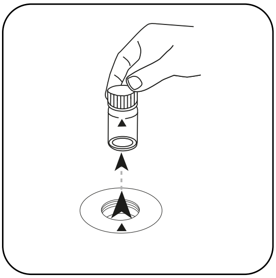
等待 **2 分钟反应时间** 。



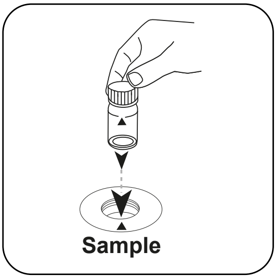
将**空白比色杯**放入测量轴中。注意定位。



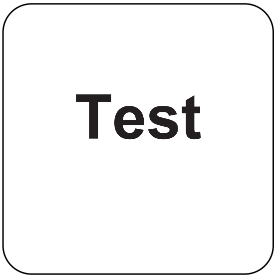
按下 **ZERO** 按钮。



从测量轴上取下比色杯。



将**样本比色杯**放入测量轴中。注意定位。



按下 **TEST** (XD: **START**)
按钮。

结果在显示屏上显示为 mg / l 钼酸。

分析

下表中输出数据也可转换为其他格式表示.

单位	参考表格	因素
mg/l	MoO_4	1
mg/l	Mo	0.6
mg/l	Na_2MoO_4	1.29

化学方法

Ternary Complex

附錄

干扰说明

干擾	從/ [mg/l]	影響
Al	50	
Cr	1000	
Fe	50	
Ni	50	
NO_2^-	所有的量	
Cu	10	反应时间超过5分钟会导致读数偏高

参考文献

Analytical Chemistry, 25(9) 1363 (1953)

HR L 钼酸 M254

1 - 100 mg/L MoO_4 Mo2

巯基乙酸

材料

所需材料（部分可選）：

试剂	**包装单位**	**货号**
KS63-FE6 巯基乙酸盐/钼酸盐 HR RGT	65 mL	56L006365

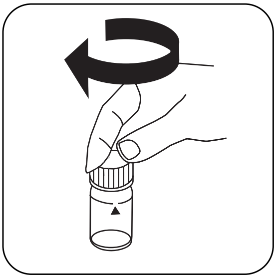
取样

1. 取样后必须立即进行测试。取样器壁上的钼酸盐沉积物导致测量结果较低。

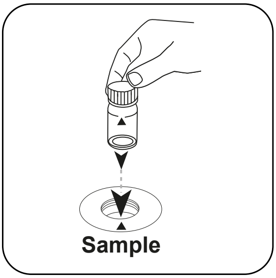
进行测定 HR 钼酸液剂

选择设备中的方法。

用 **10 mL 样本**填充 24 mm 比色杯。



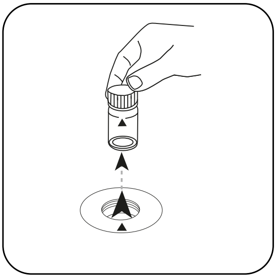
密封比色杯。



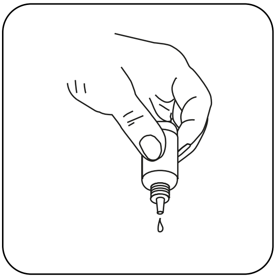
将**样本比色杯**放入测量轴中。注意定位。

Zero

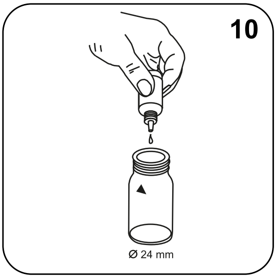
按下 **ZERO** 按钮。



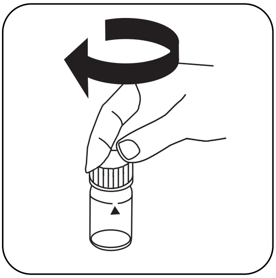
从测量轴上取下比色杯。



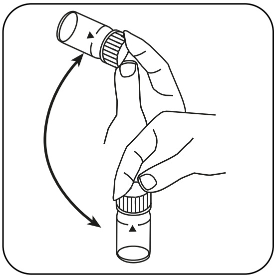
垂直握住滴瓶，慢慢加入相同大小的滴剂。



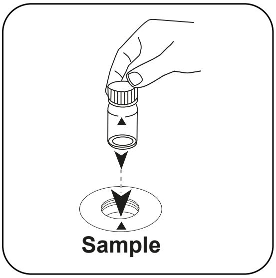
加入 **10 滴 Iron Reagent FE6**。



密封比色杯。



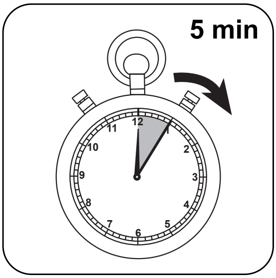
通过旋转混合内容物。



将**样本比色杯**放入测量轴中。注意定位。

Test

按下 **TEST** (XD: **START**) 按钮。



等待 **5 分钟反应时间** 。

反应时间结束后，自动进行测量。

结果在显示屏上显示为 mg / l 钼酸。

分析

下表中输出数据也可转换为其他格式表示.

单位	参考表格	因素
mg/l	MoO_4	1
mg/l	Mo	0.6
mg/l	Na_2MoO_4	1.29

化学方法

巯基乙酸

附錄

干扰说明

可消除干扰

1. 铌、钽、钛和锆的干扰用柠檬酸掩盖。
2. 钒（V）的干扰用氟化钾掩盖。

参考文献

Photometrische Analyse, Lange/ Vjedelek, Verlag Chemie 1980

T 臭氧 M300

0.02 - 2 mg/L O_3 O3

DPD / 甘氨酸

材料
所需材料（部分可選）：

试剂	包装单位	货号
DPD No.1	片剂 / 100	511050BT
DPD No.1	片剂 / 250	511051BT
DPD No.1	片剂 / 500	511052BT
DPD No.3	片剂 / 100	511080BT
DPD No.3	片剂 / 250	511081BT
DPD No.3	片剂 / 500	511082BT
DPD No.1 高钙 [e)]	片剂 / 100	515740BT
DPD No.1 高钙 [e)]	片剂 / 250	515741BT
DPD No.1 高钙 [e)]	片剂 / 500	515742BT
DPD No.3 高钙 [e)]	片剂 / 100	515730BT
DPD No.3 高钙 [e)]	片剂 / 250	515731BT
DPD No.3 高钙 [e)]	片剂 / 500	515732BT
甘氨酸 [f)]	片剂 / 100	512170BT
甘氨酸 [f)]	片剂 / 250	512171BT
套件 DPD No.1/No.3[#]	各100次	517711BT
套件 DPD No.1/No.3[#]	各250次	517712BT
套件 DPD No.1/No .3 高钙 [#]	各100次	517781BT
套件 DPD No.1/No .3 高钙 [#]	各250次	517782BT
套件 DPD No.1/甘氨酸 [#]	各100次	517731BT
套件 DPD No.1/甘氨酸 [#]	各250次	517732BT

准备

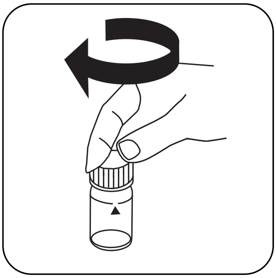
1. 清洗比色杯：
   由于许多家用清洁剂（例如洗碗用洗涤剂）含有还原剂，所以随后测定的氧化剂（例如臭氧、氯）结果可能会不足。为了排除这种测量误差，玻璃器皿应无氯。为此，将玻璃器皿在次氯酸钠溶液（0.1 g/L）下存放 1 小时，然后用去离子水彻底冲洗。
2. 在样本制备中，通过移液和摇动来避免臭氧的排气。取样后必须立即进行分析。
3. 在分析前（用 0.5 mol/l 硫酸或 1 mol/l 氢氧化钠溶液）必须将强碱性或酸性水的 pH 范围调节到 6 和 7 之间。

进行测定 臭氧，样品中含氯，片剂

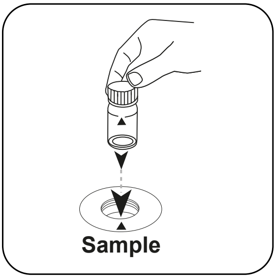
选择设备中的方法。

另外选择测定：有氯存在

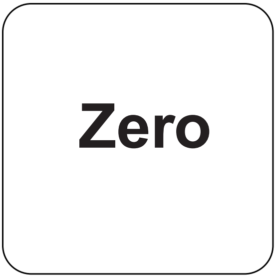
用 **10 mL 样本**填充 24 mm 比色杯。



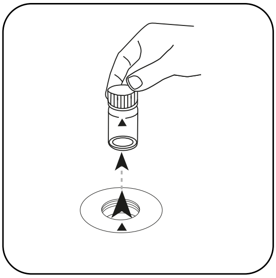
密封比色杯。



将**样本比色杯**放入测量轴中。注意定位。

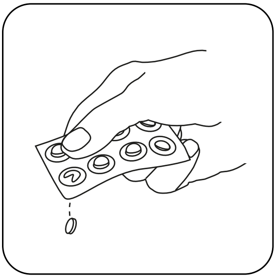


按下 **ZERO** 按钮。

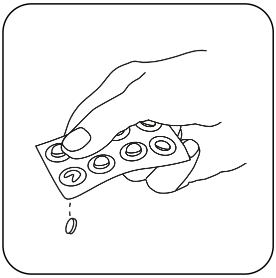


从测量轴上取下比色杯。

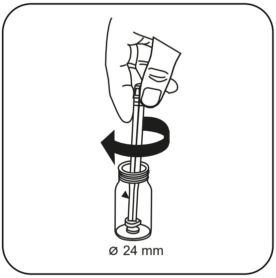
将比色杯倒空。



加入 **DPD No. 1 片剂** 。

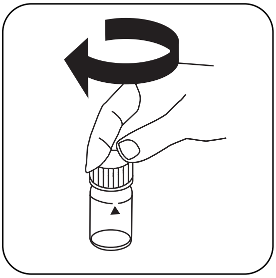


加入 **DPD No. 3 片剂** 。

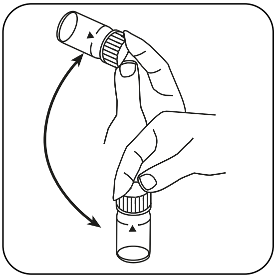


用轻微的扭转压碎片剂。

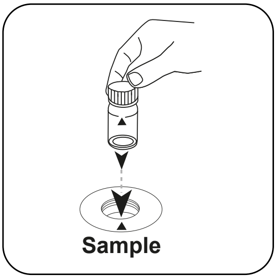
用**样本**将比色杯填充至 **10 mL 刻度**处。



密封比色杯。



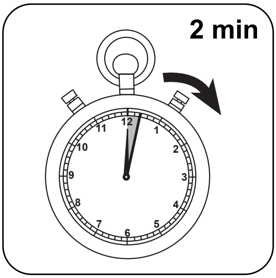
通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。

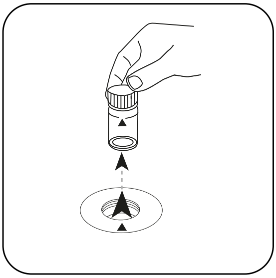
Test

按下 **TEST** (XD: **START**) 按钮。

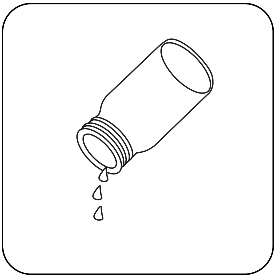


等待 **2 分钟反应时间** 。

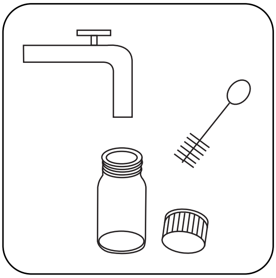
反应时间结束后，自动进行测量。



从测量轴上取下比色杯。

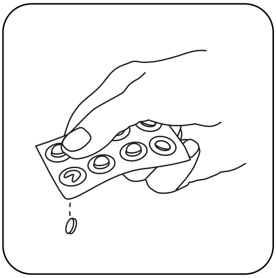


倒空比色杯。

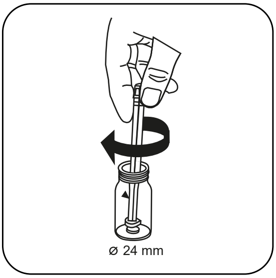


彻底清洗比色杯和比色杯杯盖。

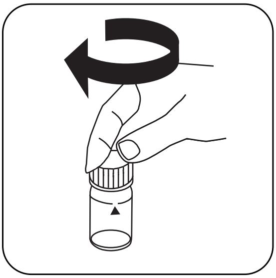
用 **10 mL 样本**填充**第二个比色杯**。



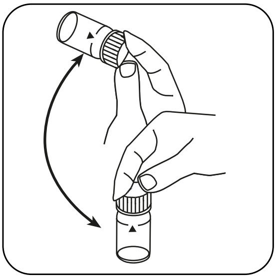
加入 **GLYCINE 片剂**。



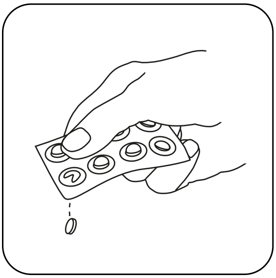
用轻微的扭转压碎片剂。



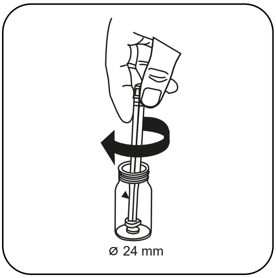
密封比色杯。



通过旋转溶解片剂。

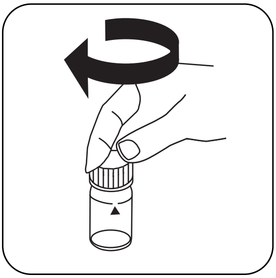


将**一片 DPD No. 1 片剂** 和**一片 DPD No. 3 片剂** 直接从铝箔中取出加入到第一个比色杯中。

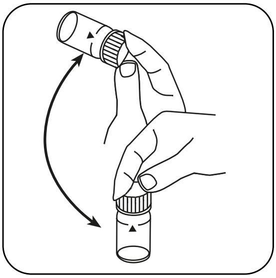


用轻微的扭转压碎片剂。

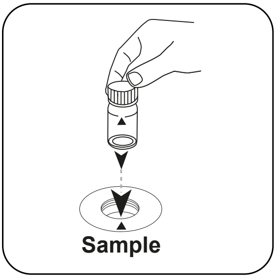
将准备好的**甘氨酸**加入到准备好的比色杯中。



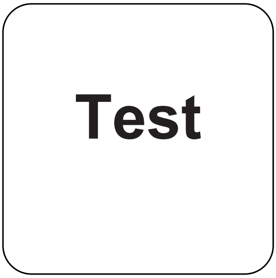
密封比色杯。



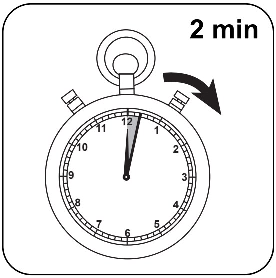
通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。



按下 **TEST** (XD: **START**) 按钮。



等待 **2 分钟反应时间** 。

反应时间结束后，自动进行测量。

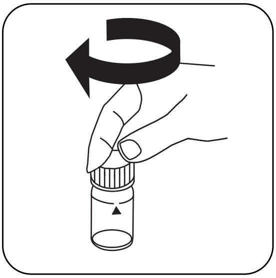
结果在显示屏上显示为 mg / l 臭氧； mg/l 总氯。

进行测定 臭氧，样品中不含氯，片剂

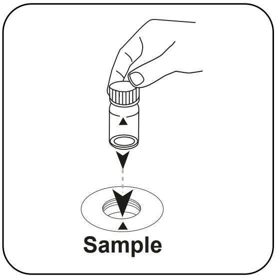
选择设备中的方法。

另外选择测定：不含氯

用 **10 mL 样本**填充 24 mm 比色杯。



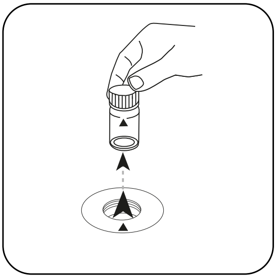
密封比色杯。



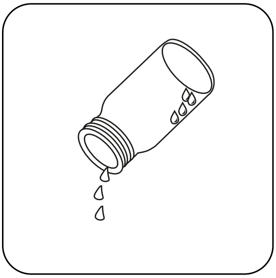
将**样本比色杯**放入测量轴中。注意定位。

Zero

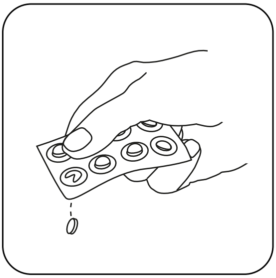
按下 **ZERO** 按钮。



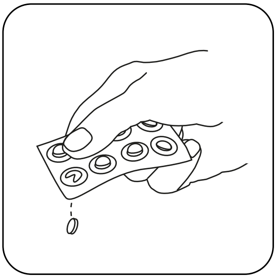
从测量轴上取下比色杯。



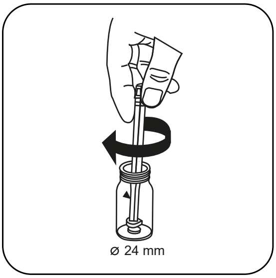
将比色杯倒空。



加入 **DPD No. 1 片剂** 。

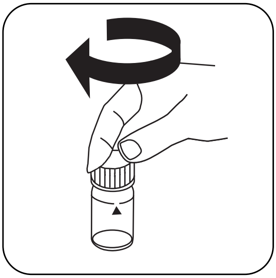


加入 **DPD No. 3 片剂** 。

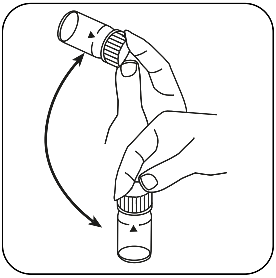


用轻微的扭转压碎片剂。

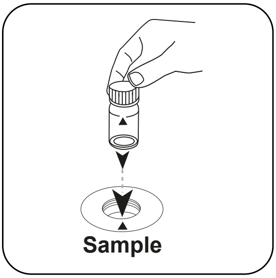
用**样本**将比色杯填充至 **10 mL 刻度**处。



密封比色杯。



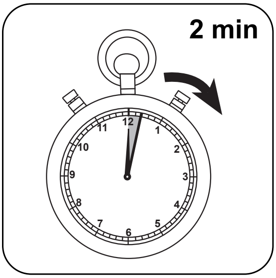
通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。

Test

按下 **TEST** (XD: **START**) 按钮。



等待 **2 分钟反应时间** 。

反应时间结束后，自动进行测量。

结果在显示屏上显示为 mg / l 臭氧。

分析

下表中输出数据也可转换为其他格式表示.

单位	参考表格	因素
mg/l	O_3	1
mg/l	Cl_2	1.4771

化学方法

DPD / 甘氨酸

附錄

干扰说明

持续干扰

1. 存在于样本中的所有氧化剂都像氯一样反应，导致多重结果。
2. 高于 6 mg/L 臭氧的浓度可导致测量范围内的结果高达 0 mg/L。在这种情况下应稀释水样。将 10 ml 稀释的样本与试剂混合并重复测量（可信度测试）。

参考文献

Colorimetric Chemical Analytical Methods, 9th Edition, Lovibond

源于

DIN 38408-3:2011-04

[e)] 替代试剂，取代DPD No.1/No.3试剂，用于由高浓度钙离子和/或高电导率引起的浑浊水样分析 | [f)] 附加试剂，用于含氯水样，进行溴，二氧化氯和臭氧的测定分析 | [#] i含搅拌棒, 10cm

L 聚丙烯酸酯 M338

1 - 30 mg/L Polyacryl POLY

浊度

材料

所需材料（部分可選）：

试剂	包装单位	货号
试剂筒 C18	1 片	56A020101
KS173-P2-2.4 二硝基苯酚指示剂	65 mL	56L017365
KS183-QA2-MO1-P3 硝酸	65 mL	56L018365
Polyacrylate L Reagent Set	1 片	56R019165
KS336-Propan-2-ol, 65 mL	65 mL	56L033665

它還需要以下配件。

附件	包装单位	货号
Pipette, 1000 µl	1 片	365045
移液器吸头，0.1-1 ml（蓝色），1000 件	1 片	419073

准备

- **小柱制备：**

1. 取下合适的注射器的柱塞。将 C18 小柱固定在注射筒上。
2. 向注射筒中注入 5 ml KS336（异丙醇）。
3. 利用柱塞将溶剂逐滴推入小柱内。
4. 清除流过的溶剂。
5. 重新取下柱塞。用 20 ml 去离子水填充注射筒。
6. 利用柱塞将内容物逐滴推入小柱内。
7. 弃用流过的去离子水。
8. 现在小柱已准备就绪。

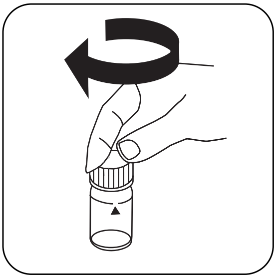
备注

1. 如果尽管样本和试剂剂量正确，没有或仅形成轻微浑浊，则有必要浓缩样本以检测聚丙烯酸酯/聚合物。
2. 如果由于样本成分或污染物而造成干扰，结果可能会出现偏差。在这种情况下必需消除干扰。
3. 在 1-30 mg/L 的范围内使用聚丙烯酸 2100 钠盐的情况下采用该方法。其他聚丙烯酸酯/聚合物会产生结果偏差，这可能会改变测量范围。

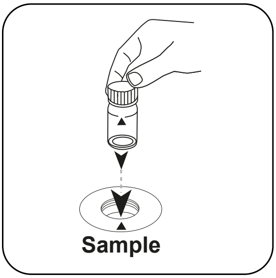
进行测定 聚丙烯酸酯液剂

选择设备中的方法。

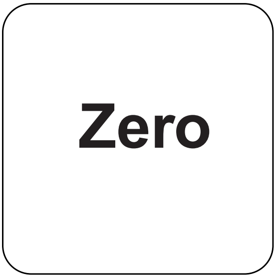
用 **10 mL 样本**填充 24 mm 比色杯。



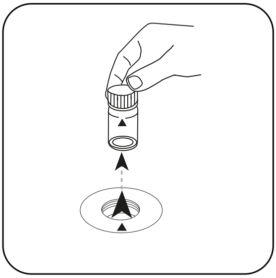
密封比色杯。



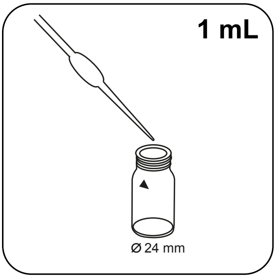
将**样本比色杯**放入测量轴中。注意定位。



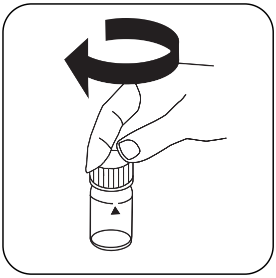
按下 **ZERO** 按钮。



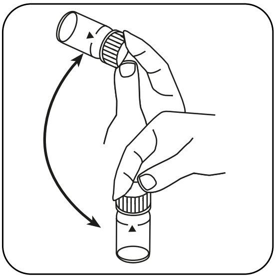
从测量轴上取下比色杯。



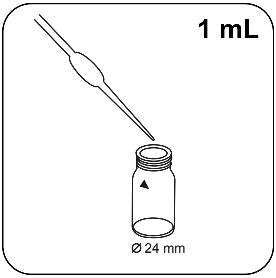
将 **1 mL (25 滴) KS255 (Polyacrylate Reagenz 1) 溶液**加入到样本比色杯中。



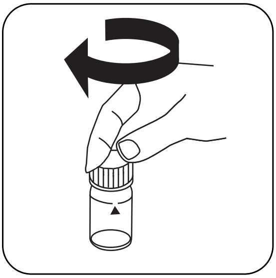
密封比色杯。



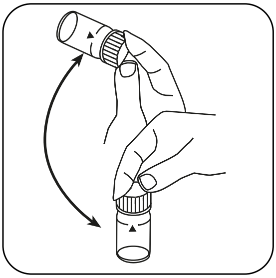
通过旋转混合内容物。



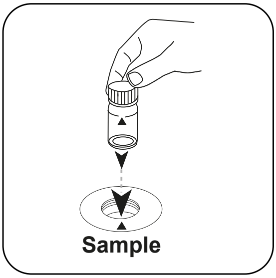
将 **1 mL (25 滴) Polyacrylate Precipitant A2 溶液**加入到样本比色杯中。



密封比色杯。



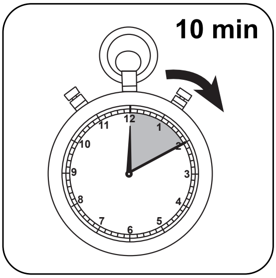
通过旋转混合内容物。



将**样本比色杯**放入测量轴中。注意定位。

Test

按下 **TEST** (XD: **START**) 按钮。



等待 **10 分钟反应时间** 。

反应时间结束后，自动进行测量。

结果在显示屏上显示为 mg / l 聚丙烯酸 2100 钠盐 。

化学方法

浊度

附錄

参考文献

W.B.Crummett, R.A.Hummel (1963), The Determination of Polyacrylamides in Water, American Water Works Association, 55 (2), pp. 209-219

PP 硫酸盐 M360

5 - 100 mg/L SO_4^{2-} SO4

硫酸钡浊度法

材料

所需材料（部分可選）：

试剂	包装单位	货号
VARIO 硫酸盐 4 F10	粉剂 / 100 片	532160
ValidCheck 硫酸盐 75 mg/l	1 片	48311325

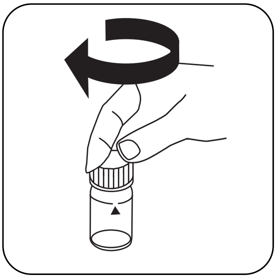
备注

1. 硫酸盐引起细微的分散浑浊。

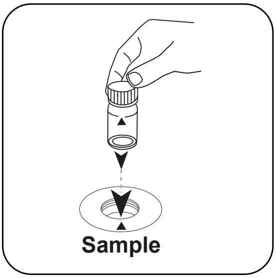
进行测定 硫酸盐 Vario 粉包

选择设备中的方法。

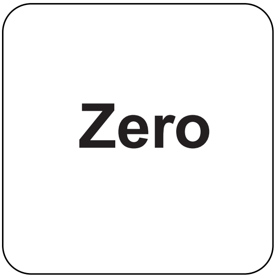
用 **10 mL 样本**填充 24 mm 比色杯。



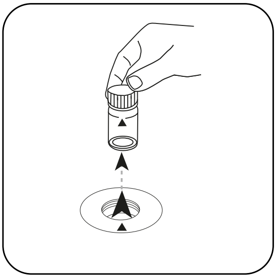
密封比色杯。



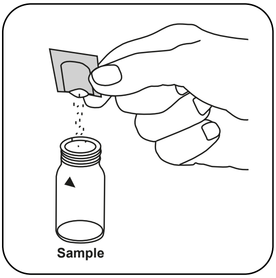
将**样本比色杯**放入测量轴中。注意定位。



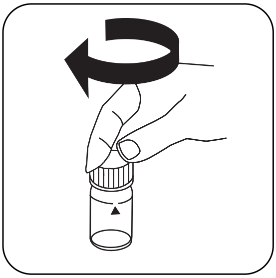
按下 **ZERO** 按钮。



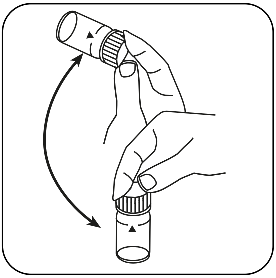
从测量轴上取下比色杯。



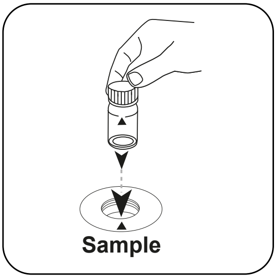
加入 **Vario Sulpha 4/ F10 粉包** 。



密封比色杯。



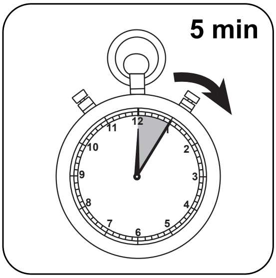
通过旋转混合内容物。



将**样本比色杯**放入测量轴中。注意定位。

Test

按下 **TEST** (XD: **START**) 按钮。



等待 **5 分钟反应时间** 。

反应时间结束后，自动进行测量。

结果在显示屏上显示为 mg / l 硫酸盐。

化学方法

硫酸钡浊度法

附錄

参照

标准方法 4500-SO42- E
US EPA 375.4

源于

DIN ISO 15923-1 D49

PP 三唑 M388

1 - 16 mg/L Benzotriazole or Tolyltriazole

tri

催化紫外消解

材料

所需材料（部分可選）：

试剂	包装单位	货号
VARIO 三唑 RGT 粉包 F25	粉剂 / 100 片	532200
VARIO Rochelle 盐溶液, 30 ml [h]	30 mL	530640

它還需要以下配件。

附件	包装单位	货号
灯	1 片	400740
防紫外线眼镜，橙色	1 片	400755

危险提示

在 UV 灯运行时，必须佩戴防 UV 护目镜。

取样

1. 取样后尽快测试水样。

准备

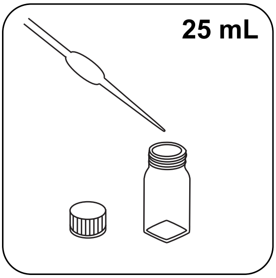
1. 为了获得准确的分析结果，必须保持 20 °C 到 25 °C 的样本温度。
2. 在分析前必须（用 1N 硫酸）将含亚硝酸盐或硼砂的水的 pH 范围调节到 4 和 6 之间。
3. 如果样本含有超过 500 mg/L $CaCO_3$ 硬度，加入 10 滴 Rochelle 盐溶液。

备注

1. 可根据要求获得三唑试剂粉包和 UV 灯。
2. 对于操作 UV 灯，必须遵守制造商的说明。不要触摸 UV 灯的表面。指纹腐蚀玻璃。在测量期间用柔软干净的布擦拭 UV 灯。
3. 测试对于甲苯基三唑和苯并三唑无区别。

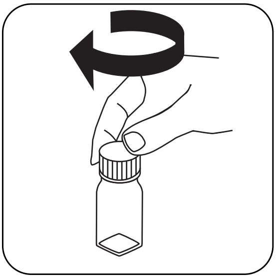
进行测定 苯并三唑/甲苯基三唑 Vario 粉包

选择设备中的方法。

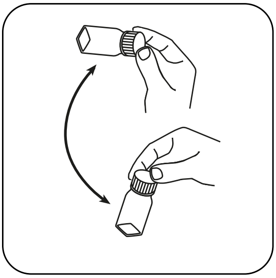


用 25 mL 样本填充合适的样本容器。

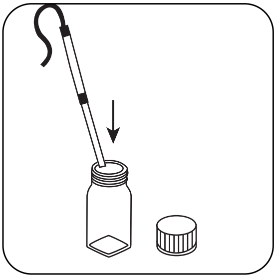
加入 **粉包**。



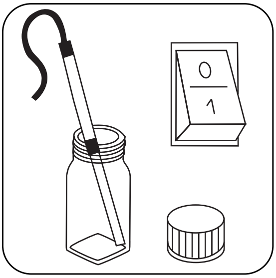
密封容器



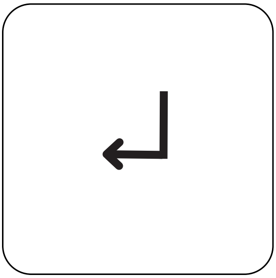
通过旋转溶解粉末。



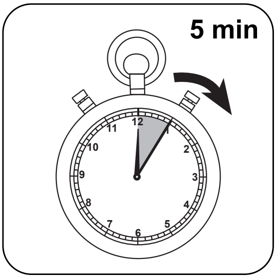
UV 灯保持在样本中。**注意：佩戴 UV 护目镜！**



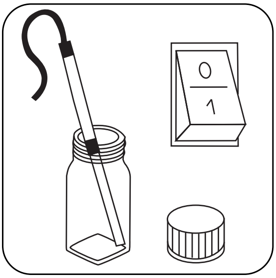
开启 UV 灯。



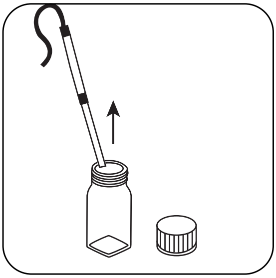
按下 **ENTER** 按钮。



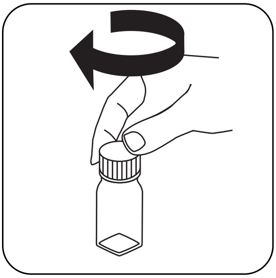
等待 **5 分钟反应时间** 。



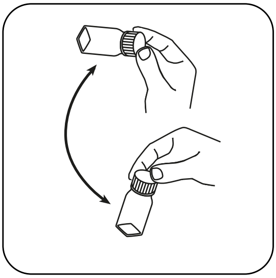
倒计时结束后关闭紫外线灯。



从样本中取出紫外线灯。

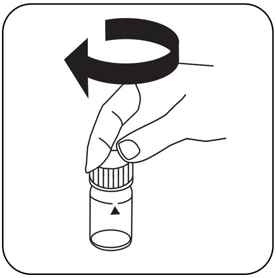


密封容器

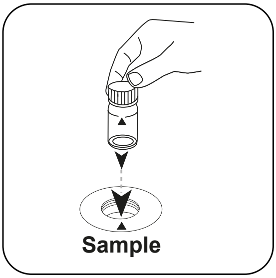


通过旋转混合内容物。

用 **10 mL 去离子水**填充 24 mm 比色杯。



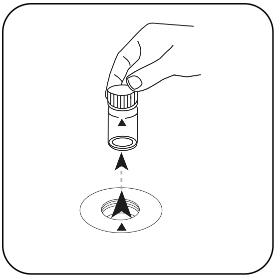
密封比色杯。



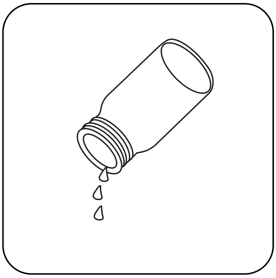
将**样本比色杯**放入测量轴中。注意定位。

Zero

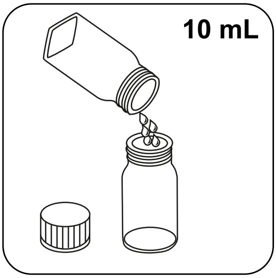
按下 **ZERO** 按钮。



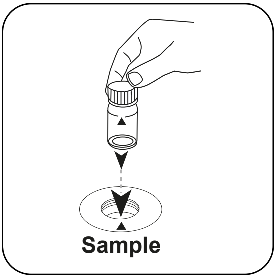
从测量轴上取下比色杯。



倒空比色杯。



用 **10 mL 准备好的样本**填充 24 mm 比色杯。



将**样本比色杯**放入测量轴中。注意定位。

Test

按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 mg / l
苯并三唑/甲苯基三唑(通过按向上/向下箭头在引文形式之间进行切换)。。

分析

下表中输出数据也可转换为其他格式表示.

单位	参考表格	因素
mg/l	Benzotriazole	1
mg/l	Tolyltriazole	1.1177

化学方法

催化紫外消解

附錄

干扰说明

持续干扰

- 如果光解进行多于或少于 5 分钟，则可能导致结果较低。

参考文献

Harp, D., Proceedings 45th International Water Conference, 299 (October 22-24, 1984)

[h] 附加试剂，用于硬度值高于的300 mg/l $CaCO_3$分析

L 锌 M405

0.1 - 2.5 mg/L Zn Zn

锌试剂 / EDTA

材料

所需材料（部分可選）：

试剂	包装单位	货号
KS 89 - 阳离子抑制剂	65 mL	56L008965
Zinc LR Reagent Set	1 片	56R023965
缓冲锌Z1B	65 mL	56L024365
KP244 锌试剂2	粉剂 / 20 g	56P024420

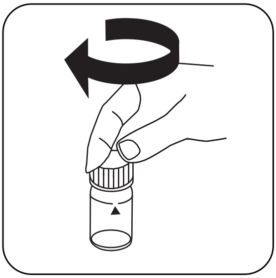
备注

1. 为了正确剂量，必须使用随试剂一起提供的量匙。
2. 该测试适用于测定游离的可溶性锌。与强结合剂结合的锌检测不到。

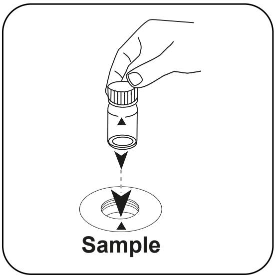
进行测定 锌片剂和粉末

选择设备中的方法。

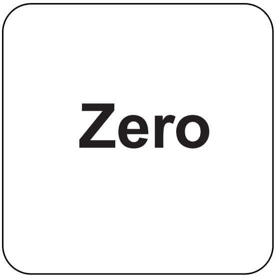
用 **10 mL 样本**填充 24 mm 比色杯。



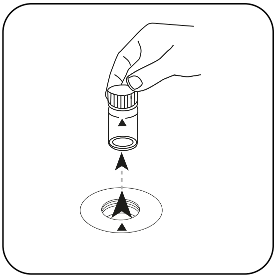
密封比色杯。



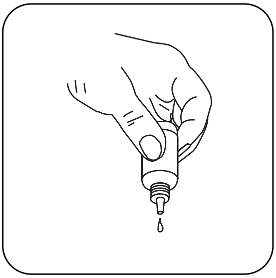
将**样本比色杯**放入测量轴中。注意定位。



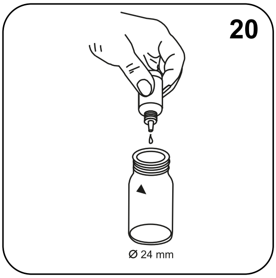
按下 **ZERO** 按钮。



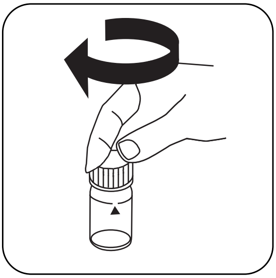
从测量轴上取下比色杯。



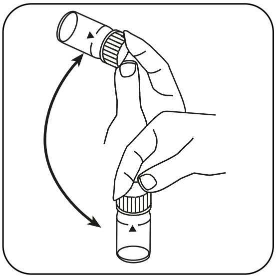
垂直握住滴瓶，慢慢加入相同大小的滴剂。



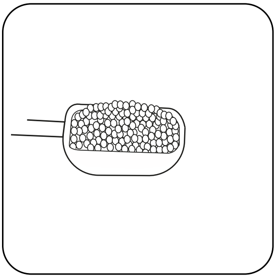
加入 **20 滴 Zinc Buffer Z1B**。



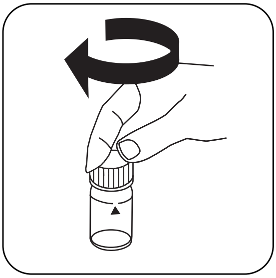
密封比色杯。



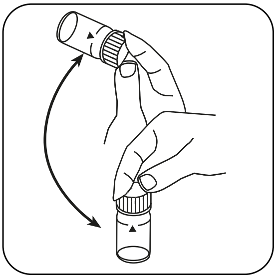
通过旋转混合内容物。



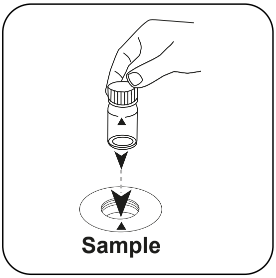
加入**一勺 Zinc Indicator Z4P**。



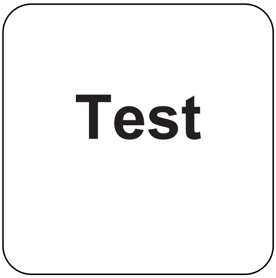
密封比色杯。



通过旋转溶解粉末。



将**样本比色杯**放入测量轴中。注意定位。



按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 mg / l 锌。

化学方法

锌试剂 / EDTA

附錄

干扰说明

可消除干扰

- 阳离子如季铵化合物会导致颜色由粉红色变为紫色，这取决于铜的浓度。在这种情况下，向样本中滴加 KS89（阳离子抑制剂），直到看到橙/蓝色。注意：滴加后摇动样本。

参考文献

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989
S.M.Khopkar, Basic Concepts of Analytical Chemistry (2004), New Age International Ltd. Publishers, New Dheli, p. 75

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