Lovibond® Water Testing

Tintometer® Group

Manual of Methods

MD 100 • MD 110 • MD 200

Aluminium | Chloride | Copper | DEHA | Hydrazine | Iron |
Oxygen | Phosphate | Polyacrylate | Silica

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DE **Methodenhandbuch**
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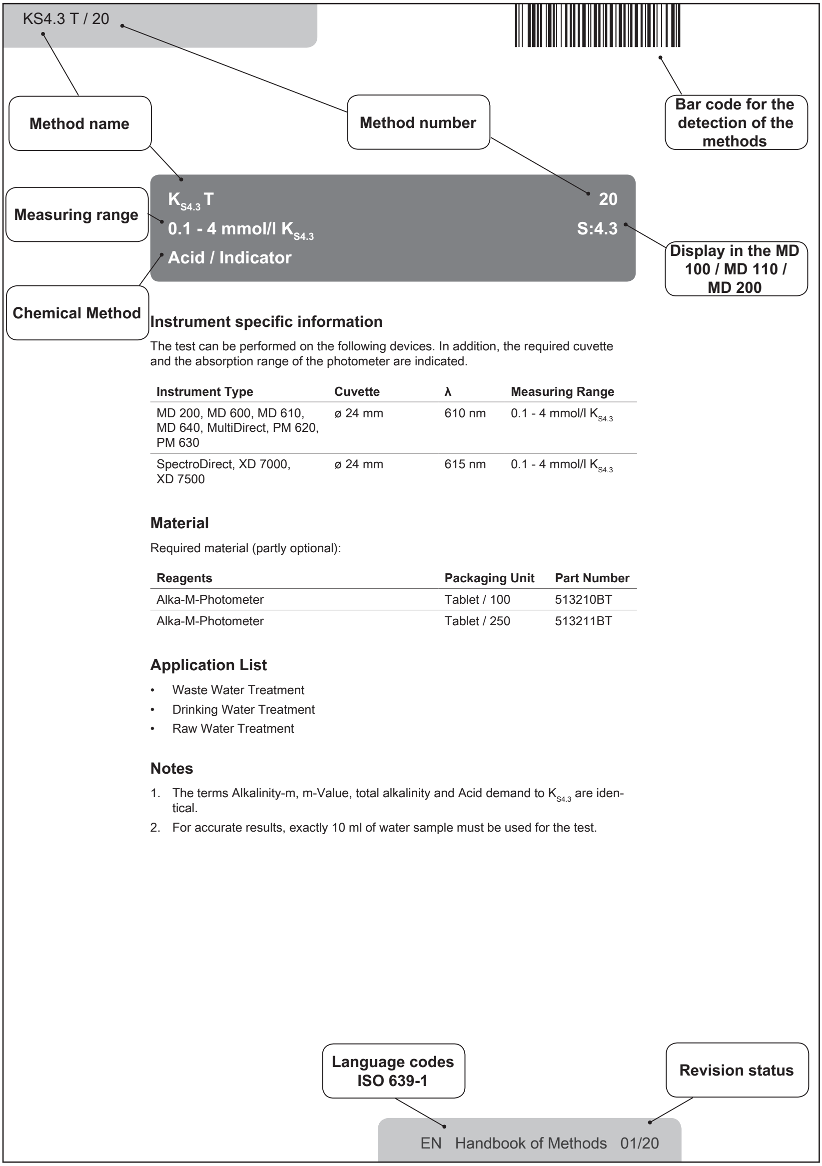


KS4.3 T / 20

$K_{S4.3}$ 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

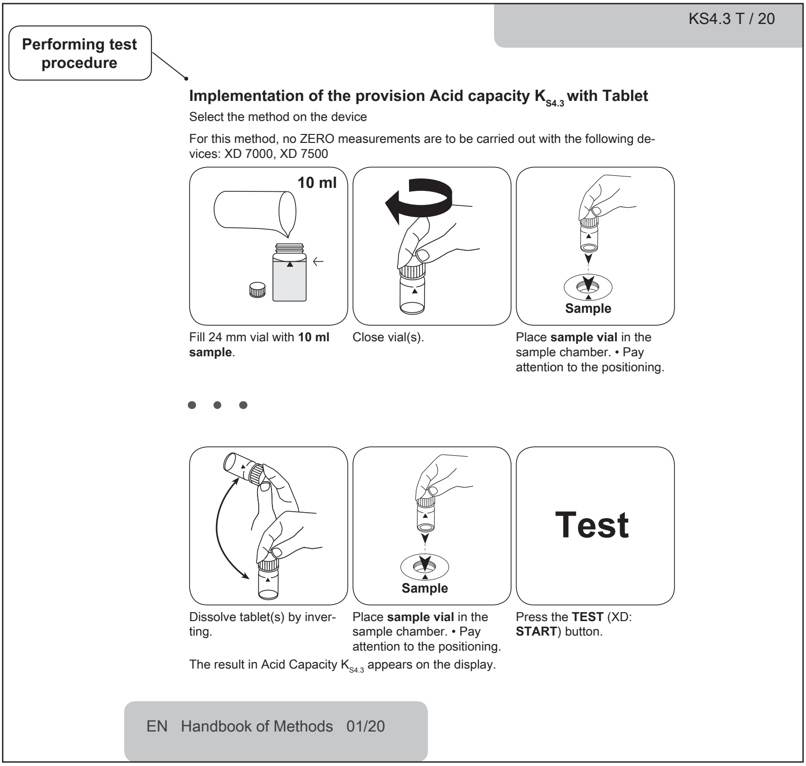
Application List

- 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



Performing test procedure

KS4.3 T / 20

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.

EN Handbook of Methods 01/20

Aluminium PP M50

0.01 - 0.25 mg/L Al AL

Eriochrom Cyanine R

Material

Required material (partly optional):

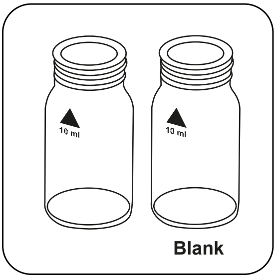
Reagents	Packaging Unit	Part Number
VARIO Aluminium Reagent, Set F20	1 pc.	535000

Preparation

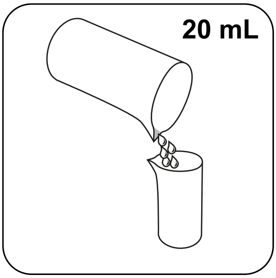
1. To get accurate results the sample temperature must be between 20 °C and 25 °C.
2. To avoid errors caused by contamination, rinse the vial and the accessories with Hydrochloric acid (approx. 20%) before the analysis. Then rinse them with deionised water.

Determination of Aluminium with Vario Powder Pack

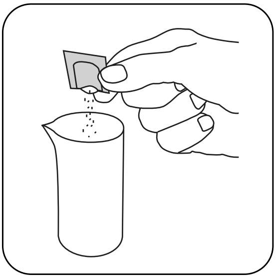
Select the method on the device.



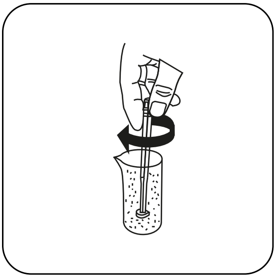
Prepare two clean 24 mm vials. Mark one as a blank.



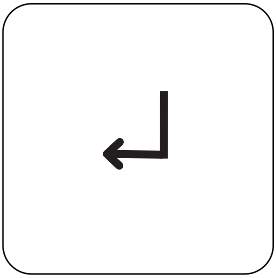
Put **20 mL sample** in 100 mL measuring beaker



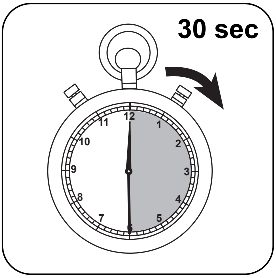
Add **Vario ALUMINIUM ECR F20 powder pack**.



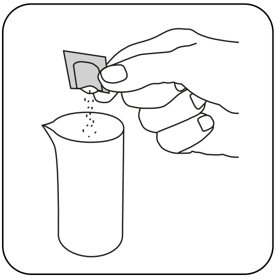
Dissolve the powder by mixing.



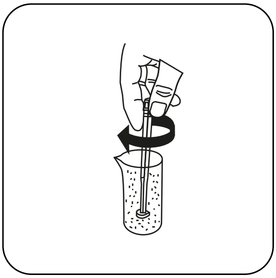
Press the **ENTER** button.



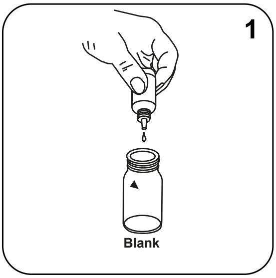
Wait for **30 second(s) reaction time**.



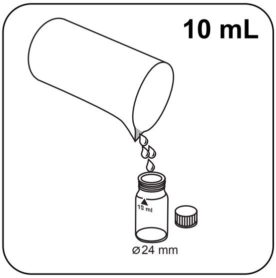
Add **Vario HEXAMINE F20 powder pack**.



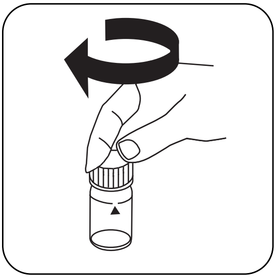
Dissolve the powder by mixing.



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



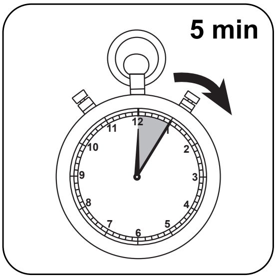
Place **10 mL pre-treated sample** in each vial.



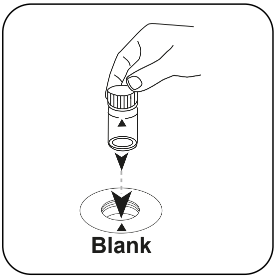
Close vial(s).

↵

Press the **ENTER** button.



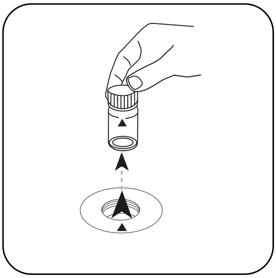
Wait for **5 minute(s) reaction time**.



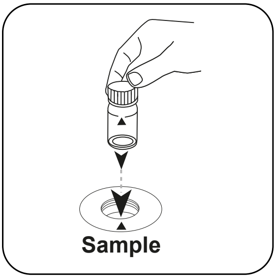
Place **blank** in the sample chamber. Pay attention to the positioning.

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

Chloride L (B) M92

0.5 - 20 mg/L Cl^- CL-

Mercury Thiocyanate / Iron Nitrate

Material

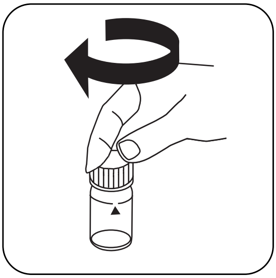
Required material (partly optional):

Reagents	Packaging Unit	Part Number
Chloride Reagent Set	1 pc.	56R018490

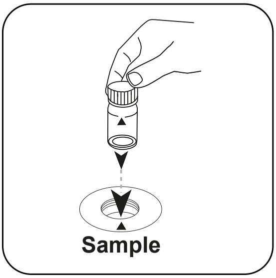
Determination of Chloride with liquid reagent

Select the method on the device.

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



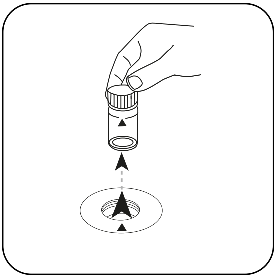
Close vial(s).



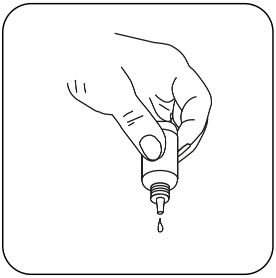
Place **sample vial** in the sample chamber. Pay attention to the positioning.

Zero

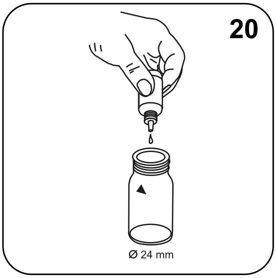
Press the **ZERO** button.



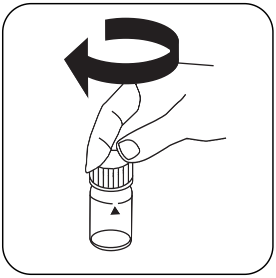
Remove the vial from the sample chamber.



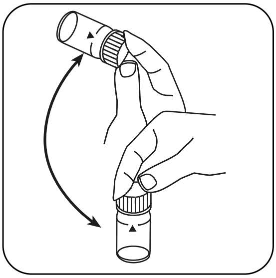
Hold cuvettes vertically and add equal drops by pressing slowly.



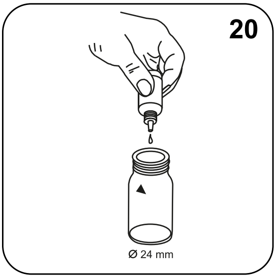
Add **20 drops KS251 (Chloride Reagenz A)**.



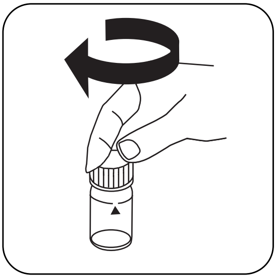
Close vial(s).



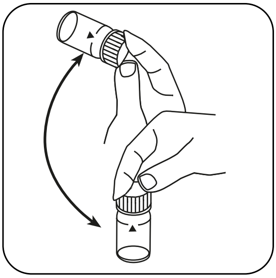
Invert several times to mix the contents.



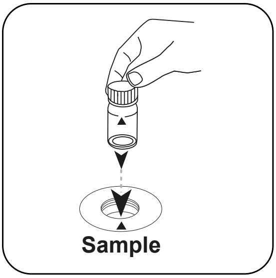
Add **20 drops KS253 (Chloride Reagenz B)**.



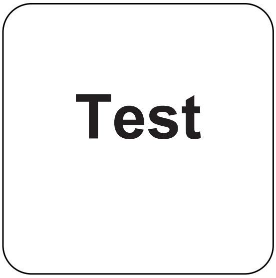
Close vial(s).



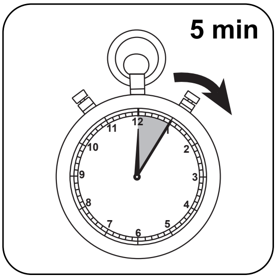
Invert several times to mix the contents.



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 Chloride 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	Cl^-	1
mg/l	NaCl	1.65

Chemical Method

Mercury Thiocyanate / Iron Nitrate

Appendix

Interferences

Persistant Interferences

1. Reducing substances such as sulfite and thiosulfate, that can reduce iron (III) to iron (II) or mercury (II) to mercury (I) may interfere. Cyanide, Iodine and Bromide give a positive intereference.

Derived from

DIN 15682-D31
DIN ISO 15923-1 D49

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

Preparation

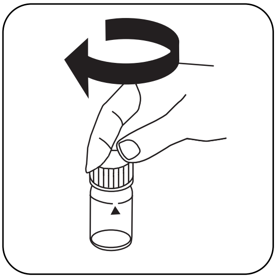
1. Strong alkaline or acidic water samples must be adjusted to pH 4 to 6 before analysis.

Determination of Copper, free with tablet

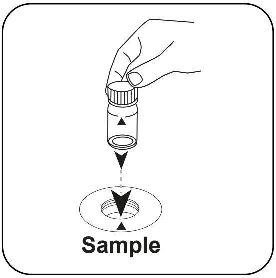
Select the method on the device.

In addition, choose the test: free

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



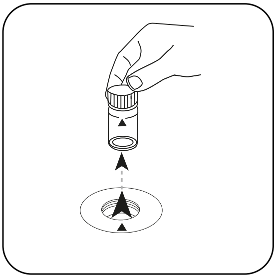
Close vial(s).



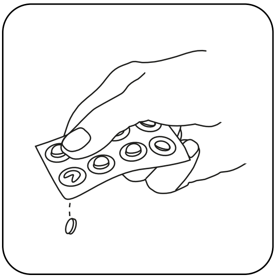
Place **sample vial** in the sample chamber. Pay attention to the positioning.

Zero

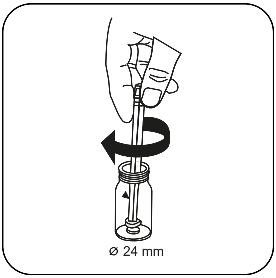
Press the **ZERO** button.



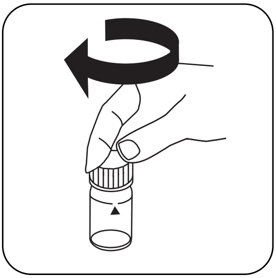
Remove the vial from the sample chamber.



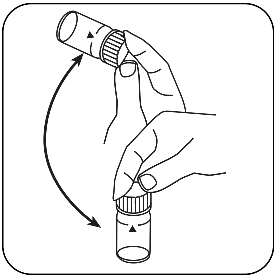
Add **COPPER No. 1 tablet** .



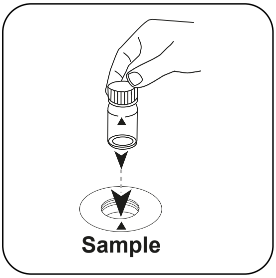
Crush tablet(s) by rotating slightly.



Close vial(s).



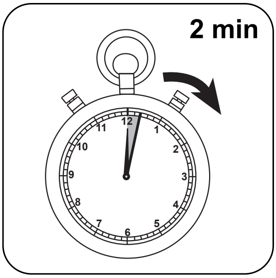
Dissolve tablet(s) by inverting.



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.

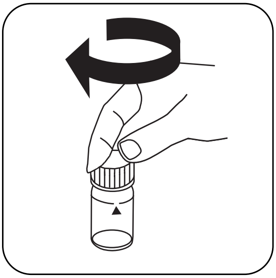
The result in mg/L free Copper appears on the display.

Determination of Copper, total with tablet

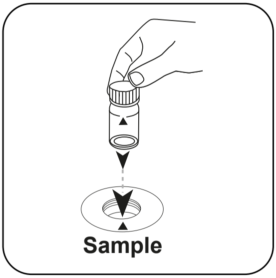
Select the method on the device.

In addition, choose the test: total

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



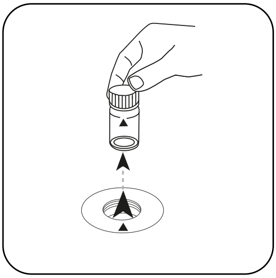
Close vial(s).



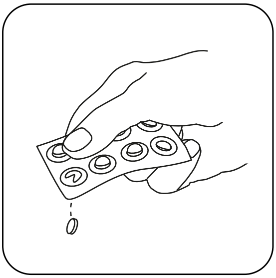
Place **sample vial** in the sample chamber. Pay attention to the positioning.

Zero

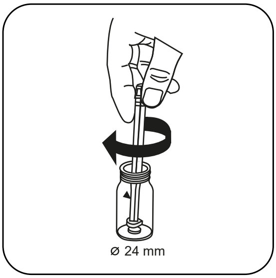
Press the **ZERO** button.



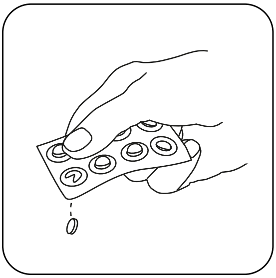
Remove the vial from the sample chamber.



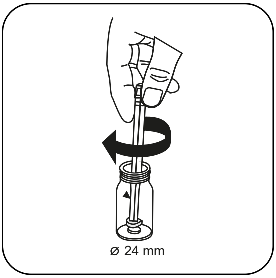
Add **COPPER No. 1 tablet** .



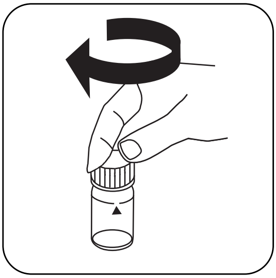
Crush tablet(s) by rotating slightly and dissolve.



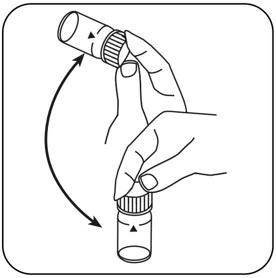
Add **COPPER No. 2 tablet** .



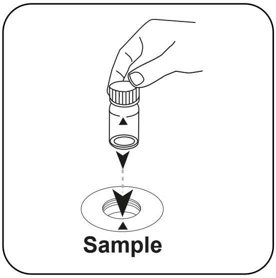
Crush tablet(s) by rotating slightly.



Close vial(s).



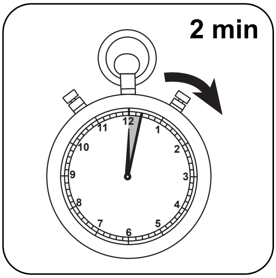
Dissolve tablet(s) by inverting.



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

DEHA PP M167

0.02 - 0.5 mg/L DEHA DEHA

PPST

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
VARIO DEHA Reagent Set	1 pc.	536000

Preparation

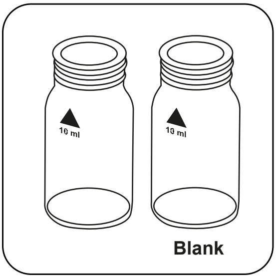
1. To avoid errors caused by iron deposits, rinse the glassware with Hydrochloric acid (approx. 20%) before the analysis and then rinse with deionised water.

Notes

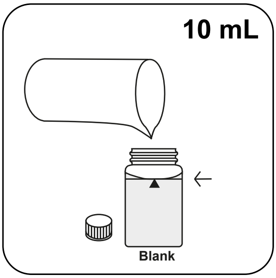
1. Because the reaction depends on temperature, the temperature must be maintained at 20 °C ± 2 °C.
2. Keep the sample vial in the dark or in the sample chamber during colour development time. If the Reagent solution is exposed to UV-light (sunlight) it causes high measurement results.

Determination of DEHA (N,N-Diethylhydroxylamine) with Vario Powder Pack and Fluid Reagent

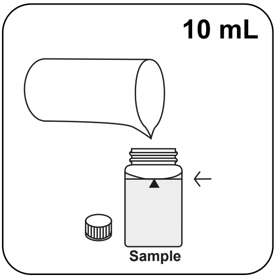
Select the method on the device.



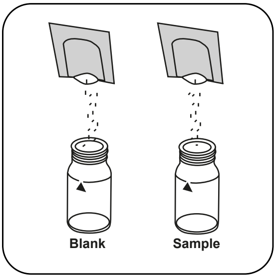
Prepare two clean 24 mm vials. Mark one as a blank.



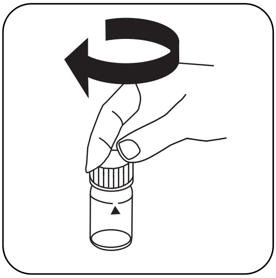
Put **10 mL deionised water** in the blank.



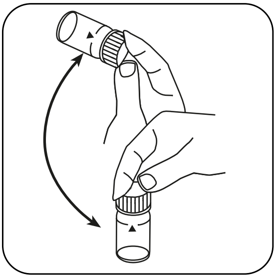
Put **10 mL sample** in the sample vial.



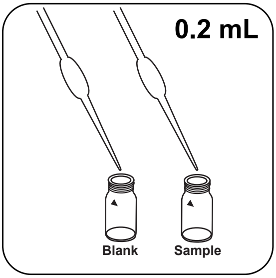
Add **a Vario OXYSCAV 1 Rgt powder pack** in each vial.



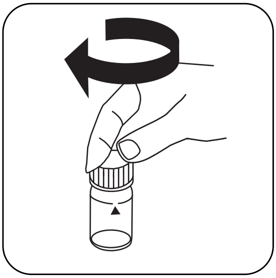
Close vial(s).



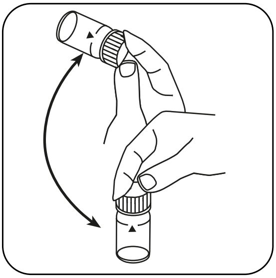
Invert several times to mix the contents.



Add **0.2 mL Vario DEHA 2 Rgt solution** to each vial.



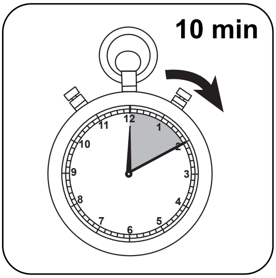
Close vial(s).



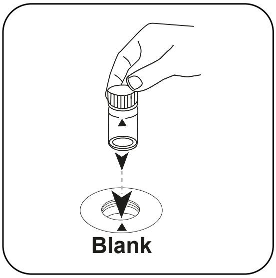
Invert several times to mix the contents.

↵

Press the **ENTER** button.



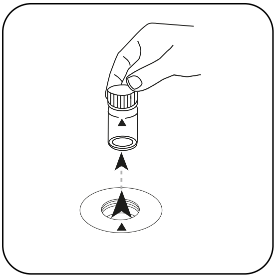
Wait for **10 minute(s) reaction time**.



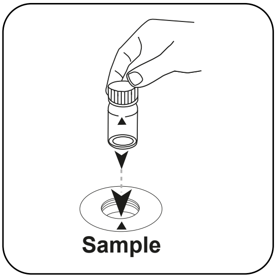
Place **blank** in the sample chamber. Pay attention to the positioning.

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 DEHA 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	DEHA	1
µg/l	DEHA	1000
mg/l	Hydrochinon	2.63
mg/l	MEKO	4.5
mg/l	Carbohydrazid	1.31
mg/l	ISA	3.9

Chemical Method

PPST

Appendix

Interferences

Removeable Interferences

1. Interference:
   Iron (II) interferes at all concentrations: For the determination of iron (II) concentration, the test is repeated without the addition of DEHA solution. Should the concentration be over 20 µg/L, the displayed value will be deducted from the result of the DEHA test result.
2. Substances that reduce Iron (III), interfere. Substances that complex iron strongly, may also interfere.

Interference	from / [mg/L]
Zn	50
$Na_2B_4O_7$	500
Co	0,025
Cu	8
$CaCO_3$	1000
Lignosulfonate	0,05
Mn	0,8
Mo	80
Ni	0,8

Interference	from / [mg/L]
PO_4^{3-}	10
$R\text{-}PO(OH)_2$	10
SO_4^{2-}	1000

Bibliography

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989

Hydrazine P M205

0.05 - 0.5 mg/L N_2H_4 Hydr

Dimethylaminobenzaldehyde

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Hydrazine Test Powder	Powder / 30 g	462910

The following accessories are required.

Accessories	Packaging Unit	Part Number
Measuring spoon, 1 g	1 pc.	384930

Preparation

1. If the water sample is turbid, it must be filtered before performing the zeroing.
2. The sample's temperature should not exceed 21 °C.

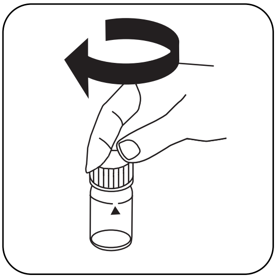
Notes

1. When using the hydrazine measuring spoon, 1 g is a level measuring spoon.
2. For removal of the reagents resulting in turbidity, ensure to use a quality membrane filter for medium deposits.
3. To check the reagent for prolonged storage and possible ageing, follow the test as described for tap water. Should the result of the value of the detection limit of 0.05 mg/L be exceeded, the reagent may only be used with restrictions (larger measured value deviations).

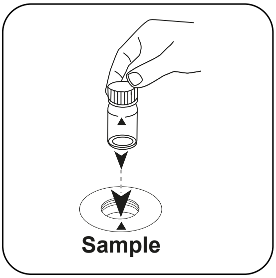
Determination of Hydrazine with Powder Reagent

Select the method on the device.

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



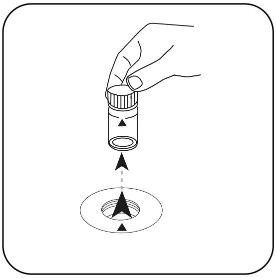
Close vial(s).



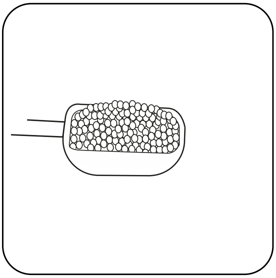
Place **sample vial** in the sample chamber. Pay attention to the positioning.

Zero

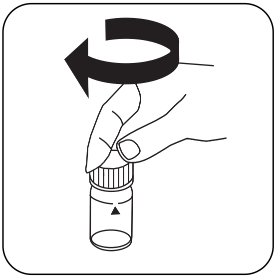
Press the **ZERO** button.



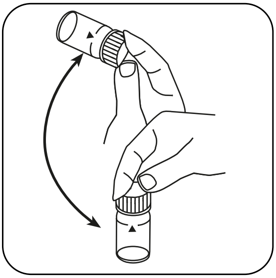
Remove the vial from the sample chamber.



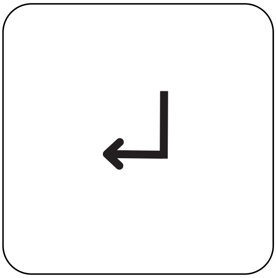
Add **1 g HYDRAZIN Test powder** .



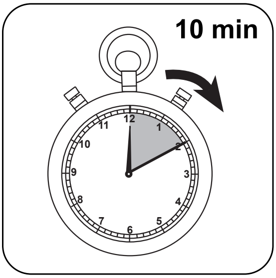
Close vial(s).



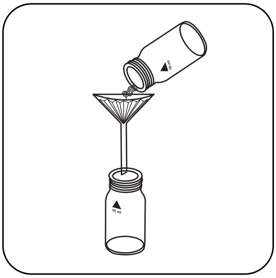
Invert several times to mix the contents.



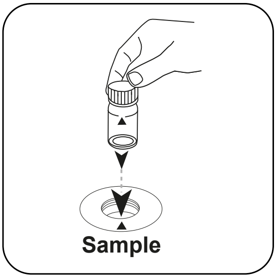
Press the **ENTER** button.



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



Any slight turbidity that occurs must be removed by filtration.



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

Test

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

The result in Hydrazine appears on the display.

Chemical Method

Dimethylaminobenzaldehyde

Appendix

Interferences

Removeable Interferences

1. Interferences as a result of highly coloured or turbid samples: Mix 1 part deionised water with 1 part household bleach. Add 1 drop of this mixture into a 25 ml water sample and mix. Use 10 ml prepared sample in place of deionised water in point 1.
   Note: For measuring water samples, an unprepared sample must be used.
   Principle: hydrazine is oxidised by household bleach. Colour interference will be eliminated by zeroing.

Interference	from / [mg/L]
NH_4^+	10
C_4H_9NO	10
VO_4^{3-}	1

Derived from

DIN 38413-P1

Iron LR L (A) M225

0.03 - 2 mg/L Fe FE

Ferrozine / Thioglycolate

Material

Required material (partly optional):

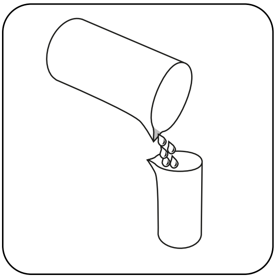
Reagents	Packaging Unit	Part Number
Acidity / Alkalinity P Indicator PA1	65 mL	56L013565
Hardness Calcium Buffer CH2	65 mL	56L014465
KP962-Ammonium Persulphate Powder	Powder / 40 g	56P096240
KS63-FE6-Thioglycolate/Molybdate HR RGT	30 mL	56L006330
Iron Reagent FE6	65 mL	56L006365
Iron Reagent FE5	65 mL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

Preparation

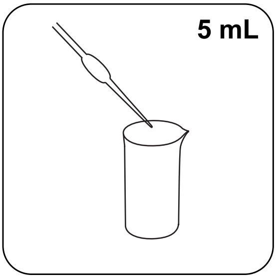
1. If there are strong complexing agents in the sample, the response time must be extended until no further colour development is seen. However, very strong iron complexes are not included in the measurement. In this event, the complexing agent must be destroyed by means of oxidation with acid/persulphate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

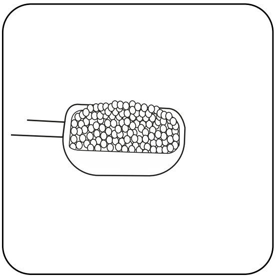
Total iron consists of suspended, soluble and complexed iron. The sample must be not filtered before measuring. To ensure homogenisation of the sample, deposed particles must be evenly distributed immediately prior to sampling by forcible shaking. A filtration of the sample is necessary for the determination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



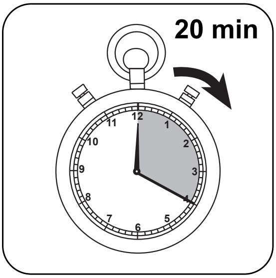
Fill a suitable digestion vessel with **50 mL homogenised sample**.



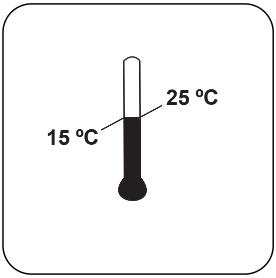
Add **5 mL 1:1 Hydrochloric acid**.



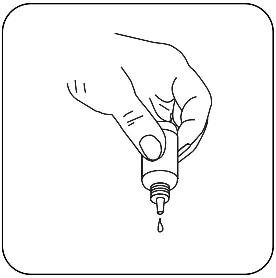
Add **a measuring scoop KP 962 (Ammonium Persulfat Powder)** .



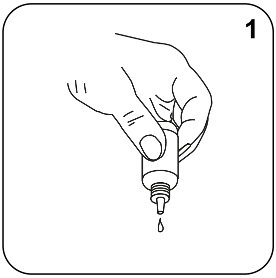
Boil the sample for **20 minutes** . A sample volume of about 25 mL should be retained;
If necessary, fill with deionised water.



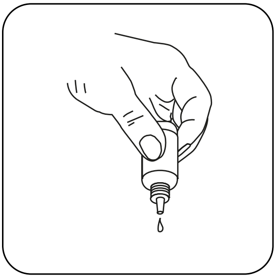
Allow the sample to cool to room temperature.



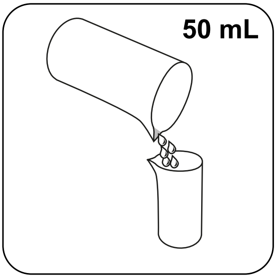
Hold cuvettes vertically and add equal drops by pressing slowly.



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!)**



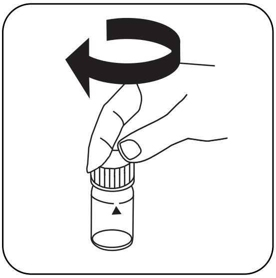
Fill the sample with **deionised water to 50 mL** .

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

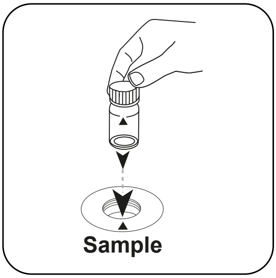
Select the method on the device.

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

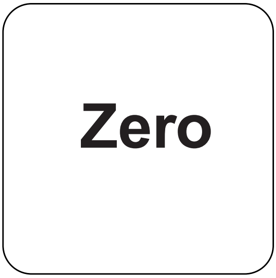
Fill 24 mm vial with **10 mL deionised water** .



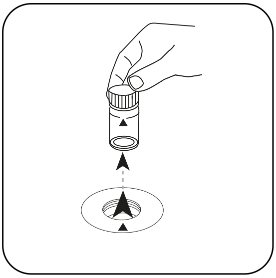
Close vial(s).



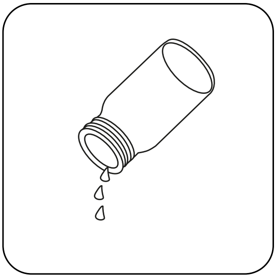
Place **sample vial** in the sample chamber. Pay attention to the positioning.



Press the **ZERO** button.

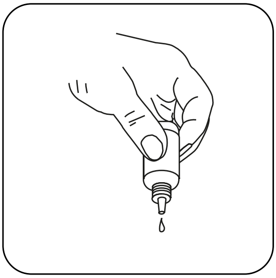


Remove the vial from the sample chamber.

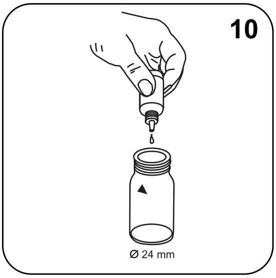


Empty vial.

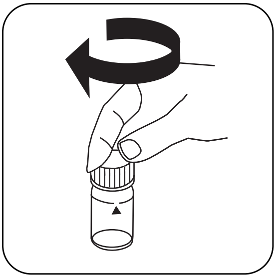
Fill 24 mm vial with **10 mL prepared sample** .



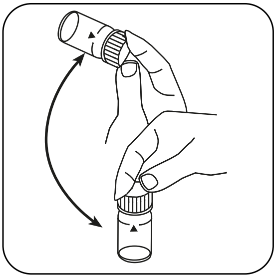
Hold cuvettes vertically and add equal drops by pressing slowly.



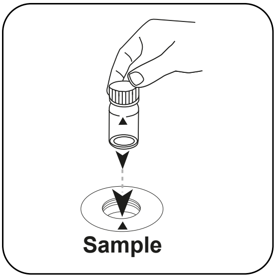
Add **10 drops Iron Reagent FE5**.



Close vial(s).



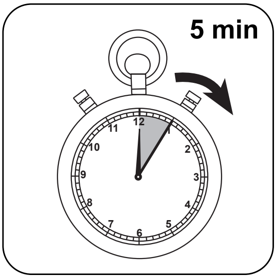
Invert several times to mix the contents.



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**.

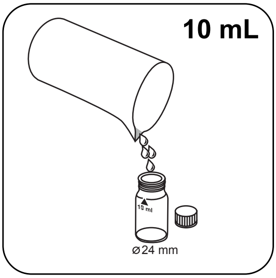
Once the reaction period is finished, the measurement takes place automatically.

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

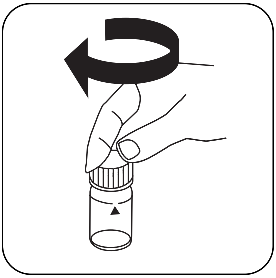
Determination of Iron LR (A) with liquid reagent

Select the method on the device.

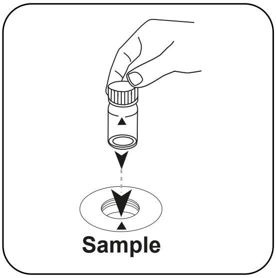
For determination of total dissolved iron the sample must be filtered prior to the test (pore size 0,45 µm). Otherwise, iron particles and suspended iron are measured.



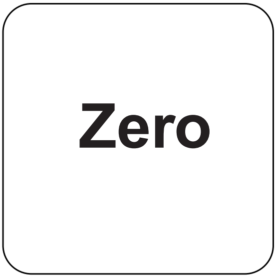
Fill 24 mm vial with **10 mL prepared sample** .



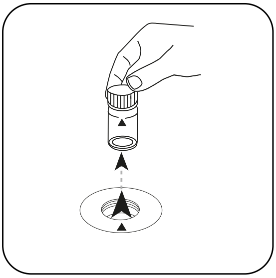
Close vial(s).



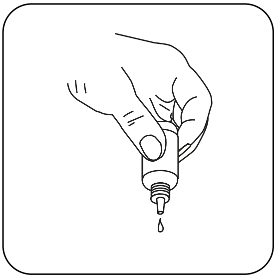
Place **sample vial** in the sample chamber. Pay attention to the positioning.



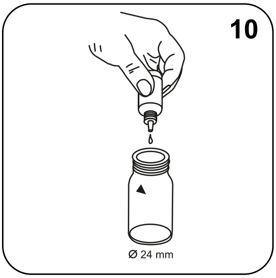
Press the **ZERO** button.



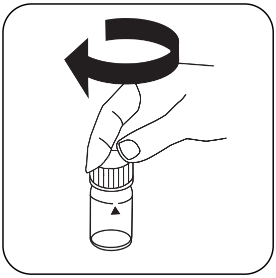
Remove the vial from the sample chamber.



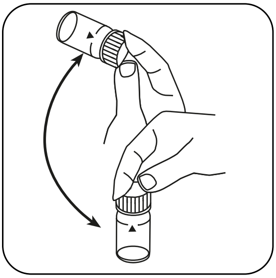
Hold cuvettes vertically and add equal drops by pressing slowly.



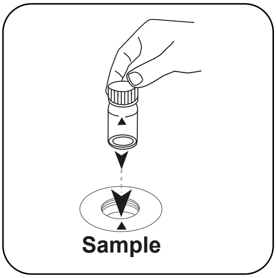
Add **10 drops Iron Reagent FE5**.



Close vial(s).



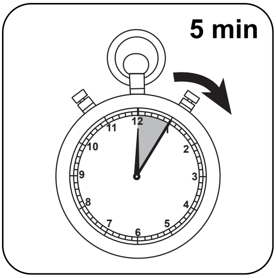
Invert several times to mix the contents.



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)

Oxygen dissolved C M292

10 - 800 µg/L O_2 c) O2

Rhodazine D TM

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Vacu-vial Oxygen Test Kit	1 Set	380450

The following accessories are required.

Accessories	Packaging Unit	Part Number
Adapter for round cuvettes 13 mm Ø	1 pc.	19802192
Adapter (13 mm) MultiDirect for Vacu-vial	1 pc.	192075

Preparation

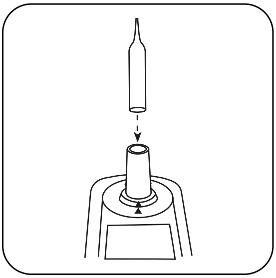
1. Before performing the test, you must read through the original instructions and safety advice that is delivered with the test kit (MSDS are available on the homepage of www.chemetrics.com).

Notes

1. This method is adapted from a product by CHEMetrics. The measuring range and wavelength used for this photometer may differ from the data specified by CHEMetrics. 2. Keep Vacu-Vials® in the dark at room temperature. 4. Vacu-vials® is a registered trademark of the company CHEMetrics, Inc. / Calverton, U.S.A.

Determination of Oxygen, dissolved with Vacu Vials® K-7553

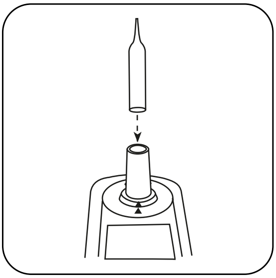
Select the method on the device.



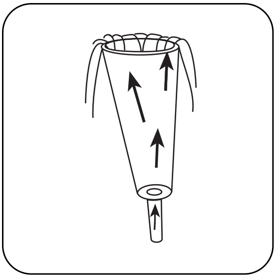
Place **Zero ampoule** in the sample chamber.

Zero

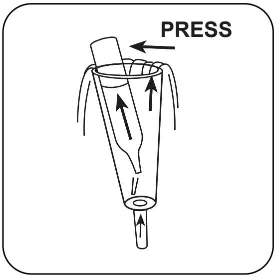
Press the **ZERO** button.



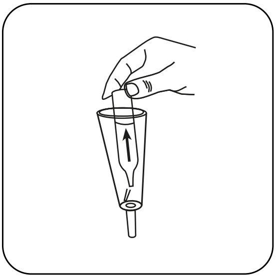
Remove zero ampoule from the sample chamber.



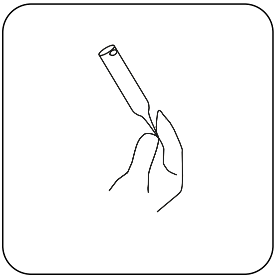
Run test water through the sampling vessel for several minutes from bottom to top to remove air bubbles.



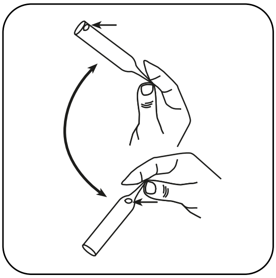
Place a Vacu-vial® ampoule in the sampling vessel. Break off the ampoule tip by applying light pressure against the vessel wall. Wait for the ampoule to fill completely.



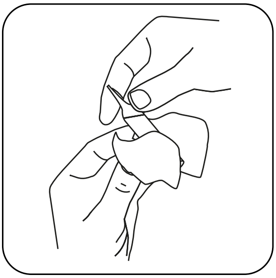
Then quickly remove the ampoule from the sampling vessel with the tip down.



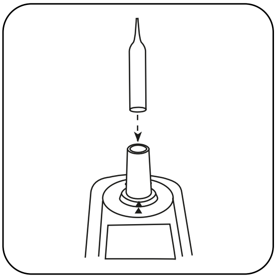
Close the opening with one finger, to avoid contact with the air.



Invert the ampoule several times.



Dry the outside of the ampoule.



Place the ampoule in the sample chamber.

Test

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

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

Chemical Method

Rhodazine D TM

Appendix

Derived from

ASTM D 5543-15

[c] MultiDirect: Adapter is necessary for Vacu-vials® (Order code 19 20 75)

Phosphate HR L M335

5 - 80 mg/L PO_4 PO4

Vanadomolybdate

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
KS278-Sulphuric Acid 50 % V/V	65 mL	56L027865
Acidity / Alkalinity P Indicator PA1	65 mL	56L013565
Hardness Calcium Buffer CH2	65 mL	56L014465
KP962-Ammonium Persulphate Powder	Powder / 40 g	56P096240
Phosphate HR, Ortho Reagent Set	1 pc.	56R019090

The following accessories are required.

Accessories	Packaging Unit	Part Number
Stirring rod and spoon	1 pc.	56A006601

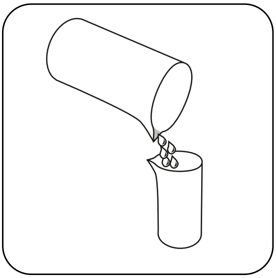
Preparation

1. Strongly buffered samples or samples with extreme pH values should be adjusted to between pH 6 and pH 7 before the analysis (use 1 mol/l Sulphuric acid or 1 mol/l Sodium hydroxide).
2. Prior digestion is required for the analysis of Polyphosphate and total phosphate.

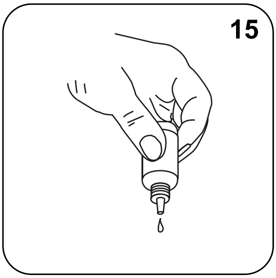
Notes

1. Reagents and accessories available on request.

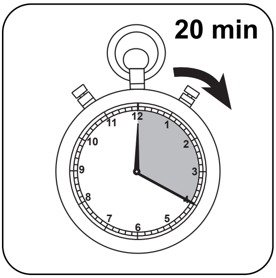
Digestion Polyphosphate HR with liquid reagents



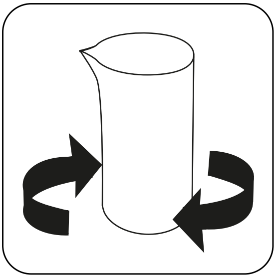
Fill a suitable digestion vessel with **50 mL homogenised sample**.



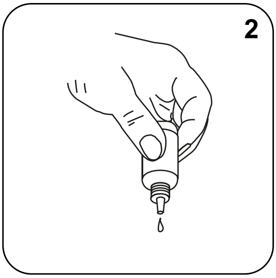
Add **15 drops KS278 (50% sulfuric acid)**.



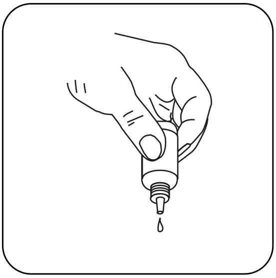
Boil the sample for **20 minutes** . A sample volume of about 25 mL should be retained; If necessary, fill with deionised water.



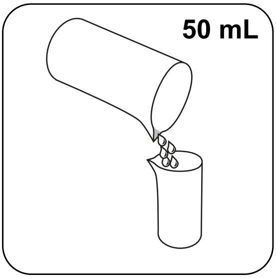
Invert the vial and allow to cool to room temperature.



Add **2 drops Acidity / Alkalinity P Indicator PA1**.

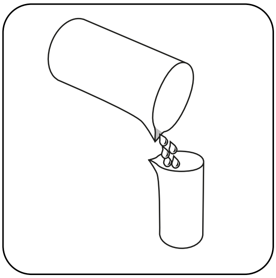


Add **Hardness Calcium Buffer CH2** drop by drop to the same sample until colouration turns from light pink to red. **(Note: make sure to swirl the vial after adding each drop!)**

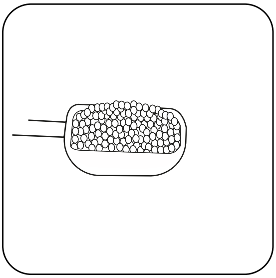


Fill the sample with **deionised water to 50 mL**
.

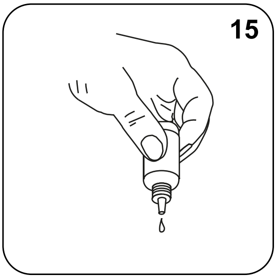
Digestion total Phosphate HR with with liquid reagents



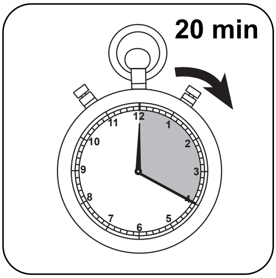
Fill a suitable digestion vessel with **50 mL homogenised sample**.



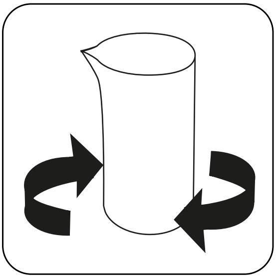
Add **a measuring scoop KP962 (Ammonium Persulfate Powder)** .



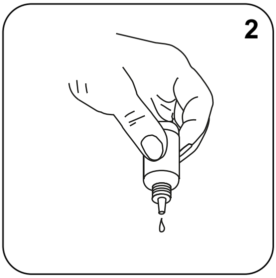
Add **15 drops KS278 (50% sulfuric acid)**.



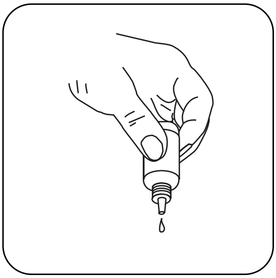
Boil the sample for **20 minutes** . A sample volume of about 25 mL should be retained;
If necessary, fill with deionised water.



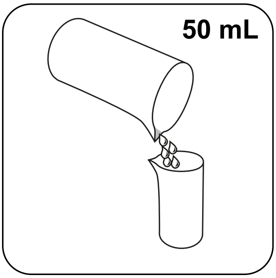
Invert the vial and allow to cool to room temperature.



Add **2 drops Acidity / Alkalinity P Indicator PA1**.



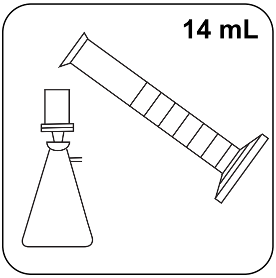
Add **Hardness Calcium Buffer CH2** drop by drop to the same sample until colouration turns from light pink to red. **(Note: make sure to swirl the vial after adding each drop!)**



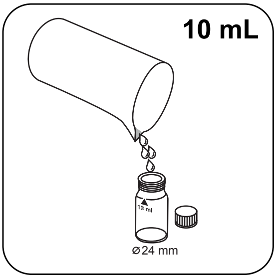
Fill the sample with **deionised water to 50 mL** .

Determination of Phosphate HR with fluid reagent

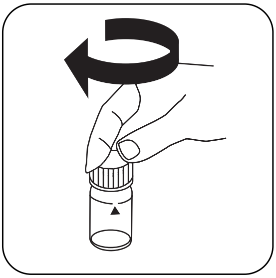
Select the method on the device.



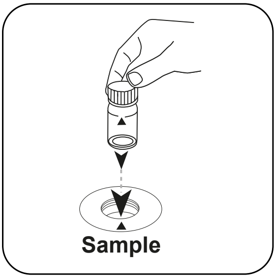
Filter approx. 14 mL sample with a pre-rinsed filter (pore size 0.45 µm).



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



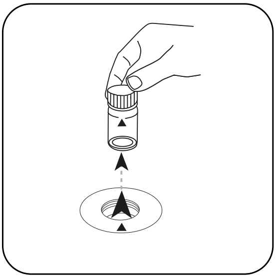
Close vial(s).



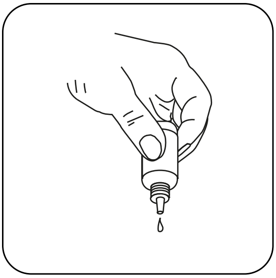
Place **sample vial** in the sample chamber. Pay attention to the positioning.

Zero

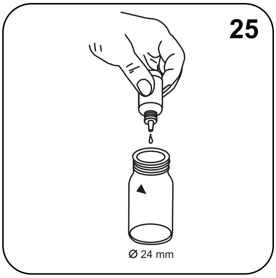
Press the **ZERO** button.



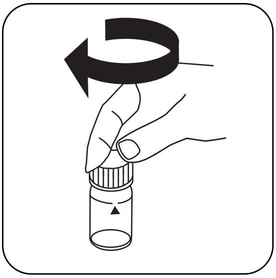
Remove the vial from the sample chamber.



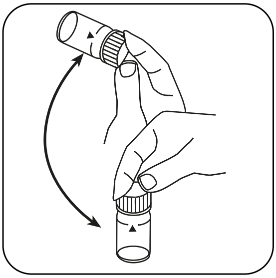
Hold cuvettes vertically and add equal drops by pressing slowly.



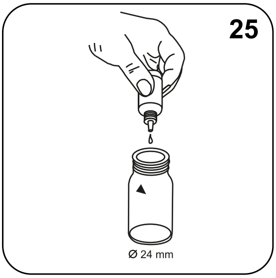
Add **25 drops KS228 (Ammonium Molybdate)**.



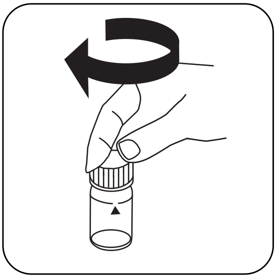
Close vial(s).



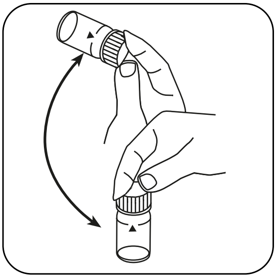
Invert several times to mix the contents.



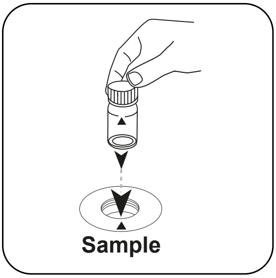
Add **25 drops** **KS229 (Ammonium Metavanadate)**.



Close vial(s).



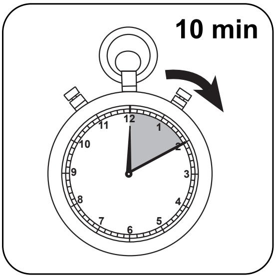
Invert several times to mix the contents.



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 Phosphate appears on the display.

Determination of Polyphosphate with liquid reagents

Select the method on the device.

For testing of **Polyphosphate HR with liquid reagents,** carry out the described **digestion**.

This test determines the content of inorganic total phosphate.The Polyphosphate content arises from the difference between inorganic and ortho phosphate.

The test for total Phosphate LR with liquid reagents runs just as the test under Method 335, Phosphate HR with liquid reagents.

The result in mg/L anorganic Total Phosphate (ortho-Phosphate and Polyphosphate) appears on the display.

Determination of total Phosphate with liquid reagents

Select the method on the device.

For testing of **total Phosphate HR with liquid reagents,** carry out the described **digestion**.

This test determines all compounds of phosphorus present in the sample, including ortho-phosphate, polyphosphate, and organic phosphorus compounds.

The test for total Phosphate HR with liquid reagent runs just as the test under Method 335, Phosphate HR with liquid reagent.

The result in mg/L total Phosphate 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	P	1
mg/l	PO_4^{3-}	3.066177
mg/l	P_2O_5	2.29137

Chemical Method

Vanadomolybdate

Appendix

Interferences

Persistant Interferences

- Large amounts of unresolved substances can cause non-reproducible measurement results.

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

According to

Standard Method 4500-P E

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

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.

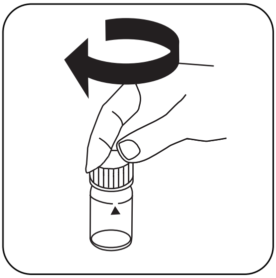
Notes

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.

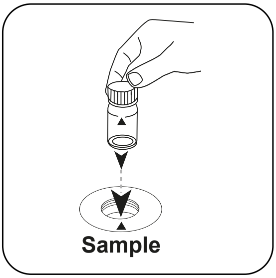
Determination of Polyacrylate with liquid reagent

Select the method on the device.

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



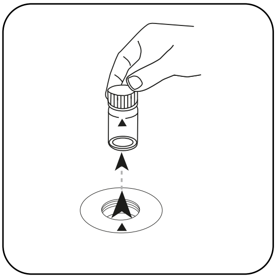
Close vial(s).



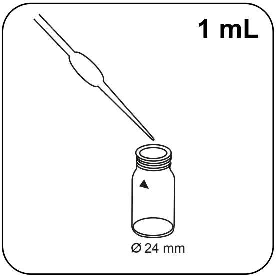
Place **sample vial** in the sample chamber. Pay attention to the positioning.

Zero

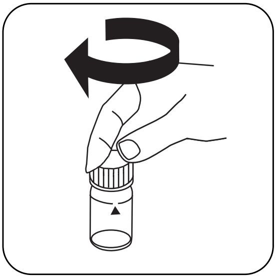
Press the **ZERO** button.



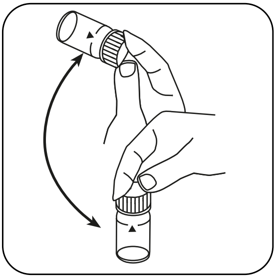
Remove the vial from the sample chamber.



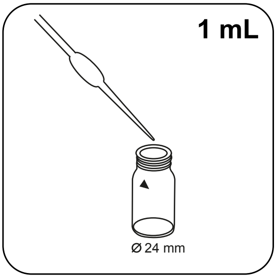
Place **1 mL (25 drops) Polyacrylate Buffer A1 solution** in the sample cuvette.



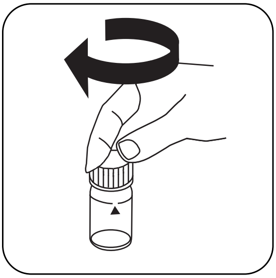
Close vial(s).



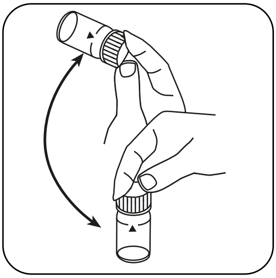
Invert several times to mix the contents.



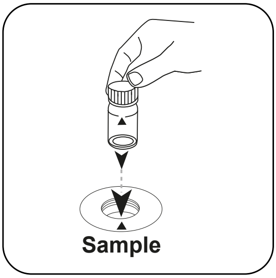
Place **1 mL (25 drops) Polyacrylate Precipitant A2 solution** in the sample cuvette.



Close vial(s).



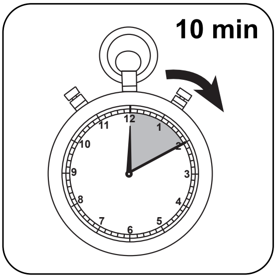
Invert several times to mix the contents.



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

Silicate HR PP M352

1 - 90 mg/L SiO_2 SiHr

Silicomolybdate

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
VARIO Silica HR Reagent, Set F10	1 Set	535700

Preparation

1. The temperature of the sample should be between 15 °C and 25 °C.

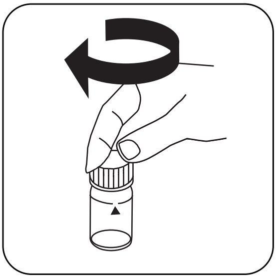
Notes

1. The method measures in the flank of the absorption curve of the resulting coloration. For filter photometers, the accuracy of the method can therefore be improved, if necessary, by user adjustment using a silicate standard (approx. 70 mg/L SiO_2).

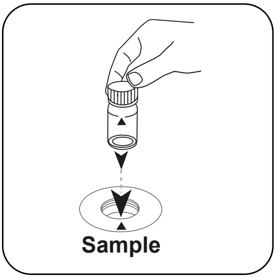
Determination of Silicate dioxide HR with Vario Powder Packs

Select the method on the device.

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



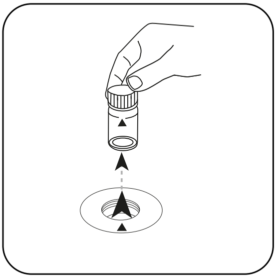
Close vial(s).



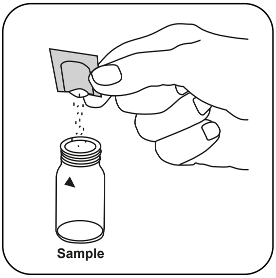
Place **sample vial** in the sample chamber. Pay attention to the positioning.

Zero

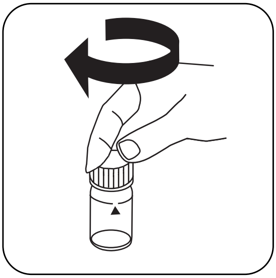
Press the **ZERO** button.



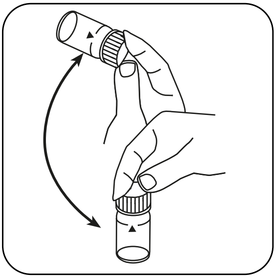
Remove the vial from the sample chamber.



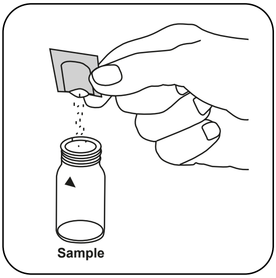
Add **Vario Silica HR Molybdate F10 powder pack**.



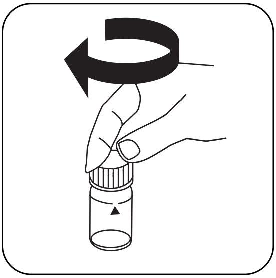
Close vial(s).



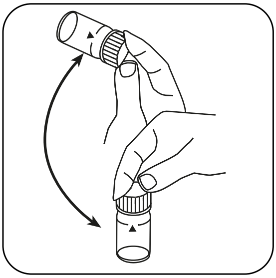
Swirl around to dissolve the powder.



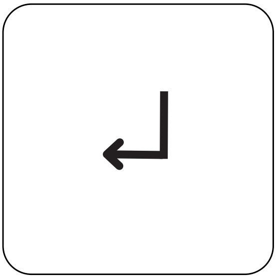
Add **Vario Silica HR Acid Rgt. F10 powder pack**.



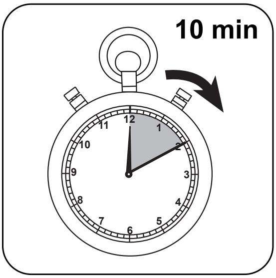
Close vial(s).



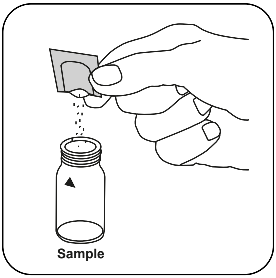
Invert several times to mix the contents.



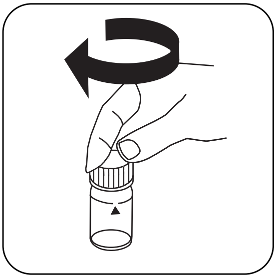
Press the **ENTER** button.



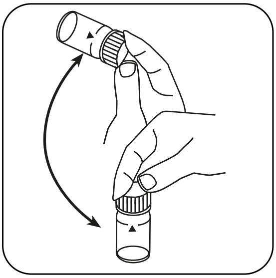
Wait for **10 minute(s) reaction time**.



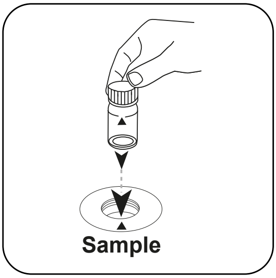
Add **Vario Silica Citric Acid F10 powder pack**.



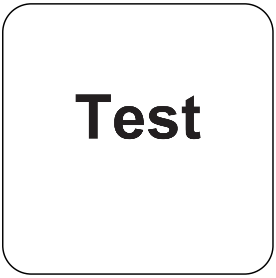
Close vial(s).



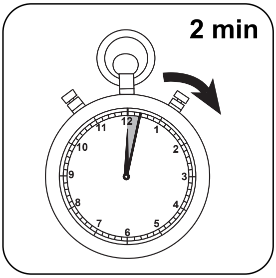
Swirl around to dissolve the powder.



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



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



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

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

The result in mg/L Silica 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	SiO_2	1
mg/l	Si	0.47

Chemical Method

Silicomolybdate

Appendix

Interferences

Removeable Interferences

- Occasionally water samples contain forms of silica which reacts very slowly with Molybdate. The nature of these forms is not known. A pre-treatment with Sodium hydrogencarbonate and then with Sulphuric Acid will make these forms reactive to Molybdate (pre-treatment is given in “Standard Methods for the Examination of Water and Wastewater” under “ Silica Digestion with Sodium Bicarbonate”).
- If silicon dioxide or phosphate are present, a yellow colour develops. The yellow colour caused by phosphate is eliminated by the addition of silica citric acid F10 powder packets.

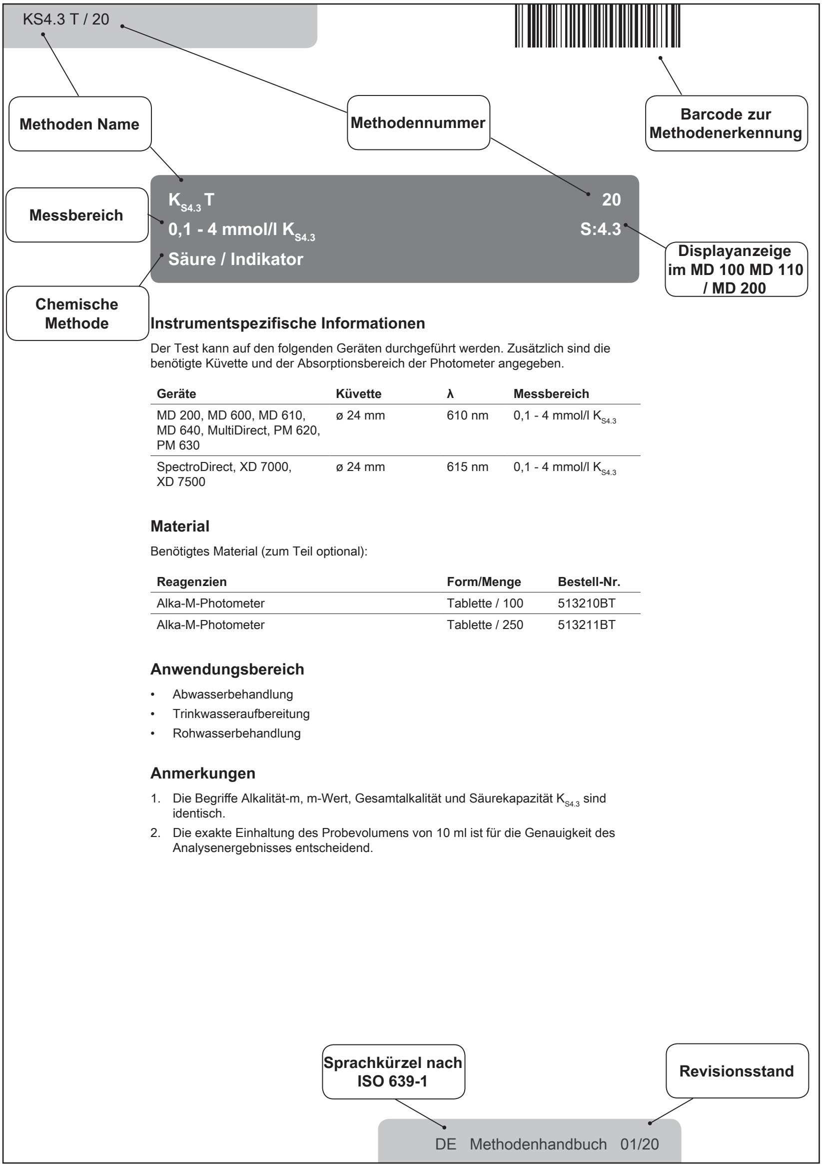
Interference	from / [mg/L]	Influence
Fe	large quantities	
PO_4^{3-}	50	
PO_4^{3-}	60	The disturbance is about -2 %
PO_4^{3-}	75	The disturbance is about -11 %
S^{2-}	in all quantities	

Method Validation

Limit of Detection	0.38 mg/L
Limit of Quantification	1.14 mg/L
End of Measuring Range	100 mg/L
Sensitivity	120 mg/L / Abs
Confidence Intervall	1.69 mg/L
Standard Deviation	0.70 mg/L
Variation Coefficient	1.38 %

Derived from

Standard Method 4500-SiO2 C



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

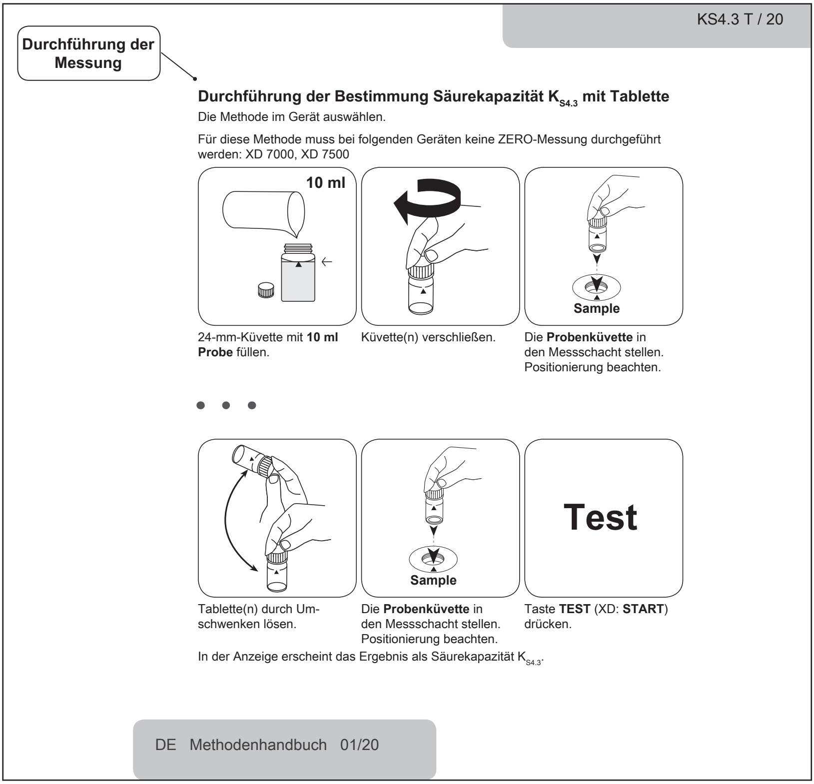
Anwendungsbereich

- 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

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 $K_{S4.3}$.

Aluminium PP M50

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

Eriochromcyanin R

Material

Benötigtes Material (zum Teil optional):

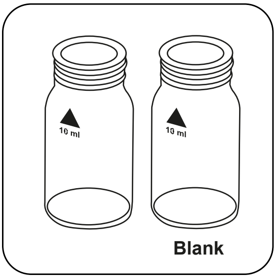
Reagenzien	Form/Menge	Bestell-Nr.
VARIO Aluminium Set 20 ml	1 St.	535000

Vorbereitung

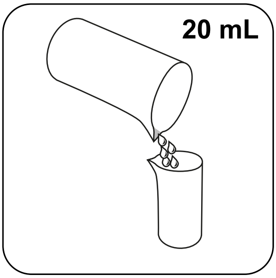
1. Zur Erzielung genauer Analyseergebnisse muss eine Probentemperatur von 20 °C bis 25 °C eingehalten werden.
2. Zur Vermeidung von Fehlern durch Verunreinigungen, die Küvette und das Zubehör vor der Analyse mit Salzsäurelösung (ca. 20%ig) und anschließend mit VE-Wasser spülen.

Durchführung der Bestimmung Aluminium mit Vario Pulverpäckchen

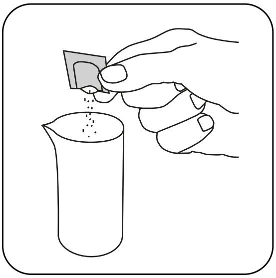
Die Methode im Gerät auswählen.



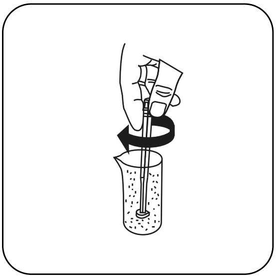
Zwei saubere 24-mm-Küvetten bereitstellen. Eine als Nullküvette kennzeichnen.



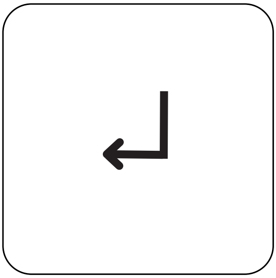
20 mL Probe in einen 100-mL-Messbecher geben.



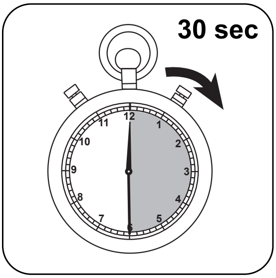
Ein **Vario ALUMINIUM ECR F20 Pulverpäckchen** zugeben.



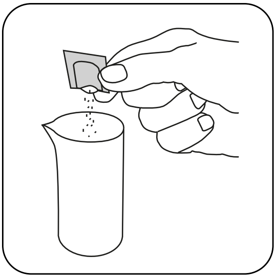
Pulver durch Rühren lösen.



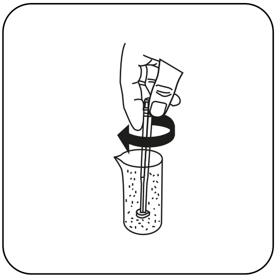
Taste **ENTER** drücken.



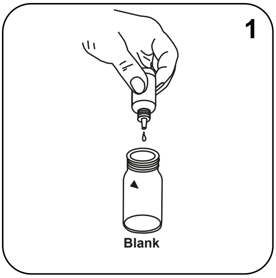
30 Sekunden Reaktionszeit abwarten.



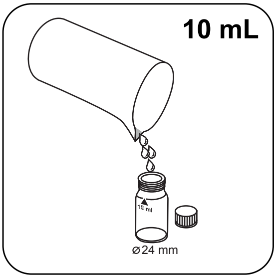
Ein **Vario HEXAMINE F20 Pulverpäckchen** zugeben.



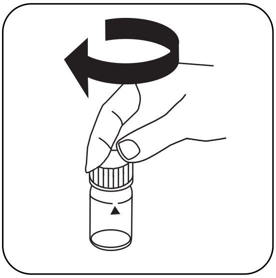
Pulver durch Rühren lösen.



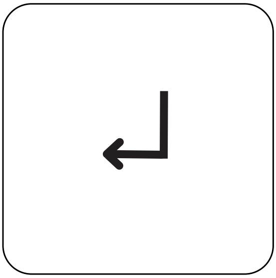
1 Tropfen Vario ALUMINIUM ECR Masking Reagent in die Nullküvette geben.



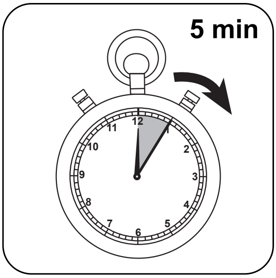
In jede Küvette **10 mL vorbehandelte Probe** geben.



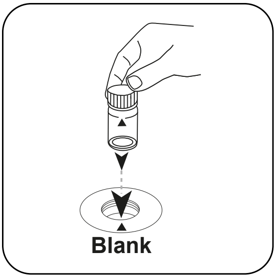
Küvette(n) verschließen.



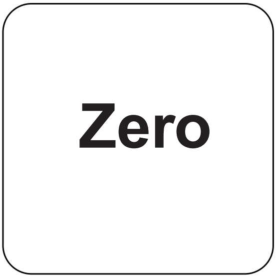
Taste **ENTER** drücken.



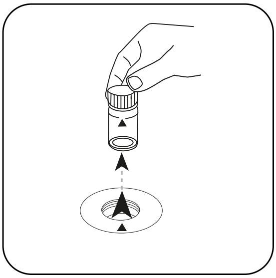
5 Minute(n) Reaktionszeit abwarten.



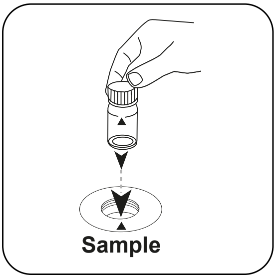
Die **Nullküvette** in den Messschacht stellen. Positionierung beachten.



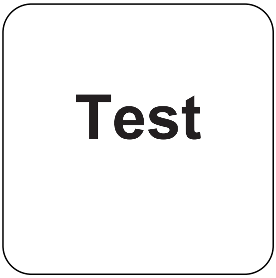
Taste **ZERO** drücken.



Küvette aus dem Messschacht nehmen.



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



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

Chlorid L (B) M92

0,5 - 20 mg/L Cl^- CL-

Quecksilberthiocyanat / Eisennitrat

Material

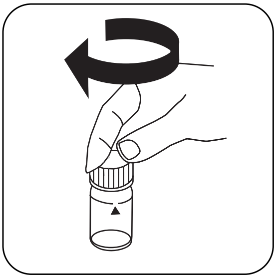
Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
Chloride Reagent Set	1 St.	56R018490

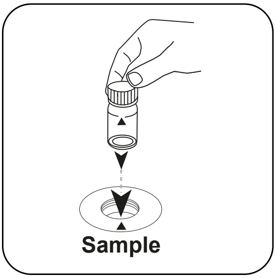
Durchführung der Bestimmung Chlorid mit Flüssigreagenz

Die Methode im Gerät auswählen.

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



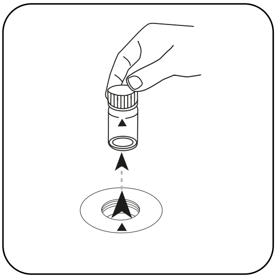
Küvette(n) verschließen.



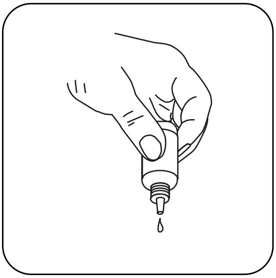
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

Zero

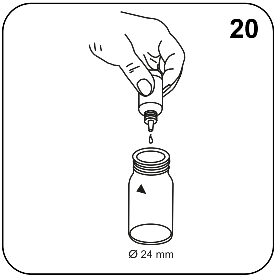
Taste **ZERO** drücken.



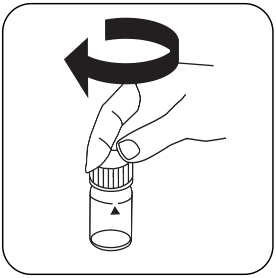
Küvette aus dem Messschacht nehmen.



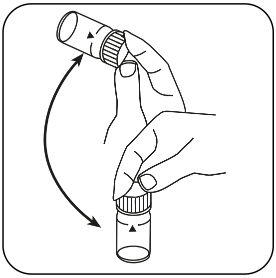
Die Tropfflaschen senkrecht halten und durch langsames Drücken gleich große Tropfen zugeben.



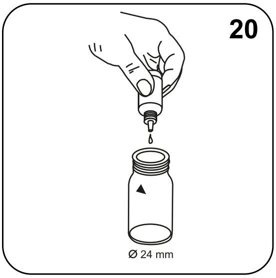
20 Tropfen KS251 (Chloride Reagenz A) zugeben.



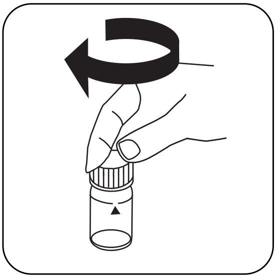
Küvette(n) verschließen.



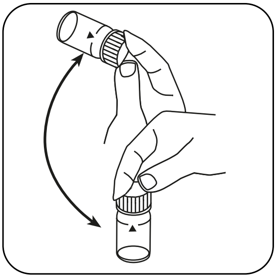
Inhalt durch Umschwenken mischen.



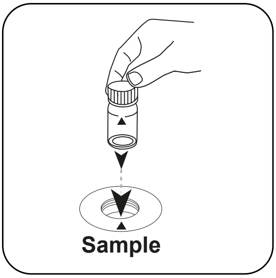
20 Tropfen KS253 (Chloride Reagenz B) zugeben.



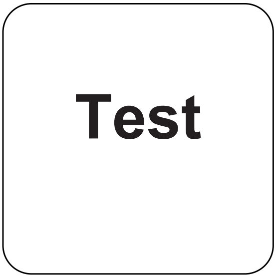
Küvette(n) verschließen.



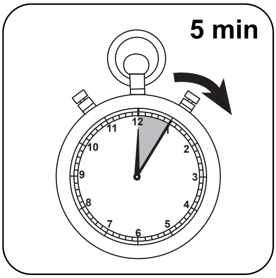
Inhalt durch Umschwenken mischen.



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



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



5 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

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

Auswertung

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

Einheit	Zitierform	Umrechnungsfaktor
mg/l	Cl^-	1
mg/l	NaCl	1.65

Chemische Methode

Quecksilberthiocyanat / Eisennitrat

Appendix

Störungen

Permanente Störungen

1. Reduzierende Substanzen wie Sulfit und Thiosulfat, die Eisen (III) zu Eisen (II) oder Quecksilber (II) zu Quecksilber (I) reduzieren können, können stören. Cyanide, Jod und Brom beeinflussen positiv.

Abgeleitet von

DIN 15682-D31
DIN ISO 15923-1 D49

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

Vorbereitung

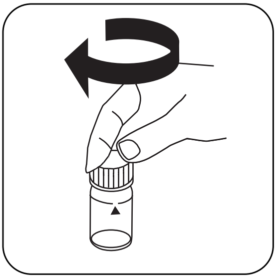
1. Stark alkalische oder saure Wässer sollten vor der Analyse auf einen pH-Wert von 4 bis 6 eingestellt werden.

Durchführung der Bestimmung Kupfer, frei mit Tablette

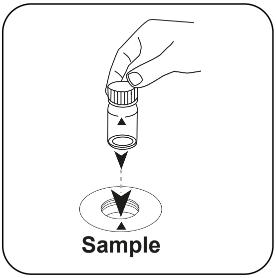
Die Methode im Gerät auswählen.

Wählen Sie zudem die Bestimmung: frei

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



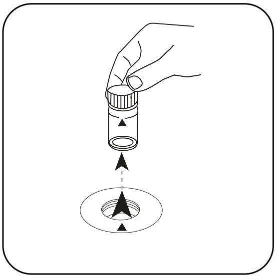
Küvette(n) verschließen.



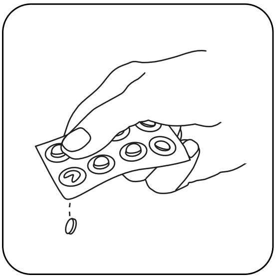
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

Zero

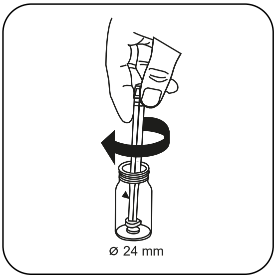
Taste **ZERO** drücken.



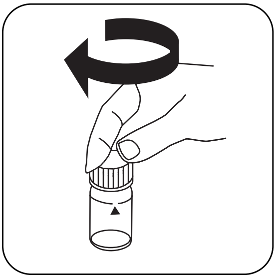
Küvette aus dem Messschacht nehmen.



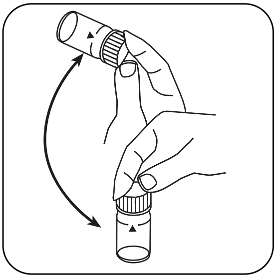
Eine **COPPER No. 1 Tablette** zugeben.



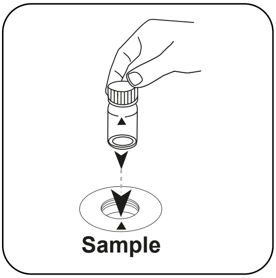
Tablette(n) unter leichter Drehung zerdrücken.



Küvette(n) verschließen.



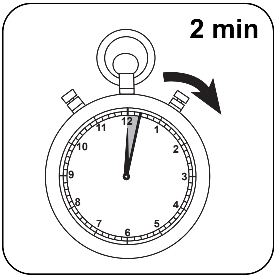
Tablette(n) durch Umschwenken lösen.



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.

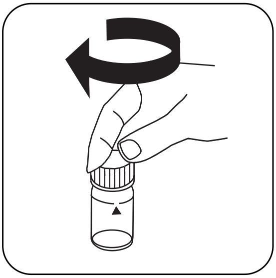
In der Anzeige erscheint das Ergebnis in mg/L freies Kupfer.

Durchführung der Bestimmung Kupfer, gesamt mit Tablette

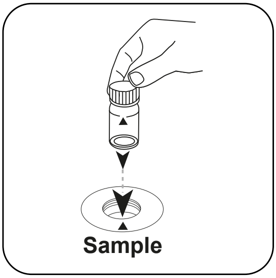
Die Methode im Gerät auswählen.

Wählen Sie zudem die Bestimmung: gesamt

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



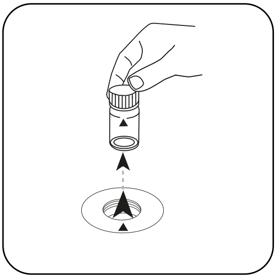
Küvette(n) verschließen.



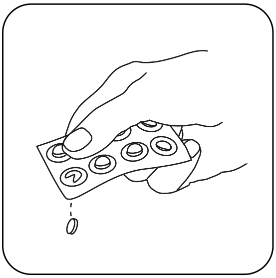
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

Zero

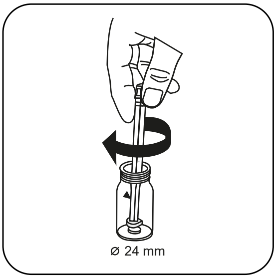
Taste **ZERO** drücken.



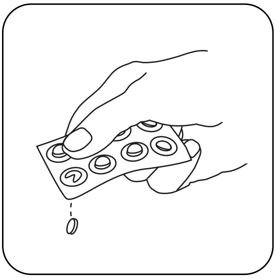
Küvette aus dem Messschacht nehmen.



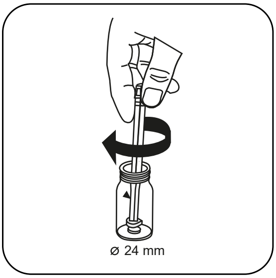
Eine **COPPER No. 1 Tablette** zugeben.



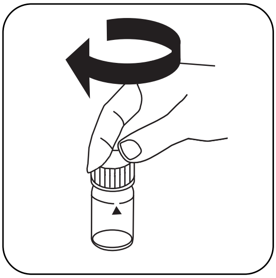
Die Tablette(n) unter leichter Drehung zerdrücken und lösen.



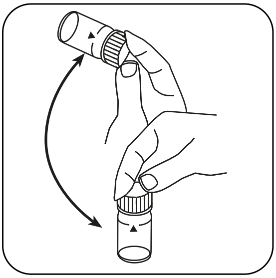
Eine **COPPER No. 2 Tablette** zugeben.



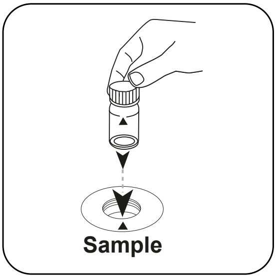
Tablette(n) unter leichter Drehung zerdrücken.



Küvette(n) verschließen.



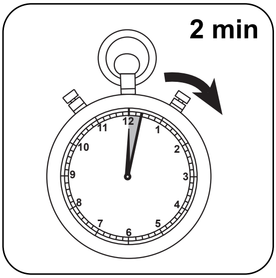
Tablette(n) durch Umschwenken lösen.



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

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 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

DEHA PP M167

0,02 - 0,5 mg/L DEHA DEHA

PPST

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
VARIO DEHA Reagent Set	1 St.	536000

Vorbereitung

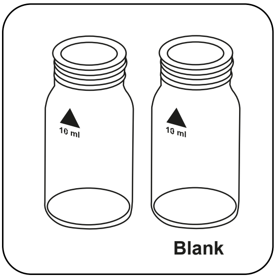
1. Zur Vermeidung von Fehlern durch Eisenablagerungen, die Glasgeräte vor der Analyse mit Salzsaurelösung (ca. 20%ig) und anschließend mit VE-Wasser spülen.

Anmerkungen

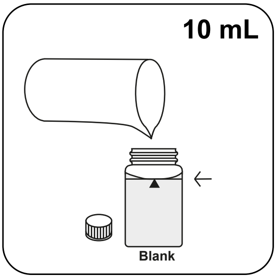
1. Da die Reaktion temperaturabhängig ist, sind 20 °C ± 2 °C einzuhalten.
2. Die Probenküvette während der Farbentwicklungszeit in den Messschacht bzw. dunkel stellen. (Wenn die Reagenzlösung UV-Licht (Sonnenlicht) ausgesetzt wird, führt dies zu überhöhten Messwerten.)

Durchführung der Bestimmung DEHA (N,N-Diethylhydroxylamin) mit Vario Pulverpäckchen und Flüssigreagenz

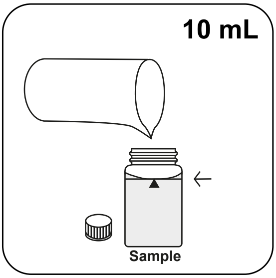
Die Methode im Gerät auswählen.



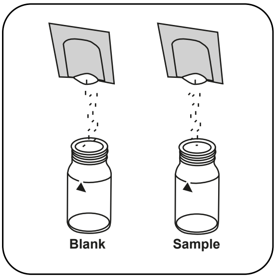
Zwei saubere 24-mm-Küvetten bereitstellen. Eine als Nullküvette kennzeichnen.



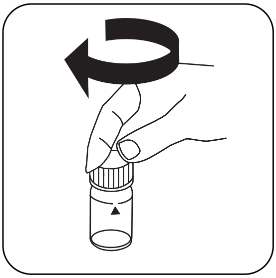
10 mL VE-Wasser in die Nullküvette geben.



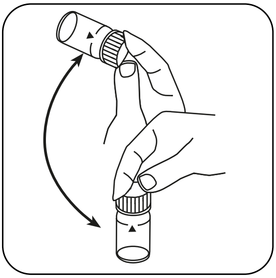
10 mL Probe in die Probenküvette geben.



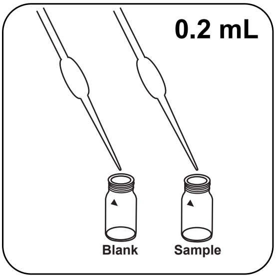
In jede Küvette **ein Vario OXYSCAV 1 Rgt Pulverpäckchen** geben.



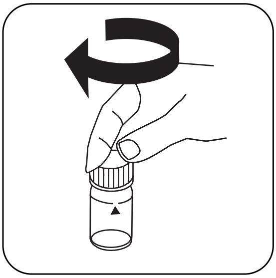
Küvette(n) verschließen.



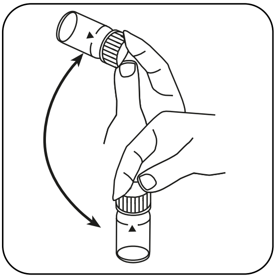
Inhalt durch Umschwenken mischen.



In jede Küvette **0.2 mL Vario DEHA 2 Rgt Lösung** geben.



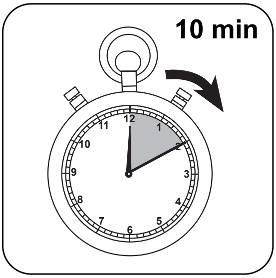
Küvette(n) verschließen.



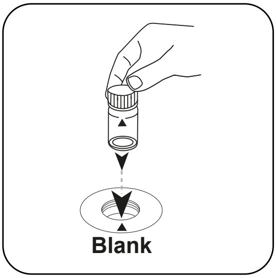
Inhalt durch Umschwenken mischen.

↵

Taste **ENTER** drücken.



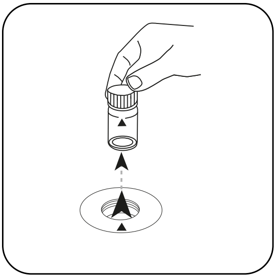
10 Minute(n) Reaktionszeit abwarten.



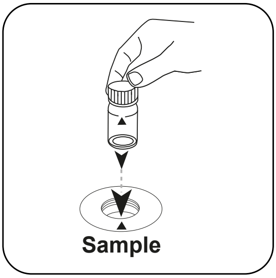
Die **Nullküvette** in den Messschacht stellen. Positionierung beachten.

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 als DEHA.

Auswertung

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

Einheit	Zitierform	Umrechnungsfaktor
mg/l	DEHA	1
µg/l	DEHA	1000
mg/l	Hydrochinon	2.63
mg/l	MEKO	4.5
mg/l	Carbohydrazid	1.31
mg/l	ISA	3.9

Chemische Methode

PPST

Appendix

Störungen

Ausschließbare Störungen

1. Störungen:
   Eisen (II) stört in allen Mengen: Zur Bestimmung der Eisen (II) Konzentration wird der Test ohne Zugabe der DEHA Lösung wiederholt. Liegt die Konzentration oberhalb von 20 µg/L wird der angezeigte Wert vom Ergebnis der DEHA-Bestimmung abgezogen.
2. Substanzen, die Eisen (III) reduzieren, verursachen Interferenzen. Substanzen, die Eisen stark komplexieren, können stören.

Störung	Stört ab / [mg/L]
Zn	50
$Na_2B_4O_7$	500
Co	0,025
Cu	8
$CaCO_3$	1000
Lignosulfonate	0,05
Mn	0,8
Mo	80
Ni	0,8

Störung	Stört ab / [mg/L]
PO_4^{3-}	10
$R\text{-}PO(OH)_2$	10
SO_4^{2-}	1000

Literaturverweise

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989

Hydrazin P M205

0,05 - 0,5 mg/L N_2H_4 Hydr

Dimethylaminobenzaldehyd

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
Hydrazin Test Pulver	Pulver / 30 g	462910

Es wird außerdem folgendes Zubehör benötigt.

Zubehör	Verpackungseinheit	Bestell-Nr.
Dosierlöffel, 1 g	1 St.	384930

Vorbereitung

1. Sollte die Wasserprobe getrübt sein, muss sie vor der Durchführung des Nullabgleichs filtriert werden.
2. Die Probentemperatur sollte 21 °C nicht übersteigen.

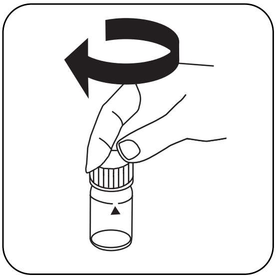
Anmerkungen

1. Bei Verwendung des Hydrazin-Messlöffels entspricht 1 g einem gestrichenen Messlöffel.
2. Für die Entfernung der, durch die Reagenzien entstandenen Trübung, haben sich qualitative Faltenfilter für mittelfeine Niederschläge bewährt.
3. Um das Reagenz bei längerer Lagerung auf eine mögliche Alterung zu überprüfen, wird der Test wie beschrieben mit Leitungswasser durchgeführt. Sollte das Ergebnis über dem Wert der Nachweisgrenze von 0,05 mg/L liegen, darf das Reagenz nur noch mit Einschränkungen verwendet werden (größere Messwertabweichungen).

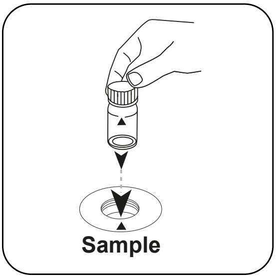
Durchführung der Bestimmung Hydrazin mit Pulverreagenz

Die Methode im Gerät auswählen.

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



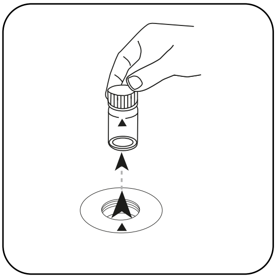
Küvette(n) verschließen.



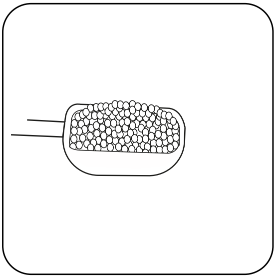
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

Zero

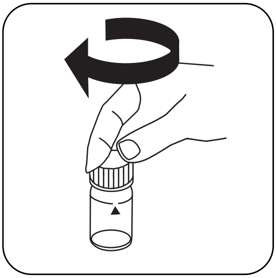
Taste **ZERO** drücken.



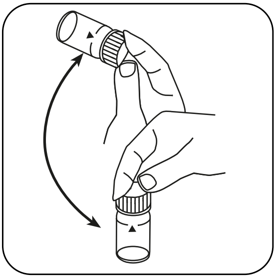
Küvette aus dem Messschacht nehmen.



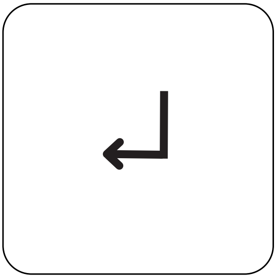
1 g HYDRAZIN Test Pulver zugeben.



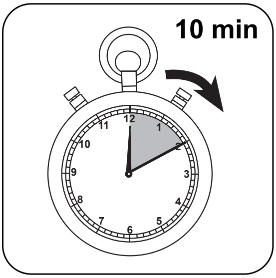
Küvette(n) verschließen.



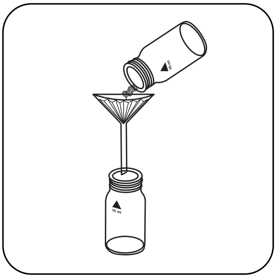
Inhalt durch Umschwenken mischen.



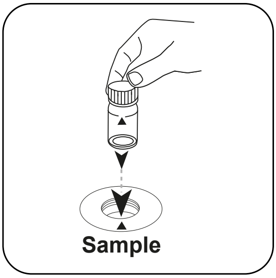
Taste **ENTER** drücken.



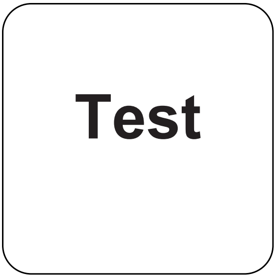
10 Minute(n) Reaktionszeit abwarten.



Die entstandene leichte Trübung durch Filtrieren entfernen.



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



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

In der Anzeige erscheint das Ergebnis als Hydrazin.

Chemische Methode

Dimethylaminobenzaldehyd

Appendix

Störungen

Ausschließbare Störungen

1. Störungen durch stark farbige oder trübe Proben beseitigen: 1 Teil VE-Wasser und 1 Teil Haushaltsbleichmittel vermischt. Von dieser Lösung 1 Tropfen in 25 ml Probe geben und mischen. 10 ml dieser Probe anstelle des VE-Wassers für die Nullprobe verwenden. Achtung: Für die Messung der Wasserprobe unbedingt die unbehandelte Probe verwenden.
   Prinzip: das Hydrazin wird durch das Bleichmittel oxidiert und die Farbinterferenz beim Nullabgleich ausgeschaltet.

Störung	Stört ab / [mg/L]
NH_4^{+}	10
C_4H_9NO	10
VO_4^{3-}	1

Abgeleitet von

DIN 38413-P1

Eisen LR L (A) M225

0,03 - 2 mg/L Fe FE

Ferrozine / Thioglycolat

Material

Benötigtes Material (zum Teil optional):

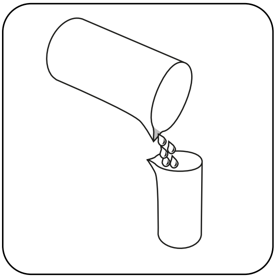
Reagenzien	Form/Menge	Bestell-Nr.
Säure / Alkalität P Indikator PA1	65 mL	56L013565
Calciumhärte Puffer CH2	65 mL	56L014465
KP962-Ammonium Persulphate Pulver	Pulver / 40 g	56P096240
KS63-FE6-Thioglycolat/Molybdat HR RGT	30 mL	56L006330
Eisen Reagenz FE6	65 mL	56L006365
Eisen Reagenz FE5	65 mL	56L006165

Vorbereitung

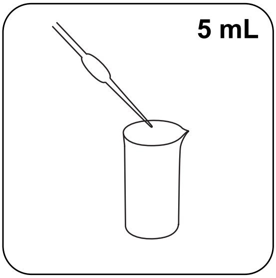
1. Wenn starke Komplexbildner in der Probe vorliegen, muss die Reaktionszeit verlängert werden, bis keine weitere Farbentwicklung mehr sichtbar ist. Sehr starke Eisen-Komplexe werden bei der Messung jedoch nicht erfasst. In diesem Fall müssen die Komplexbildner durch Oxidation mit Säure/Persulfat zerstört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

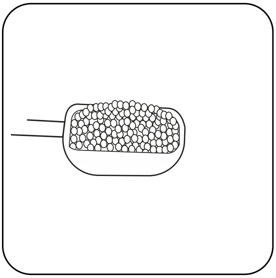
Gesamteisen setzt sich zusammen aus löslichem, komplexiertem und suspendiertem Eisen. Die Probe darf vor der Messung nicht filtriert weden. Um eine Homogenisierung der Probe zu gewährleisten, müssen abgesetzte Partikel unmittelbar vor der Probenahme durch kräftiges Schütteln gleichmäßig verteilt werden.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



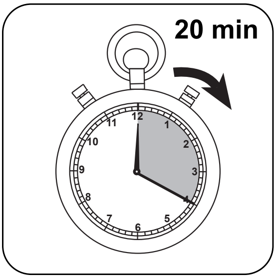
Ein geeignetes Aufschlussgefäß mit **50 mL homogenisierter Probe** füllen.



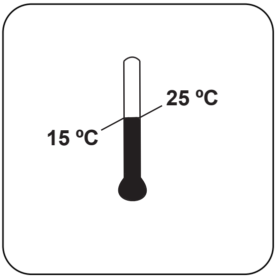
5 mL 1:1 Salzsäure zugeben.



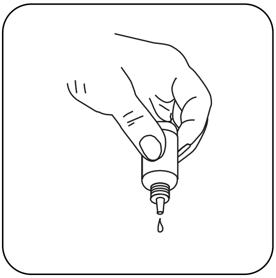
Einen Messlöffel KP 962 (Ammonium Persulfat Powder) zugeben.



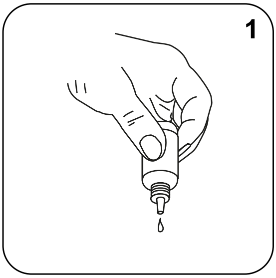
Die Probe für **20 Minuten kochen**. Ein Probevolumen von 25 mL sollte beibehalten werden, gegebenenfalls mit VE-Wasser aufüllen.



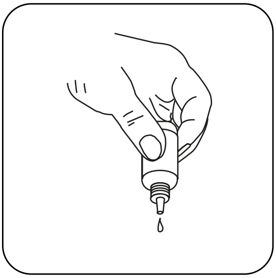
Die Probe auf **Raumtemperatur** abkühlen lassen.



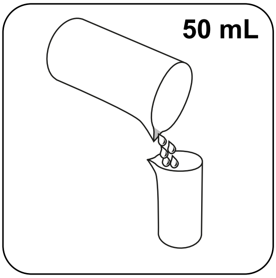
Die Tropfflaschen senkrecht halten und durch langsames Drücken gleich große Tropfen zugeben.



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!)**



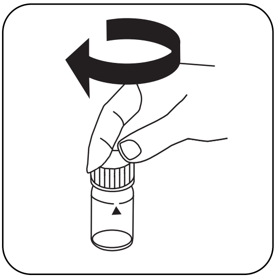
Die Probe mit **VE-Wasser auf 50 mL** auffüllen.

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

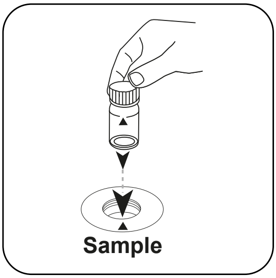
Die Methode im Gerät auswählen.

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

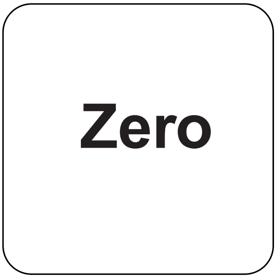
24 mm-Küvette mit **10 mL VE-Wasser** füllen.



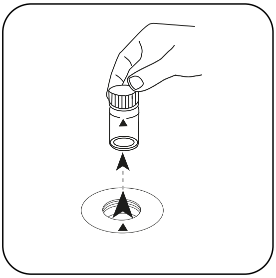
Küvette(n) verschließen.



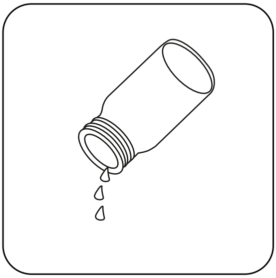
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



Taste **ZERO** drücken.

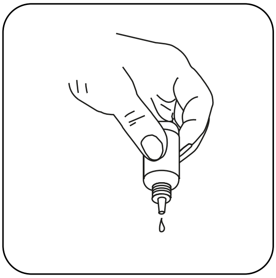


Küvette aus dem Messschacht nehmen.

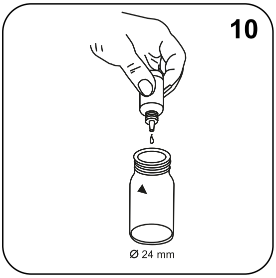


Küvette entleeren.

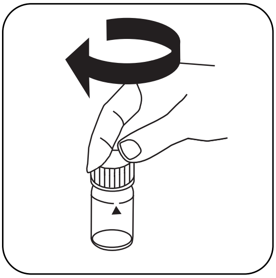
24-mm-Küvette mit **10 mL vorbereiteter Probe** füllen.



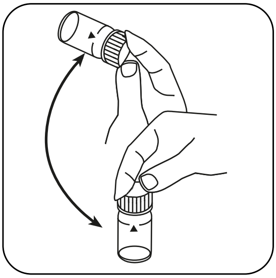
Die Tropfflaschen senkrecht halten und durch langsames Drücken gleich große Tropfen zugeben.



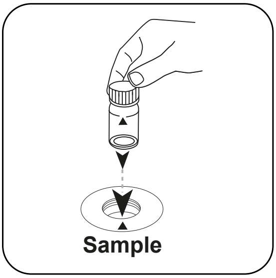
10 Tropfen Eisen Reagenz FE5 zugeben.



Küvette(n) verschließen.



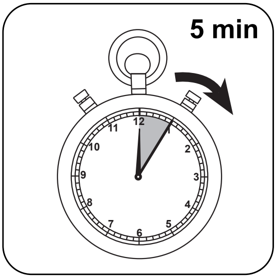
Inhalt durch Umschwenken mischen.



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

Test

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



5 Minute(n) Reaktionszeit abwarten.

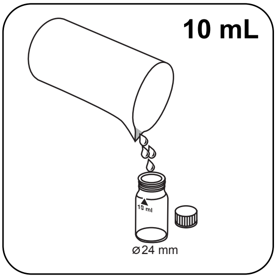
Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

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

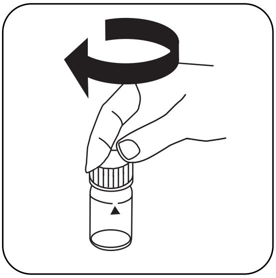
Durchführung der Bestimmung Eisen LR (A) mit Flüssigreagenz

Die Methode im Gerät auswählen.

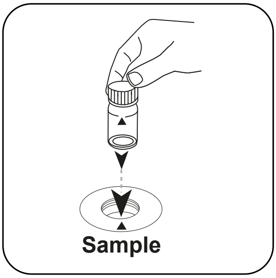
Für eine Bestimmung des gesamt gelösten Eisens muss die Probe vor der Bestimmung filtriert werden (Porenweite 0,45 µm). Andernfalls werden Eisenpartikel und suspendiertes Eisen mitbestimmt.



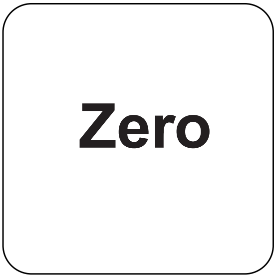
24-mm-Küvette mit **10 mL vorbereiteter Probe** füllen.



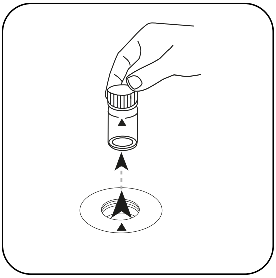
Küvette(n) verschließen.



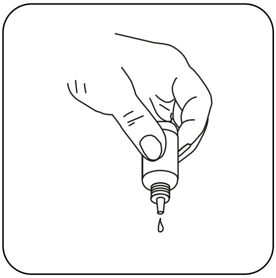
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



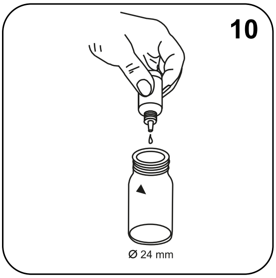
Taste **ZERO** drücken.



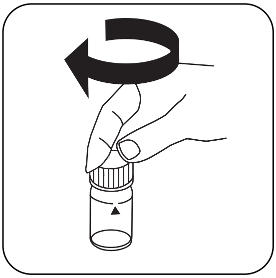
Küvette aus dem Messschacht nehmen.



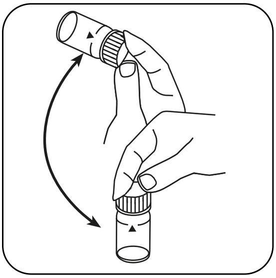
Die Tropfflaschen senkrecht halten und durch langsames Drücken gleich große Tropfen zugeben.



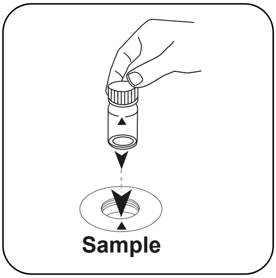
10 Tropfen Eisen Reagenz FE5 zugeben.



Küvette(n) verschließen.



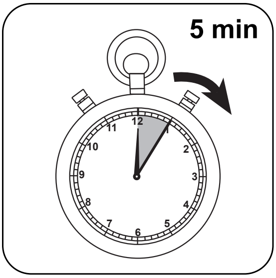
Inhalt durch Umschwenken mischen.



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)

Sauerstoff gelöst C M292

10 - 800 µg/L O_2 [c)] O2

Rhodazin D TM

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
Vacu-vial Sauerstoff Test Kit	1 Satz	380450

Es wird außerdem folgendes Zubehör benötigt.

Zubehör	Verpackungseinheit	Bestell-Nr.
Adapter für Rundküvetten 13 mm	1 St.	19802192
Adapter (13 mm) MultiDirect für Vacu-vial	1 St.	192075

Vorbereitung

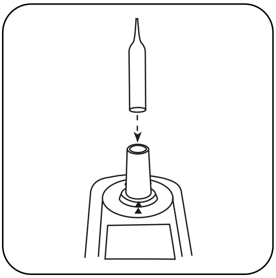
1. Lesen Sie vor der Durchführung des Testes unbedingt die Original-Arbeitsanweisung und die Sicherheitshinweise, welche dem Testsatz beiliegen (MSDS sind verfügbar auf der Homepage www.chemetrics.com).

Anmerkungen

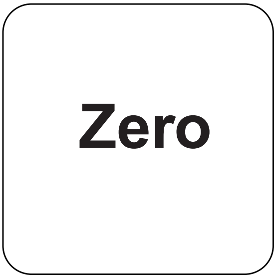
1. Bei dieser Methode handelt es sich um ein Produkt von CHEMetrics. Der in diesem Photometer angegebene Messbereich und die verwendete Wellenlänge kann jedoch von den CHEMetrics-Angaben abweichen.
2. Vacu-Vials® im Dunkeln bei Raumtemperatur aufbewahren.
3. Vacu-Vials® ist ein geschütztes Warenzeichen der Firma CHEMetrics, inc. / Calverton, U.S.A.

Durchführung der Bestimmung Sauerstoff, gelöst mit Vacu Vials® K-7553

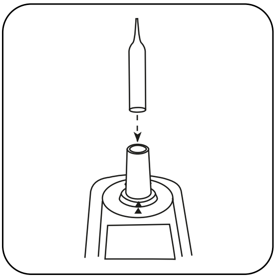
Die Methode im Gerät auswählen.



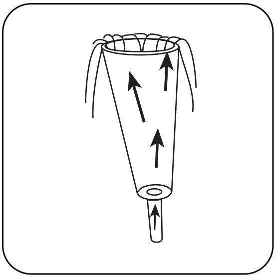
Die **Zero-Ampulle** in den Messschacht stellen.



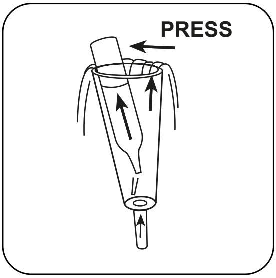
Taste **ZERO** drücken.



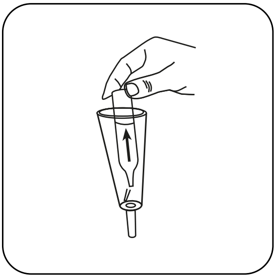
Zero-Ampulle aus dem Messschacht nehmen.



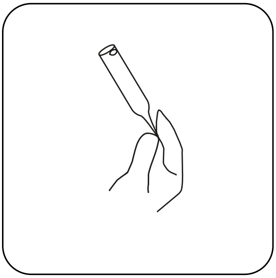
Probenahmegefäß mehrere Minuten von unten nach oben mit Testwasser durchstömen lassen, um Luftblasen zu entfernen.



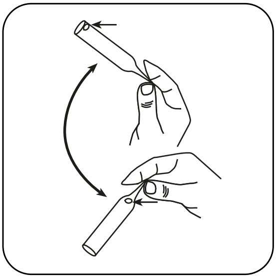
Eine Vacu-vial® Ampulle im Probenahmegefäß platzieren. Die Ampullenspitze durch leichtes Drücken gegen die Gefäßwand abbrechen. Die komplette Füllung der Ampulle abwarten.



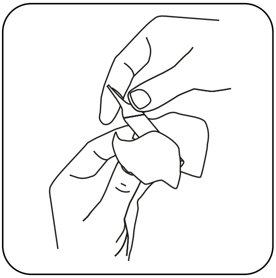
Die volle Ampulle anschließend zügig, mit der Spitze nach unten, aus dem Probenahmegefäß nehmen.



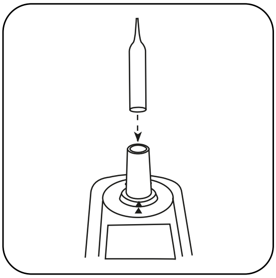
Die Öffnung mit einem Finger verschließen, um Luftkontakt zu vermeiden.



Die Ampulle mehrfach umschwenken.



Die Ampulle von außen trocknen.



Die Ampulle in den Messschacht stellen.

Test

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

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

Chemische Methode

Rhodazin D TM

Appendix

Abgeleitet von

ASTM D 5543-15

c) MultiDirect: Adapter für Vacu-vials® erforderlich (Bestell-Nr. 19 20 75)

Phosphat HR L M335

5 - 80 mg/L PO_4 PO4

Vanadomolybdat

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
KS278-Sulphuric Säure 50 %	65 mL	56L027865
Säure / Alkalität P Indikator PA1	65 mL	56L013565
Calciumhärte Puffer CH2	65 mL	56L014465
KP962-Ammonium Persulphate Pulver	Pulver / 40 g	56P096240
Phosphate HR, Ortho Reagent Set	1 St.	56R019090

Es wird außerdem folgendes Zubehör benötigt.

Zubehör	Verpackungseinheit	Bestell-Nr.
Rührstab und Pulverlöffel	1 St.	56A006601

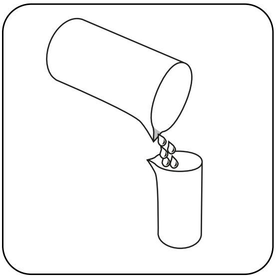
Vorbereitung

1. Stark gepufferte Proben oder Proben mit extremen pH-Werten sollten vor der Analyse in einen pH-Bereich zwischen 6 und 7 gebracht werden (mit 1 mol/l Salzsäure bzw. 1 mol/l Natronlauge).
2. Für die Analyse von Polyphosphaten und Gesamtphosphat ist ein vorheriger Aufschluss erforderlich.

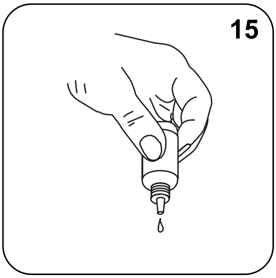
Anmerkungen

1. Reagenzien und Zubehör auf Anfrage erhältlich.

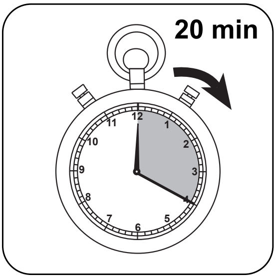
Aufschluss Polyphosphat HR mit Flüssigreagenzien



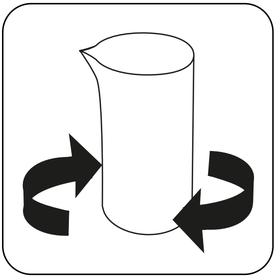
Ein geeignetes Aufschlussgefäß mit **50 mL homogenisierter Probe** füllen.



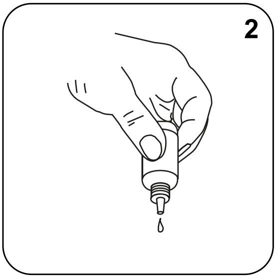
15 Tropfen KS278 (50% Schwefelsäure) zugeben.



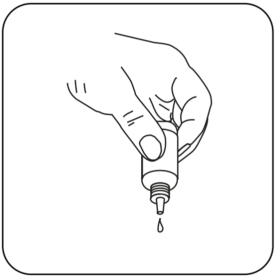
Die Probe für **20 Minuten kochen**. Ein Probevolumen von 25 mL sollte beibehalten werden, gegebenenfalls mit VE-Wasser aufüllen.



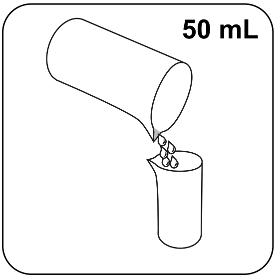
Das Aufschlussgefäß umschwenken und auf Raumtemperatur abkühlen lassen.



2 Tropfen Säure / Alkalität P Indikator PA1 zugeben.

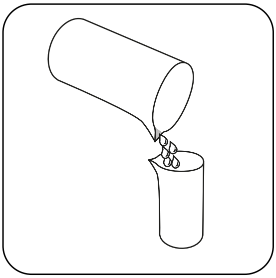


Calciumhärte Puffer CH2 tropfenweise derselben Probe zugeben bis eine schwach rosa bis rote Färbung auftritt. **(Achtung: nach Zugabe jedes Tropfens die Probe schwenken!)**

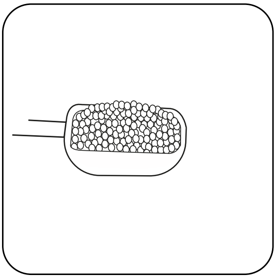


Die Probe mit **VE-Wasser auf 50 mL** auffüllen.

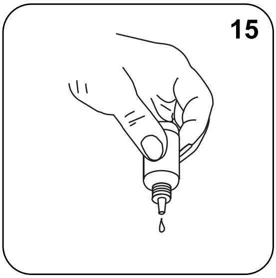
Aufschluss Gesamtphosphat HR mit Flüssigreagenzien



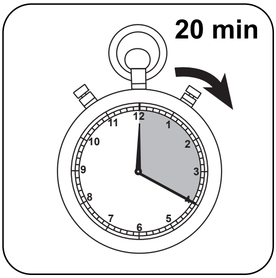
Ein geeignetes Aufschlussgefäß mit **50 mL homogenisierter Probe** füllen.



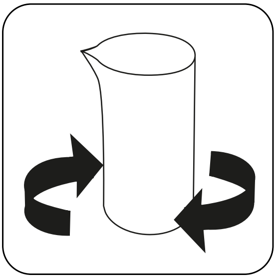
Einen Messlöffel KP962 (Ammonium Persulfate Powder) zugeben.



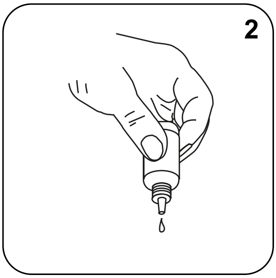
15 Tropfen KS278 (50% Schwefelsäure) zugeben.



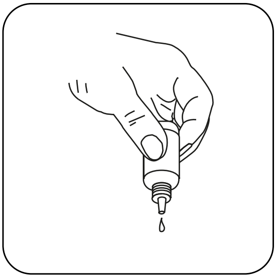
Die Probe für **20 Minuten kochen**. Ein Probevolumen von 25 mL sollte beibehalten werden, gegebenenfalls mit VE-Wasser aufüllen.



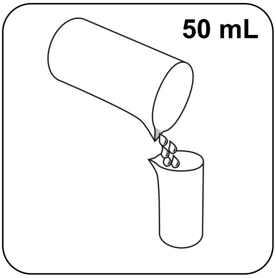
Das Aufschlussgefäß umschwenken und auf Raumtemperatur abkühlen lassen.



2 Tropfen Säure / Alkalität P Indikator PA1 zugeben.



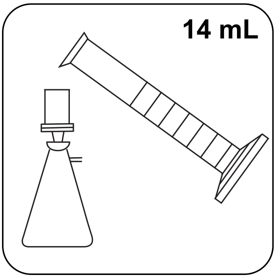
Calciumhärte Puffer CH2 tropfenweise derselben Probe zugeben bis eine schwach rosa bis rote Färbung auftritt. **(Achtung: nach Zugabe jedes Tropfens die Probe schwenken!)**



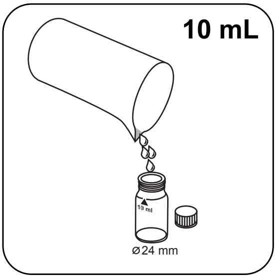
Die Probe mit **VE-Wasser auf 50 mL** auffüllen.

Durchführung der Bestimmung Phosphat HR mit Flüssigreagenz

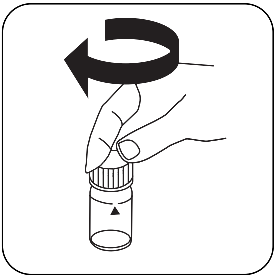
Die Methode im Gerät auswählen.



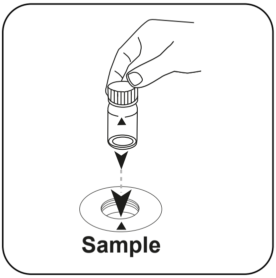
Etwa 14 mL Probe mit einem vorgespülten Filter (Porenweite 0,45 µm) filtrieren.



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



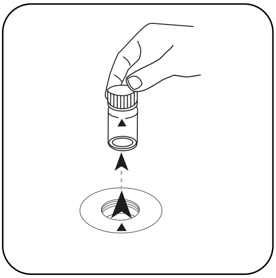
Küvette(n) verschließen.



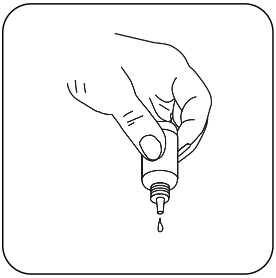
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

Zero

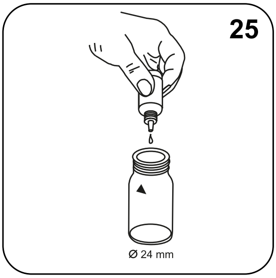
Taste **ZERO** drücken.



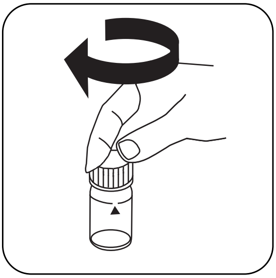
Küvette aus dem Messschacht nehmen.



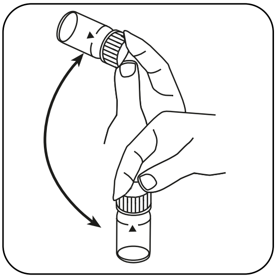
Die Tropfflaschen senkrecht halten und durch langsames Drücken gleich große Tropfen zugeben.



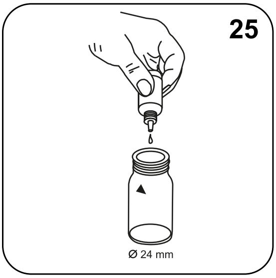
25 Tropfen KS228 (Ammonium Molybdate) zugeben.



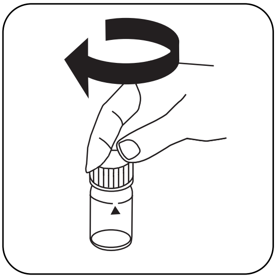
Küvette(n) verschließen.



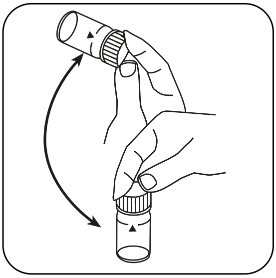
Inhalt durch Umschwenken mischen.



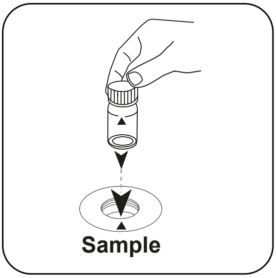
25 Tropfen KS229 (Ammonium Metavanadate) zugeben.



Küvette(n) verschließen.



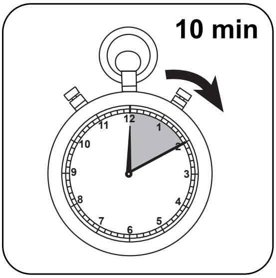
Inhalt durch Umschwenken mischen.



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 Phosphat.

Durchführung der Bestimmung Polyphosphat mit Flüssigreagenzien

Die Methode im Gerät auswählen.

Für die Bestimmung von **Polyphosphat HR mit Flüssigreagenzien** den beschriebenen **Aufschluss** durchführen.

Dieser Test ermittelt den Gehalt an anorganischem Gesamtphosphat.Der Gehalt an Polyphosphaten ergibt sich aus der Differenz zwischen anorganischem und ortho-Phosphat.

Die Bestimmung von Gesamtphosphat LR mit Flüssigreagenzien verläuft gleich wie die Bestimmung unter Methode 335, Phosphat HR mit Flüssigreagenzien.

In der Anzeige erscheint das Ergebnis in mg/L anorganischem Gesamtphosphat (ortho-Phosphat und Polyphosphat).

Durchführung der Bestimmung Gesamtphosphat mit Flüssigreagenzien

Die Methode im Gerät auswählen.

Für die Bestimmung von **Gesamtphosphat HR mit Flüssigreagenzien** den beschriebenen **Aufschluss** durchführen.

Dieser Test bestimmt alle in der Probe vorhandenen Phosphorverbindungen, einschließlich ortho-Phosphat, Polyphosphat und organischen Phosphorverbindungen.

Die Bestimmung von Gesamtphosphat HR mit Flüsigreagenz verläuft gleich wie die Bestimmung unter Methode 335, Phosphat HR mit Flüssigreagenz.

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

Auswertung

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

Einheit	Zitierform	Umrechnungsfaktor
mg/l	P	1
mg/l	PO_4^{3-}	3.066177
mg/l	P_2O_5	2.29137

Chemische Methode

Vanadomolybdat

Appendix

Störungen

Permanente Störungen

- Große Mengen ungelöster Stoffe können nicht reproduzierbare Messergebnisse verursachen.

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

Gemäß

Standard Method 4500-P C

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

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.

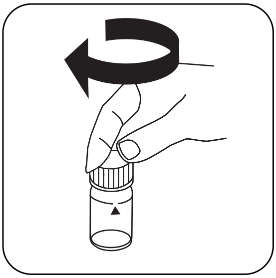
Anmerkungen

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.

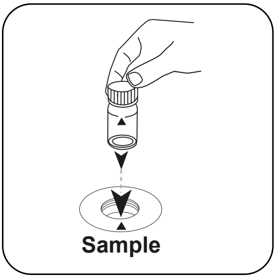
Durchführung der Bestimmung Polyacrylate mit Flüssigreagenz

Die Methode im Gerät auswählen.

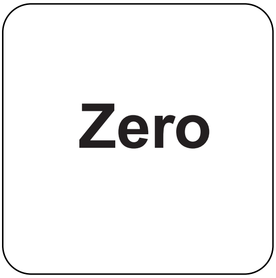
24-mm-Küvette mit **10 mL Probe** füllen.



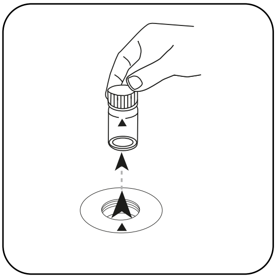
Küvette(n) verschließen.



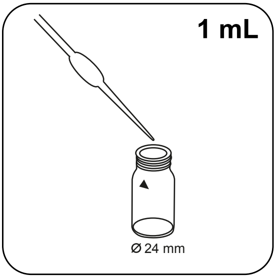
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



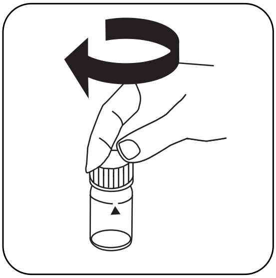
Taste **ZERO** drücken.



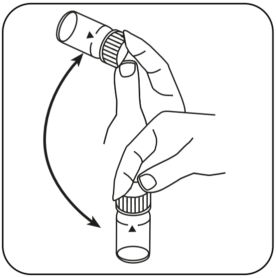
Küvette aus dem Messschacht nehmen.



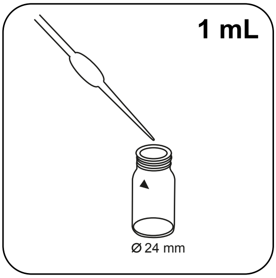
1 mL (25 Tropfen) Polyacrylat Puffer A1 Lösung in die Probenküvette geben.



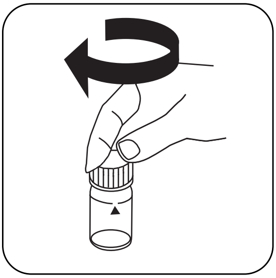
Küvette(n) verschließen.



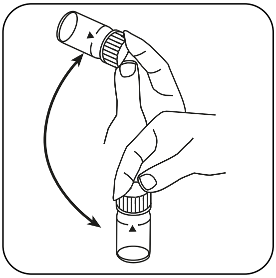
Inhalt durch Umschwenken mischen.



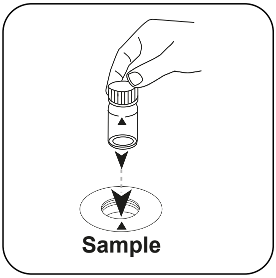
1 mL (25 Tropfen) Polyacrylat Fällmittel A2 Lösung in die Probenküvette geben.



Küvette(n) verschließen.



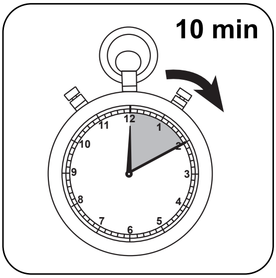
Inhalt durch Umschwenken mischen.



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

Silikat HR PP M352

1 - 90 mg/L SiO_2 SiHr

Silicomolybdat

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
VARIO Silica HR Reagenz, Set F10	1 Satz	535700

Vorbereitung

1. Die Probentemperatur muss zwischen 15 °C und 25 °C liegen.

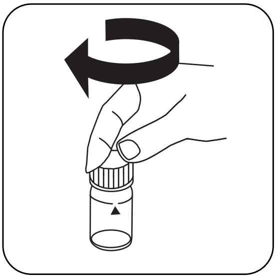
Anmerkungen

1. Die Methode misst in der Flanke der Absorptionskurve der entstehenden Färbung. Bei Filterphotometern kann daher bei Bedarf die Genauigkeit der Methode durch eine Anwenderjustierung mittels eines Silikat-Standards (ca. 70 mg/L SiO_2) verbessert werden.

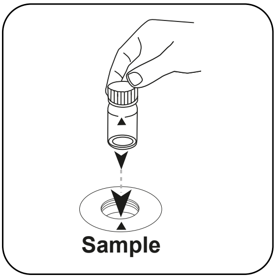
Durchführung der Bestimmung Siliciumdioxid HR mit Vario Pulverpäckchen

Die Methode im Gerät auswählen.

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



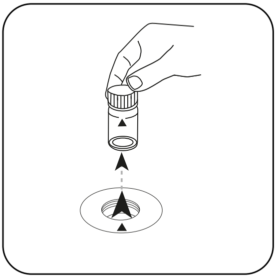
Küvette(n) verschließen.



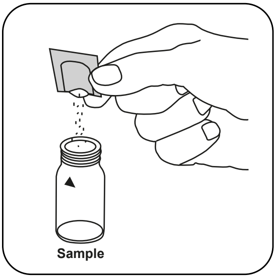
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.

Zero

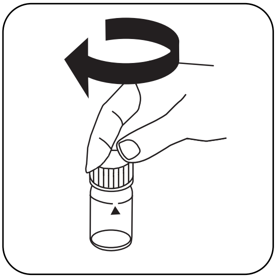
Taste **ZERO** drücken.



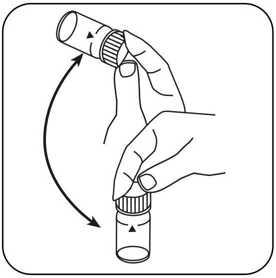
Küvette aus dem Messschacht nehmen.



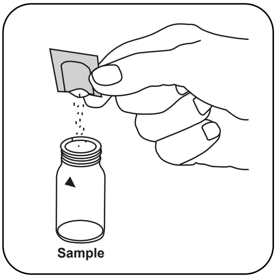
Ein **Vario Silica HR Molybdate F10 Pulverpäckchen** zugeben.



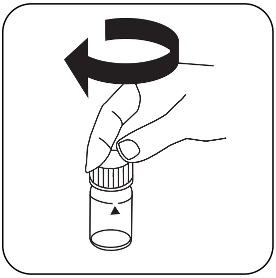
Küvette(n) verschließen.



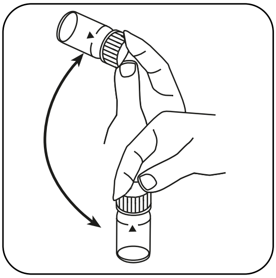
Das Pulver durch Umschwenken lösen.



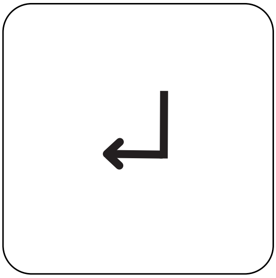
Ein **Vario Silica HR Acid Rgt. F10 Pulverpäckchen** zugeben.



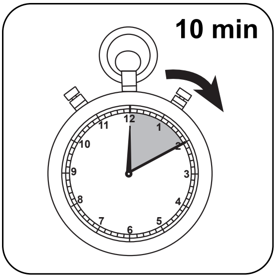
Küvette(n) verschließen.



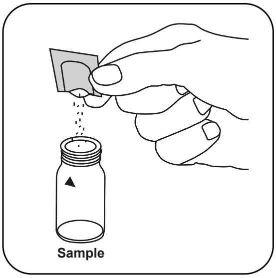
Inhalt durch Umschwenken mischen.



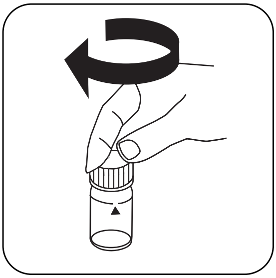
Taste **ENTER** drücken.



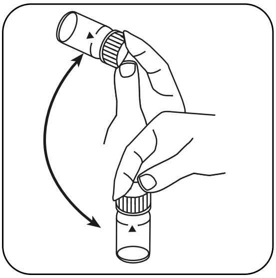
10 Minute(n) Reaktionszeit abwarten.



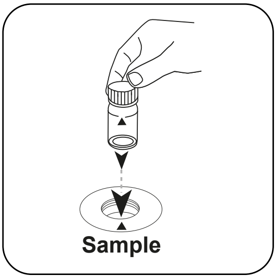
Ein **Vario Silica Citric Acid F10 Pulverpäckchen** zugeben.



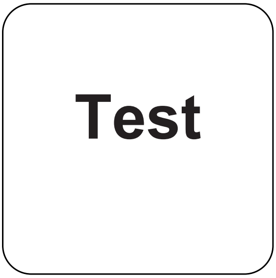
Küvette(n) verschließen.



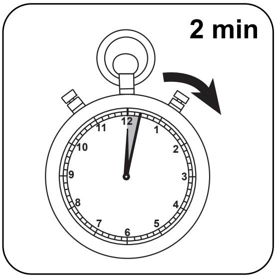
Das Pulver durch Umschwenken lösen.



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 Siliciumdioxid.

Auswertung

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

Einheit	Zitierform	Umrechnungsfaktor
mg/l	SiO_2	1
mg/l	Si	0.47

Chemische Methode

Silicomolybdat

Appendix

Störungen

Ausschließbare Störungen

- Gelegentlich enthalten Wasserproben Formen von Kieselsäuren, die sehr langsam mit Molybdat reagieren. Die genaue Art dieser Formen ist derzeit nicht bekannt. Durch eine Vorbehandlung mit Natriumhydrogencarbonat und anschließend mit Schwefelsäure können diese in reaktionsfreudige Formen umgewandelt werden (Beschreibung in "Standard Methods for the Examination of Water and Wastewater" unter "Silica-Digenstion with Sodium Bicarbonate").
- Sind Siliciumdioxid oder Phosphat vorhanden, entwickelt sich eine gelbe Farbe. Durch die Zugabe des Silica Citric Acid F10 Pulverpäckchens wird die durch Phosphat entstandene gelbe Farbe beseitigt.

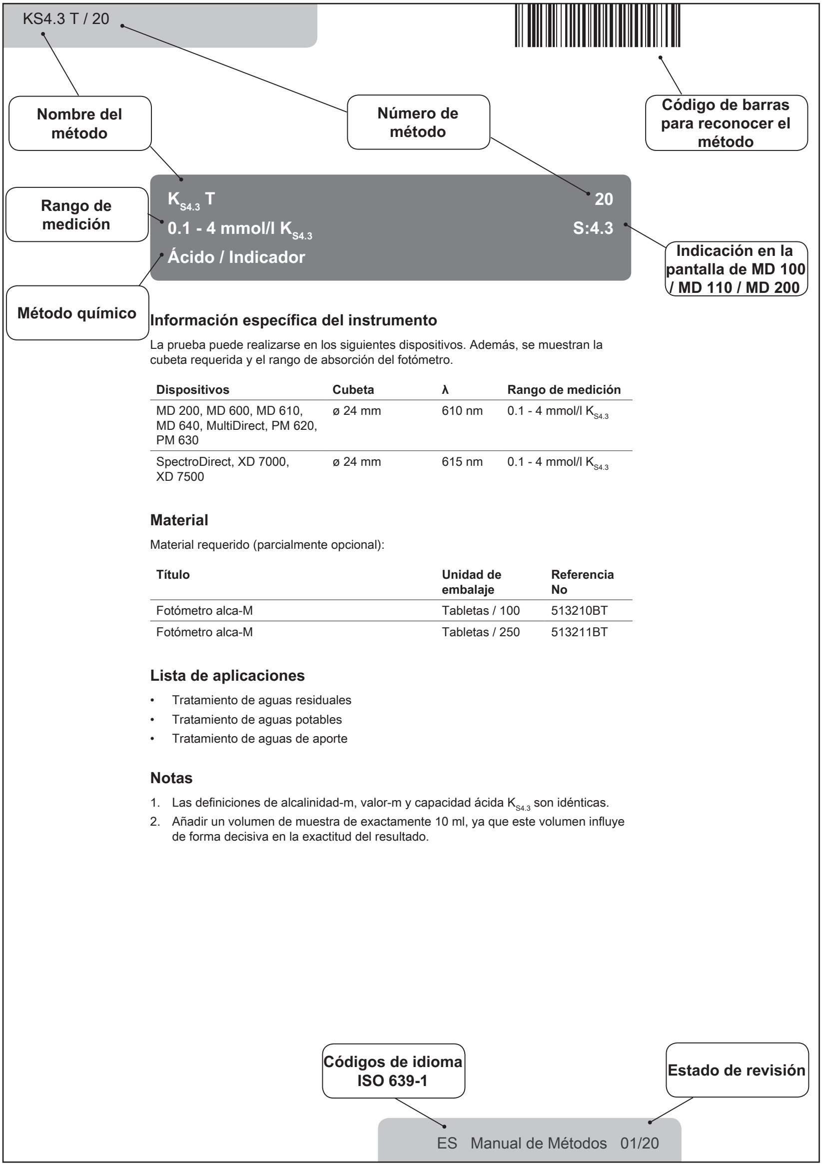
Störung	Stört ab / [mg/L]	Einfluss
Fe	große Mengen	
PO_4^{3-}	50	
PO_4^{3-}	60	Die Störung beträgt etwa -2 %
PO_4^{3-}	75	Die Störung beträgt etwa -11 %
S^{2-}	in allen Mengen	

Methodenvalidierung

Nachweisgrenze	0.38 mg/L
Bestimmungsgrenze	1.14 mg/L
Messbereichsende	100 mg/L
Empfindlichkeit	120 mg/L / Abs
Vertrauensbereich	1.69 mg/L
Verfahrensstandardabweichung	0.70 mg/L
Verfahrensvariationskoeffizient	1.38 %

Abgeleitet von

Standard Method 4500-SiO2 C



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

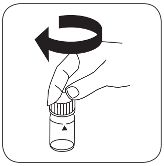
Realización de la determinación

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

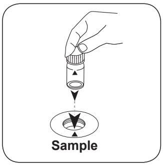
Seleccionar el método en el aparato.

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** .

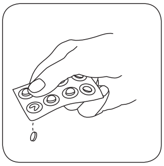


Cerrar la(s) cubeta(s).

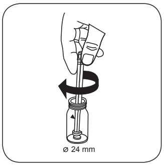


Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

• • •



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):

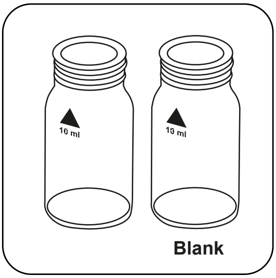
Reactivos	Unidad de embalaje	No. de referencia
Juego aluminio 20 ml VARIO	1 Cantidad	535000

Preparación

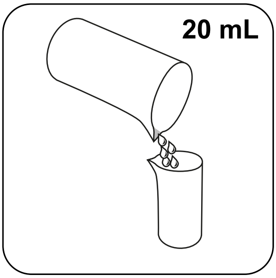
1. Para conseguir resultados de análisis exactos, la muestra acuosa deberá tener una temperatura entre 20 °C y 25 °C.
2. Para reducir errores por impurificaciones, lavar las cubetas y accesorios necesarios antes de su uso con una solución de ácido clorhídrico (aprox. 20%), enjuagándolos a continuación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

Ejecución de la determinación Aluminio con sobres de polvos Vario

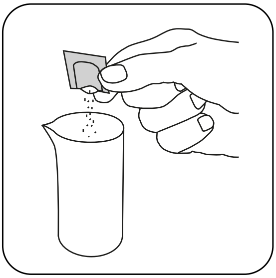
Seleccionar el método en el aparato.



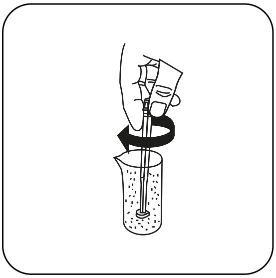
Preparar dos cubetas limpias de 24 mm. Identificar una como cubeta en blanco.



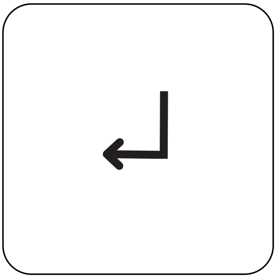
Añadir **20 mL de muestra** en un vaso de medición de 100 mL.



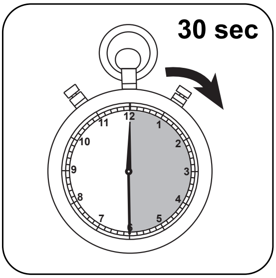
Añadir un **sobre de polvos Vario ALUMINIUM ECR F20** .



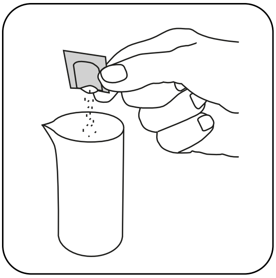
Disolver los polvos agitando.



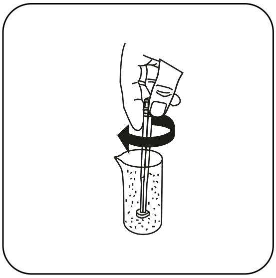
Pulsar la tecla **ENTER**.



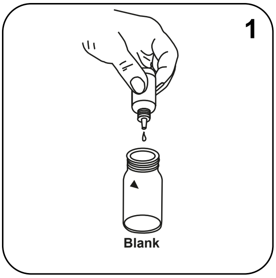
Esperar **30 segundos como periodo de reacción**.



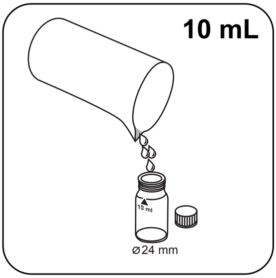
Añadir un **sobre de polvos Vario HEXAMINE F20** .



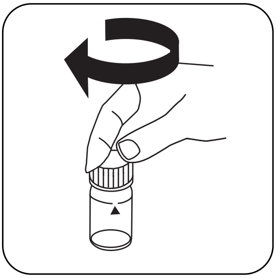
Disolver los polvos agitando.



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



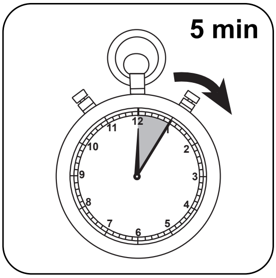
Añadir en cada cubeta **10 mL de muestra pretratada**.



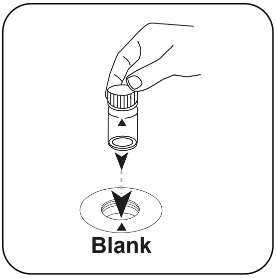
Cerrar la(s) cubeta(s).

↵

Pulsar la tecla **ENTER**.



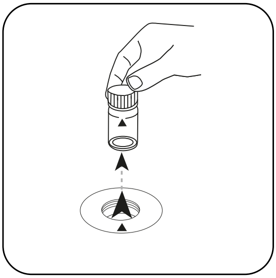
Esperar **5 minutos como periodo de reacción**.



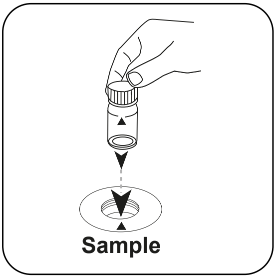
Poner la **cubeta en blanco** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

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

Cloruro L (B) M92

0.5 - 20 mg/L Cl^- CL-

Tiocianato de mercurio / Nitrato de hierro

Material

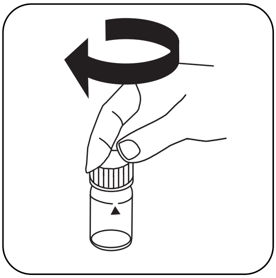
Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Chloride Reagent Set	1 Cantidad	56R018490

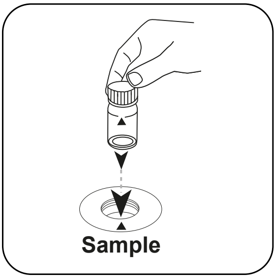
Ejecución de la determinación Cloruro con reactivo líquido

Seleccionar el método en el aparato.

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



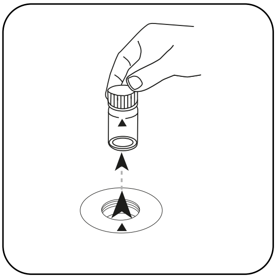
Cerrar la(s) cubeta(s).



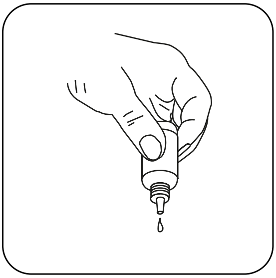
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

Zero

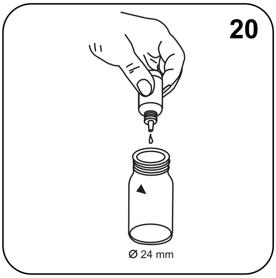
Pulsar la tecla **ZERO**.



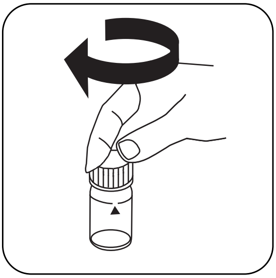
Extraer la cubeta del compartimiento de medición.



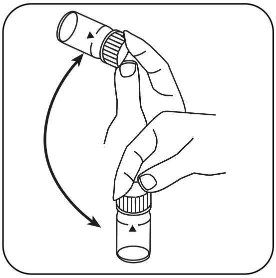
Mantener la botella cuentagotas vertical y añadir gotas del mismo tamaño presionando lentamente.



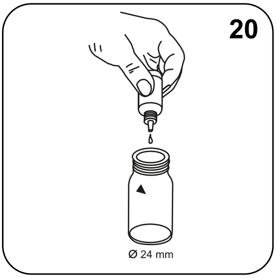
Añadir **20 gotas de KS251 (Chloride Reagenz A)**.



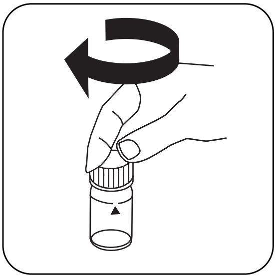
Cerrar la(s) cubeta(s).



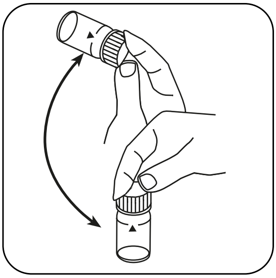
Mezclar el contenido girando.



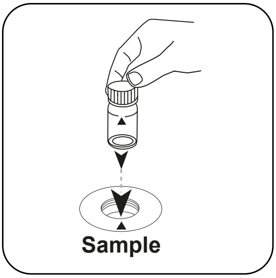
Añadir **20 gotas de KS253 (Chloride Reagenz B)**.



Cerrar la(s) cubeta(s).



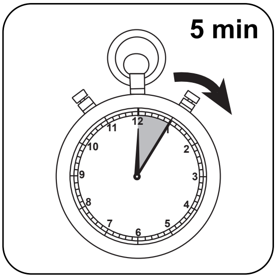
Mezclar el contenido girando.



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 Cloruro.

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	Cl^-	1
mg/l	NaCl	1.65

Método químico

Tiocianato de mercurio / Nitrato de hierro

Apéndice

Interferencia

Interferencias persistentes

1. La reducción de sustancias como el sulfito y el tiosulfato, que pueden reducir el hierro (III) a hierro (II) o el mercurio (II) a mercurio (I), puede causar interferencias. El cianuro, el yodo y el bromo dan una interferencia positiva.

Derivado de

DIN 15682-D31
DIN ISO 15923-1 D49

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

Preparación

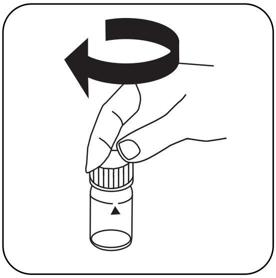
1. Las muestras acuosas muy alcalinas o muy ácidas se deberán neutralizar a un valor de pH de 4 a 6.

Ejecución de la determinación Cobre libre con tableta

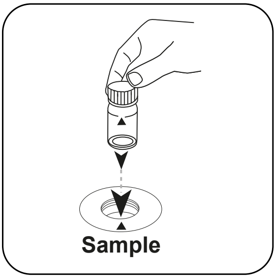
Seleccionar el método en el aparato.

Seleccione además la determinación: libre

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



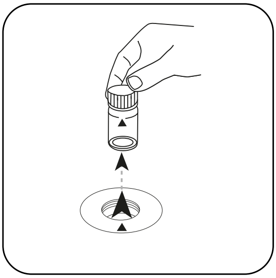
Cerrar la(s) cubeta(s).



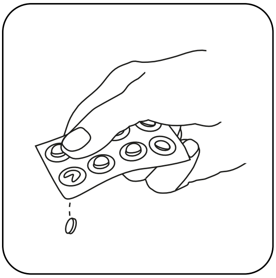
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

Zero

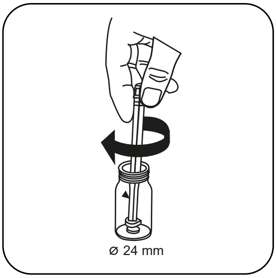
Pulsar la tecla **ZERO**.



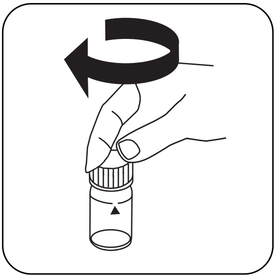
Extraer la cubeta del compartimiento de medición.



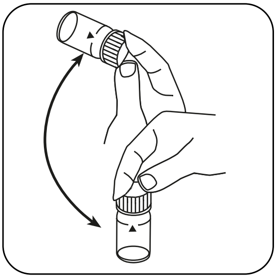
Añadir **tableta COPPER No. 1**.



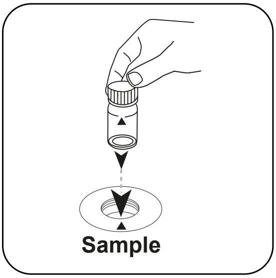
Triturar la(s) tableta(s) girando ligeramente.



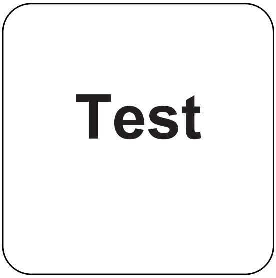
Cerrar la(s) cubeta(s).



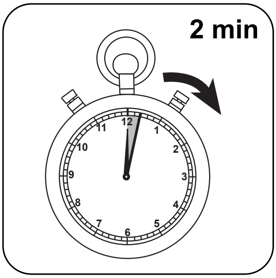
Disolver la(s) tableta(s) girando.



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.

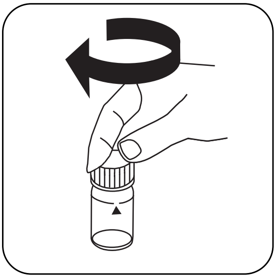
A continuación se visualizará el resultado en mg/L Cobre libre.

Ejecución de la determinación Cobre total con tableta

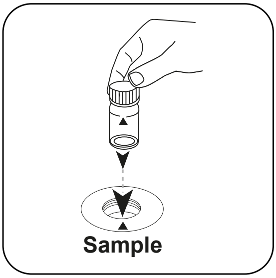
Seleccionar el método en el aparato.

Seleccione además la determinación: total

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



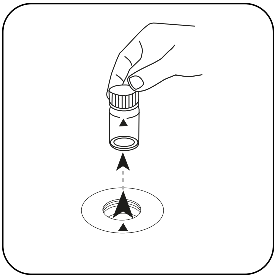
Cerrar la(s) cubeta(s).



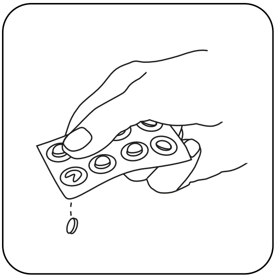
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

Zero

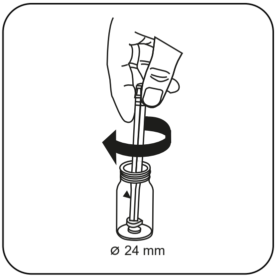
Pulsar la tecla **ZERO**.



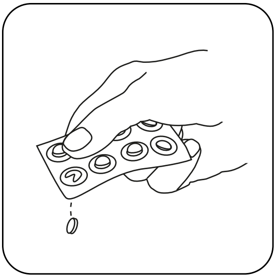
Extraer la cubeta del compartimiento de medición.



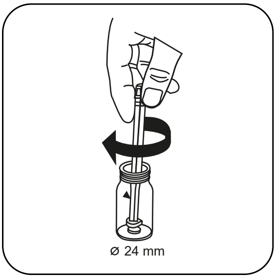
Añadir **tableta COPPER No. 1**.



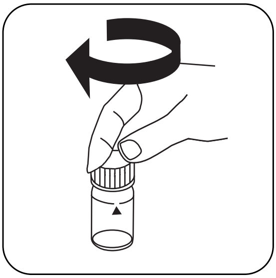
Triturar la(s) tableta(s) girando ligeramente y disolver.



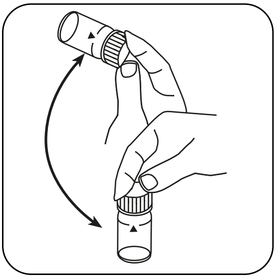
Añadir **tableta COPPER No. 2**.



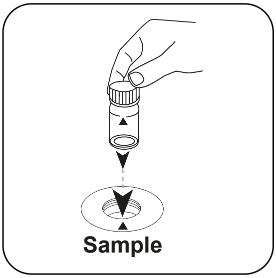
Triturar la(s) tableta(s) girando ligeramente.



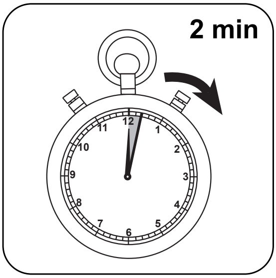
Cerrar la(s) cubeta(s).



Disolver la(s) tableta(s) girando.



Test



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 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

DEHA PP M167

0.02 - 0.5 mg/L DEHA DEHA

PPST

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Juego de reactivos para DEHA VARIO	1 Cantidad	536000

Preparación

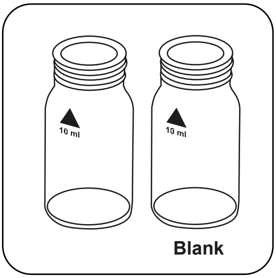
1. Para minimizar errores por residuos férricos, lavar antes de usarlos los aparatos de vidrio necesarios con una solución de ácido clorhídrico (aprox. 20%), enjuagándolos a continuación con agua desionizada.

Notas

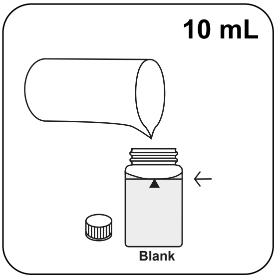
1. Como la reacción depende de la temperatura, deben mantenerse 20 °C ± 2 °C.
2. Colocar la cubeta de muestra durante la reacción colorea en el compartimiento de medición o en un lugar oscuro. (La exposición a la luz solar durante la reacción colorea produce resultados mayores).

Ejecución de la determinación DEHA (N,N-dietilohidroxilamina) con sobres de polvo Vario y reactivo líquido

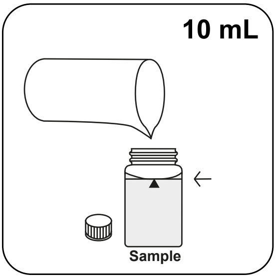
Seleccionar el método en el aparato.



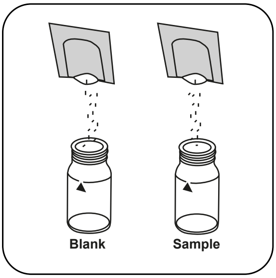
Preparar dos cubetas limpias de 24 mm. Identificar una como cubeta en blanco.



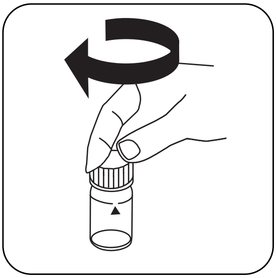
Añadir **10 mL de agua desionizada** en la cubeta en blanco.



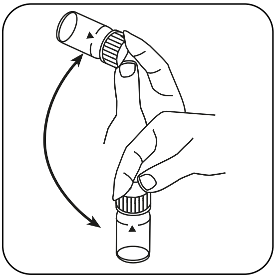
Añadir **10 mL de muestra** en la cubeta con la muestra.



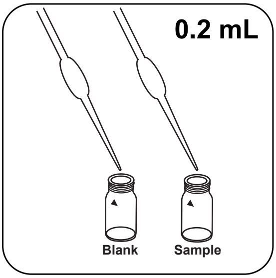
Añadir **un sobre de polvos de Vario OXYSCAV 1 Rgt** en cada cubeta.



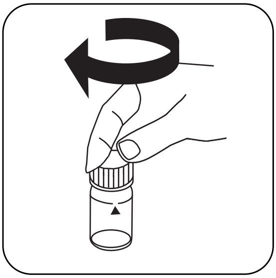
Cerrar la(s) cubeta(s).



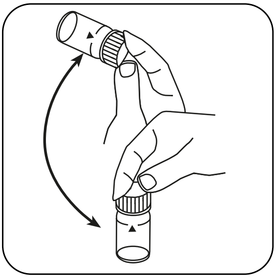
Mezclar el contenido girando.



Añadir en cada cubeta **0.2 mL de solución Vario DEHA 2 Rgt** .



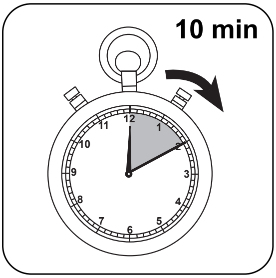
Cerrar la(s) cubeta(s).



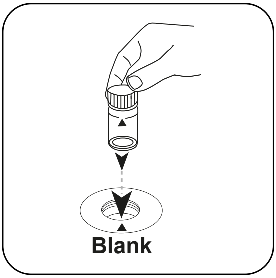
Mezclar el contenido girando.

↵

Pulsar la tecla **ENTER**.



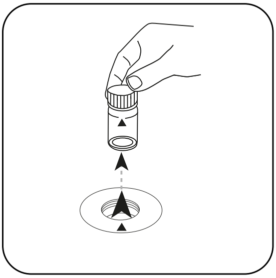
Esperar **10 minutos como periodo de reacción**.



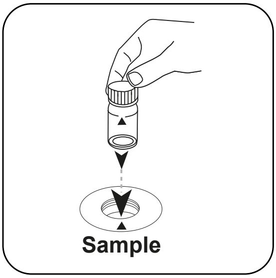
Poner la **cubeta en blanco** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

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 como DEHA.

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	DEHA	1
µg/l	DEHA	1000
mg/l	Hydrochinon	2.63
mg/l	MEKO	4.5
mg/l	Carbohydrazid	1.31
mg/l	ISA	3.9

Método químico

PPST

Apéndice

Interferencia

Interferencias extraibles

1. Perturbaciones:
   El hierro (II) perturba en todas las concentraciones. Para la determinación de concentraciones de hierro (II) repita la determinación sin añadir la solución de DEHA. Si la concentración fuese mayor a 20 µg/L, descuente este valor leído del resultado de la determinación DEHA.
2. Las sustancias que reducen el hierro (III) interfieren la determinación. Las sustancias que complejan fuertemente el hierro pueden alterar la determinación.

Interferencia	de / [mg/L]
Zn	50
$Na_2B_4O_7$	500
Co	0,025
Cu	8
$CaCO_3$	1000
Lignosulfonate	0,05
Mn	0,8
Mo	80
Ni	0,8

Interferencia	de / [mg/L]
PO_4^{3-}	10
$R\text{-}PO(OH)_2$	10
SO_4^{2-}	1000

Bibliografía

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989

Hidracina P M205

0.05 - 0.5 mg/L N_2H_4 Hydr

Dimetilaminobenzaldehido

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Análisis de hidrazina con polvo	Polvos / 30 g	462910

Se requieren los siguientes accesorios.

Accesorios	Unidad de embalaje	No. de referencia
Cucharilla dosificadora, 1 g	1 Cantidad	384930

Preparación

1. Si la muestra acuosa estuviese turbia, filtrarla antes de realizar la calibración a cero.
2. La temperatura de la muestra acuosa no deberá sobrepasar los 21 °C.

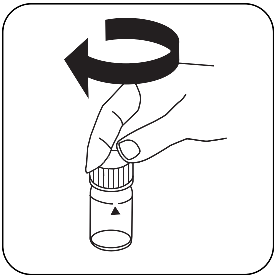
Notas

1. Cuando se usa la cuchara de medición de hidracina, 1 g corresponde a una cuchara graduada.
2. Para la eliminación del enturbiamiento producido por los reactivos han demostrado ser eficaces los filtros de papel cualitativos para precipitados de finura media.
3. Para determinar la maduración del reactivo, por ejemplo, por un largo periodo de no uso, se realizará el test descrito anteriormente con agua corriente. Si el resultado se encontrase por encima del límite de detección de 0,05 mg/L, utilizar el reactivo solamente con restricciones (resultados con desviaciones mayores.

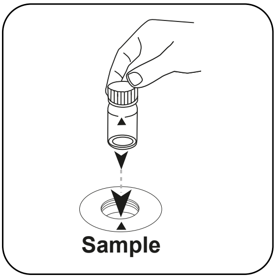
Ejecución de la determinación Hidrazina con reactivo en polvo

Seleccionar el método en el aparato.

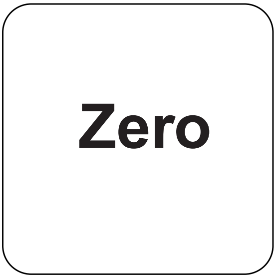
Llenar la cubeta de 24 mm con **10 mL de muestra** .



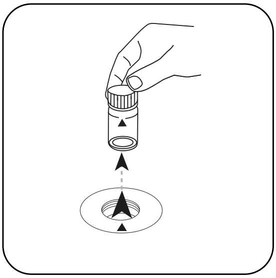
Cerrar la(s) cubeta(s).



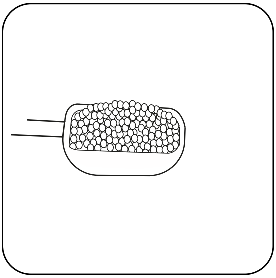
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



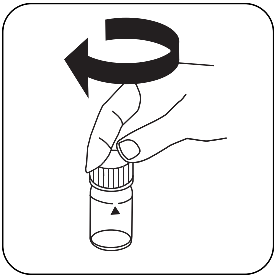
Pulsar la tecla **ZERO**.



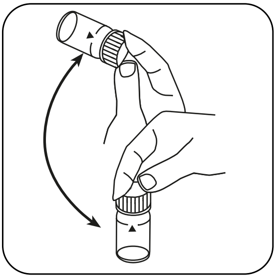
Extraer la cubeta del compartimiento de medición.



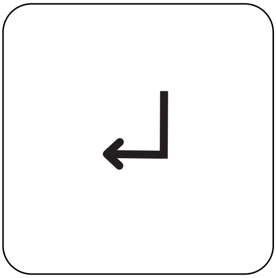
Añadir **1 g de polvos HYDRAZIN Test**.



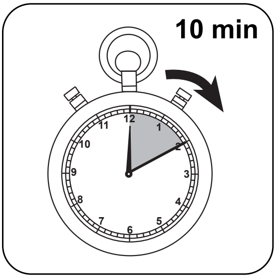
Cerrar la(s) cubeta(s).



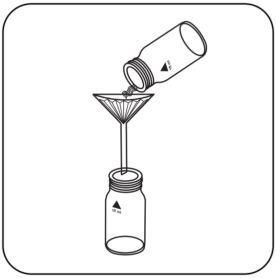
Mezclar el contenido girando.



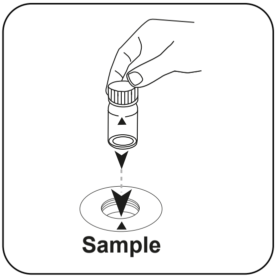
Pulsar la tecla **ENTER**.



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



Eliminar el ligero enturbiamiento producido mediante filtrado.



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 como Hidracina.

Método químico

Dimetilaminobenzaldehido

Apéndice

Interferencia

Interferencias extraibles

1. Solucionar las perturbaciones debido a muestras muy coloreadas o turbias: Mezclar 1 parte de agua desionizada y 1 parte de blanqueante doméstico. Añadir 1 gota de esta solución en 25 ml de muestra y mezclar. Utilizar 10 ml de esta muestra en lugar de agua desionizada para el ensayo en blanco. Atención: Para la medición de la muestra de agua debe utilizarse la muestra sin tratar.
   Principio: la hidracina se oxida por la solución desactivando la interferencia colorea durante la calibración a cero.

Interferencia	**de / [mg/L]**
$NH_4^{\ +}$	10
C_4H_9NO	10
$VO_4^{\ 3-}$	1

Derivado de

DIN 38413-P1

Hierro LR L (A) M225

0.03 - 2 mg/L Fe FE

Ferrocina / Tioglicolato

Material

Material requerido (parcialmente opcional):

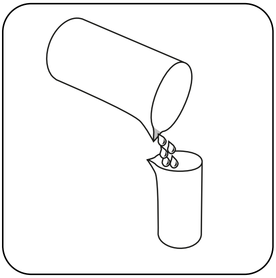
Reactivos	Unidad de embalaje	No. de referencia
Acidez / Alcalinidad P Indicador PA1	65 mL	56L013565
Tampón de dureza cálcica CH2	65 mL	56L014465
KP962-Polvo de persulfato amónico	Polvos / 40 g	56P096240
KS63-FE6-Tioglicolato/molibdato HR RGT	30 mL	56L006330
KS63-FE6-Tioglicolato/molibdato HR RGT	65 mL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

Preparación

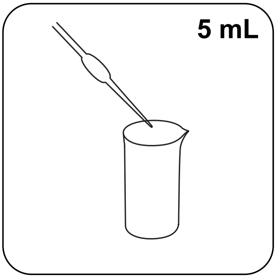
1. Si existen en la muestra formadores de complejos fuertes, debe prolongarse el periodo de reacción hasta que no pueda apreciarse ninguna colorea. Los complejos de hierro muy fuertes no se registran en la medición. En este caso deben destruirse los formadores de complejos mediante oxidación con ácido/persulfato 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

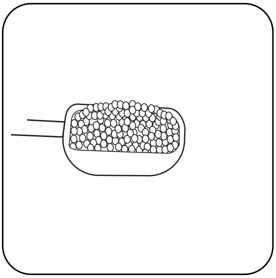
El hierro total se compone de hierro soluble, complejado y suspendido. La muestra no debe filtrarse antes de la medición. Para garantizar una homogeneización de la muestra, las partículas sedimentadas deben distribuirse uniformemente agitando enérgicamente, inmediatamente antes de tomar la muestra. Para 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.



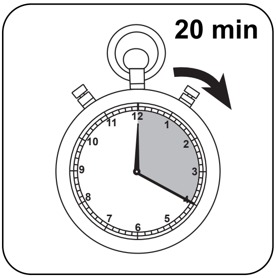
Llenar un recipiente de disgregación apropiado con **50 mL de muestra homogeneizada**.



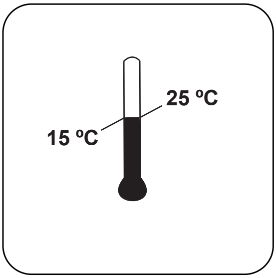
Añadir **5 mL de 1:1 ácido clorhídrico**.



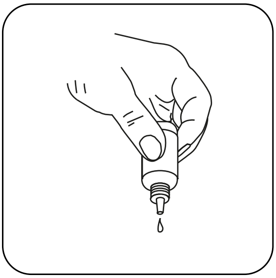
Añadir **una cuchara de KP 962 (Ammonium Persulfat Powder)**.



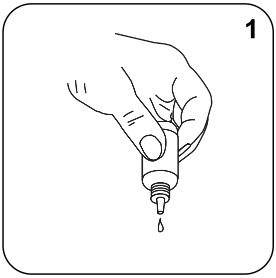
Hervir la muestra durante **20 minutos** . Debe mantenerse un volumen de muestra de 25 mL, si conviene rellenar con agua desionizada.



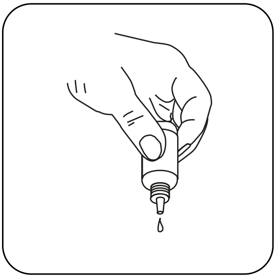
Dejar enfriar la muestra a **temperatura ambiente**.



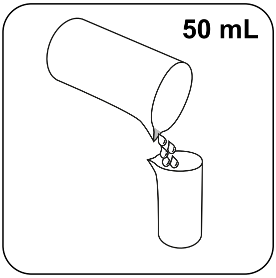
Mantener la botella cuentagotas vertical y añadir gotas del mismo tamaño presionando lentamente.



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!)**



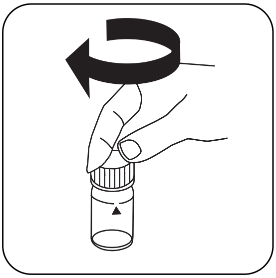
Rellenar la muestra con **agua desionizada hasta 50 mL** .

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

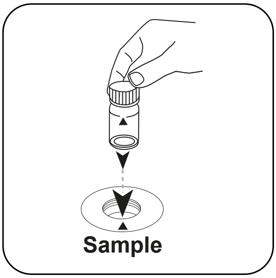
Seleccionar el método en el aparato.

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

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



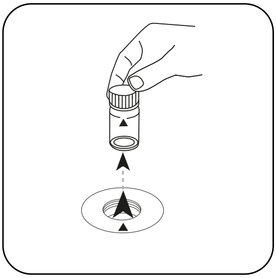
Cerrar la(s) cubeta(s).



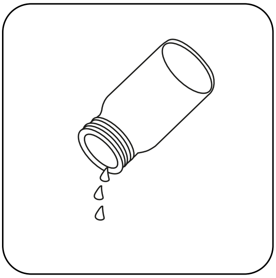
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

Zero

Pulsar la tecla **ZERO**.

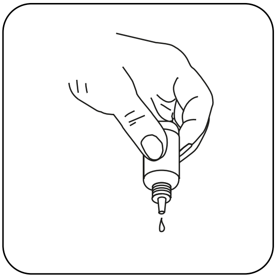


Extraer la cubeta del compartimiento de medición.

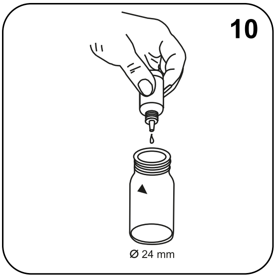


Vaciar la cubeta.

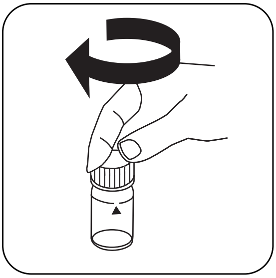
Llenar la cubeta de 24 mm con **10 mL de la muestra preparada** .



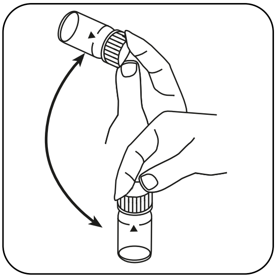
Mantener la botella cuentagotas vertical y añadir gotas del mismo tamaño presionando lentamente.



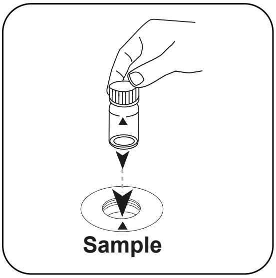
Añadir **10 gotas de Iron Reagent FE5**.



Cerrar la(s) cubeta(s).



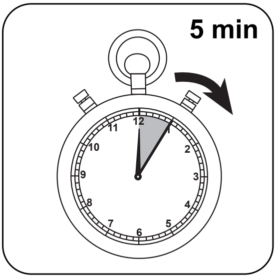
Mezclar el contenido girando.



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**.

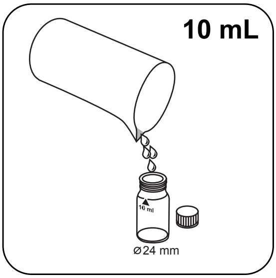
Finalizado el periodo de reacción se realizará la determinación automáticamente.

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

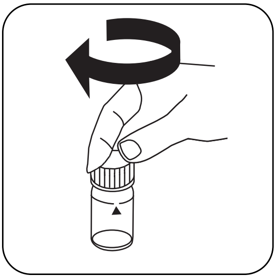
Ejecución de la determinación Hierro, LR (A) con reactivo líquido

Seleccionar el método en el aparato.

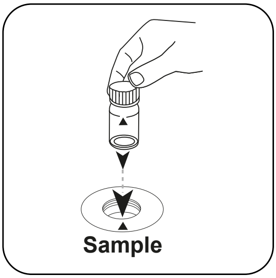
Para una determinación del hierro disuelto total, debe filtrarse la muestra antes de la determinación (porosidad 0,45 µm). De lo contrario, se determinan conjuntamente las partículas de hierro y el hierro en suspensión.



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



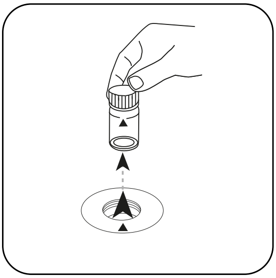
Cerrar la(s) cubeta(s).



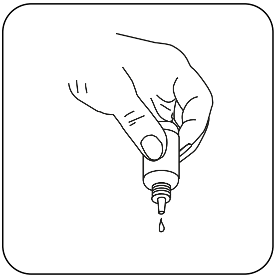
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

Zero

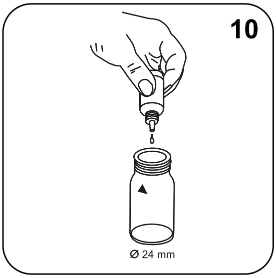
Pulsar la tecla **ZERO**.



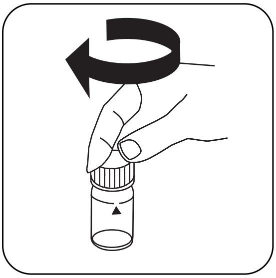
Extraer la cubeta del compartimiento de medición.



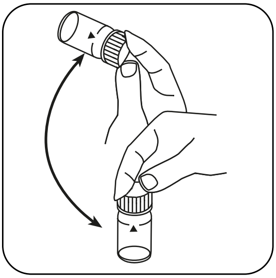
Mantener la botella cuentagotas vertical y añadir gotas del mismo tamaño presionando lentamente.



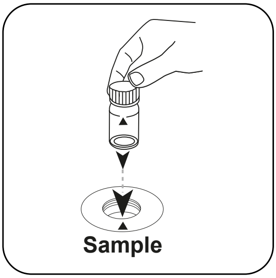
Añadir **10 gotas de Iron Reagent FE5**.



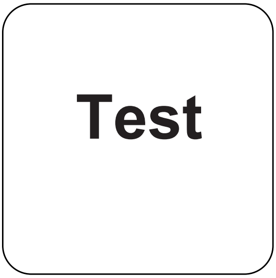
Cerrar la(s) cubeta(s).



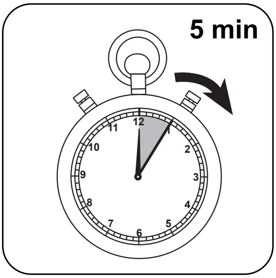
Mezclar el contenido girando.



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.

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)

Oxígeno disuelto C M292

10 - 800 µg/L O_2 [c)] O2

Rhodazine D TM

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Kit de análisis de oxígeno Vacu-vial	1 Set	380450

Se requieren los siguientes accesorios.

Accesorios	Unidad de embalaje	No. de referencia
Adaptador para cubetas redondas 13 mm	1 Cantidad	19802192
Adaptador (13 mm) MultiDirect para Vacu-vial	1 Cantidad	192075

Preparación

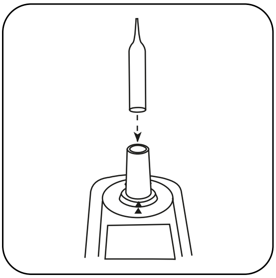
1. Antes de comenzar la determinación, lea las instrucciones originales y los avisos de seguridad que forman parte del paquete de entrega (las MSDS se encuentran en la página web www.chemetrics.com).

Notas

1. Este método es un producto de CHEMetrics. Sin embargo, el rango de medición indicado en este fotómetro y la longitud de onda utilizada pueden diferir de los datos de CHEMetrics. 2. Conservar los Vacu-Vials® en un lugar oscuro, a temperatura ambiente. 4. Vacu-Vials® es una marca comercial registrada de la empresa CHEMetrics, inc. / Calverton, EE.UU.

Ejecución de la determinación Oxígeno, disuelto con Vacu Vials® K-7553

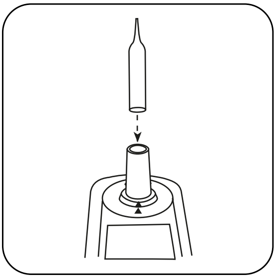
Seleccionar el método en el aparato.



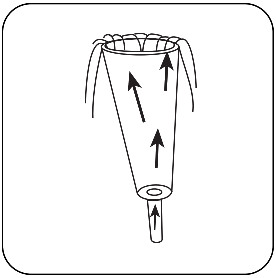
Poner la **ampolla Zero** en el compartimiento de medición.

Zero

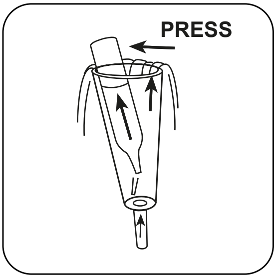
Pulsar la tecla **ZERO**.



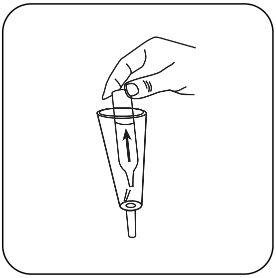
Extraer la ampolla Zero del compartimiento de medición.



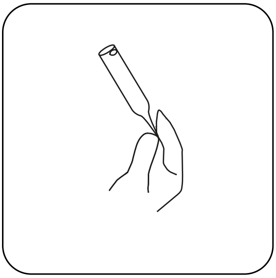
Dejar circular el agua de test de abajo a arriba durante varios minutos en el recipiente de toma de muestras, para eliminar las burbujas de aire.



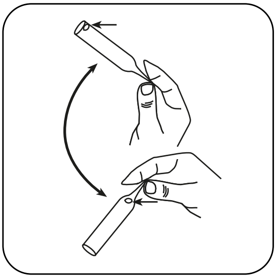
Colocar una ampolla de Vacu-vial® en el recipiente de toma de muestras. Romper la punta de la ampolla presionando ligeramente contra la pared del recipiente. Esperar hasta que se llene completamente la ampolla.



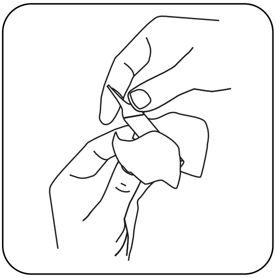
Seguidamente, extraer rápidamente la ampolla llena del recipiente de toma de muestras, con la punta hacia abajo.



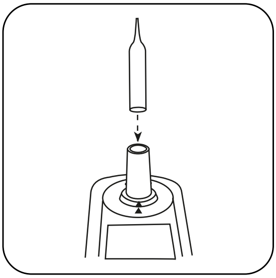
Cerrar la abertura con un dedo, para evitar el contacto con el aire.



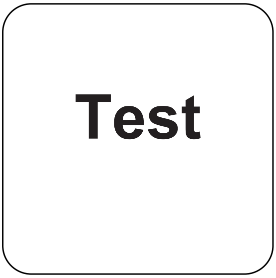
Girar varias veces la ampolla.



Secar la ampolla desde fuera.



Poner la ampolla en el compartimiento de medición.



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

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

Método químico

Rhodazine D TM

Apéndice

Derivado de

ASTM D 5543-15

[c] MultiDirect: Adaptador necesario para Vacu-Vials® (N° de pedido: 19 20 75)

Fosfato HR L M335

5 - 80 mg/L PO_4 PO4

Vanadomolibdato

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
KS278-Ácido sulfúrico 50 %	65 mL	56L027865
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
Phosphate HR, Ortho Reagent Set	1 Cantidad	56R019090

Se requieren los siguientes accesorios.

Accesorios	Unidad de embalaje	No. de referencia
Varilla agitadora y cucharilla para polvo	1 Cantidad	56A006601

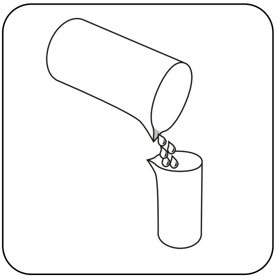
Preparación

1. Las muestras muy tamponadas o con valores de pH extremos se deberán poner antes del análisis en un rango de pH entre 6 y 7 (con 1 mol/l de ácido clorhídrico o 1 mol/l de hidróxido sódico).
2. Para el análisis de los polifosfatos y del fosfato total es necesaria una disgregación previa.

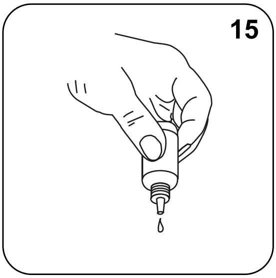
Notas

1. Reactivos y accesorios suministrables por solicitud.

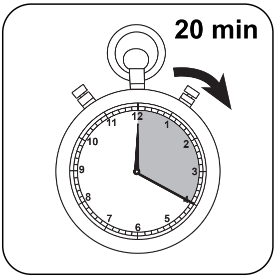
Disgregación Polifosfato con reactivo líquido



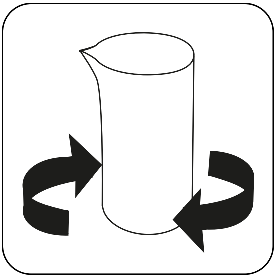
Llenar un recipiente de disgregación apropiado con **50 mL de muestra homogeneizada**.



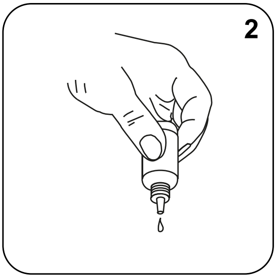
Añadir **15 gotas de KS278 (50% ácido sulfúrico)**.



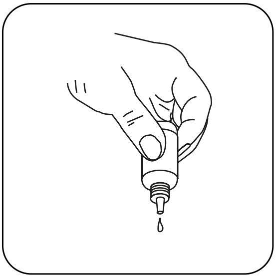
Hervir la muestra durante **20 minutos** . Debe mantenerse un volumen de muestra de 25 mL, si conviene rellenar con agua desionizada.



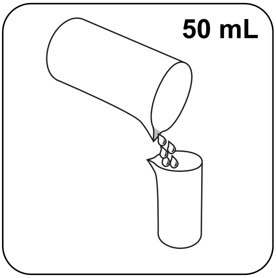
Girar el recipiente de disgregación y dejar enfriar a temperatura ambiente.



Añadir **2 gotas de Acidity / Alkalinity P Indicator PA1**.

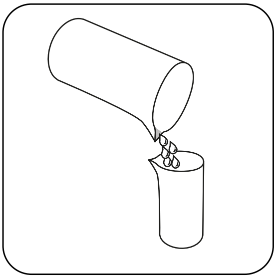


Añadir gota a gota **Hardness Calcium Buffer CH2** en la misma muestra hasta que adquiera una coloración de rosa pálido a roja. **(¡Atención: después de añadir cada gota debe agitarse la muestra!)**

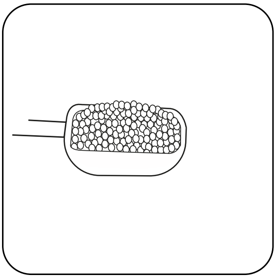


Rellenar la muestra con **agua desionizada hasta 50 mL** .

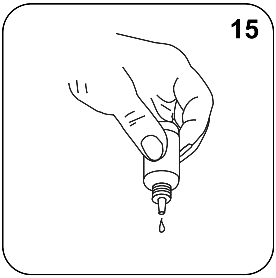
Disgregación Fosfato total HR con reactivo líquido



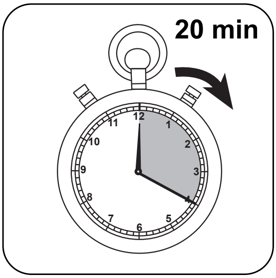
Llenar un recipiente de disgregación apropiado con **50 mL de muestra homogeneizada**.



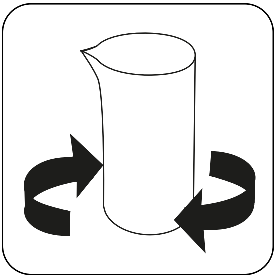
Añadir **una cuchara de KP962 (Ammonium Persulfate Powder)**.



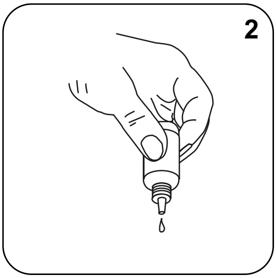
Añadir **15 gotas de KS278 (50% sulfuric acid)**.



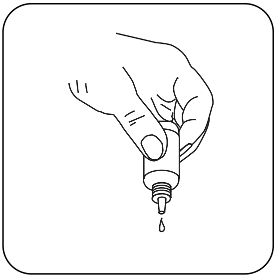
Hervir la muestra durante **20 minutos** . Debe mantenerse un volumen de muestra de 25 mL, si conviene rellenar con agua desionizada.



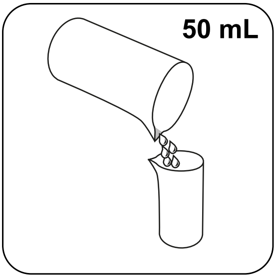
Girar el recipiente de disgregación y dejar enfriar a temperatura ambiente.



Añadir **2 gotas de Acidity / Alkalinity P Indicator PA1**.



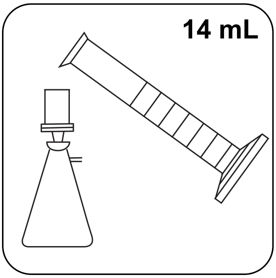
Añadir gota a gota **Hardness Calcium Buffer CH2** en la misma muestra hasta que adquiera una coloración de rosa pálido a roja. **(¡Atención: después de añadir cada gota debe agitarse la muestra!)**



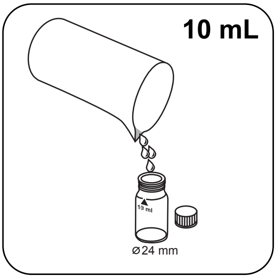
Rellenar la muestra con **agua desionizada hasta 50 mL** .

Ejecución de la determinación Fosfato HR con reactivo líquido

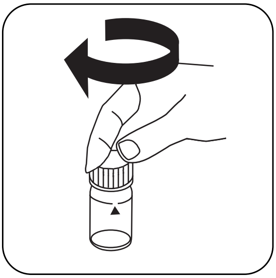
Seleccionar el método en el aparato.



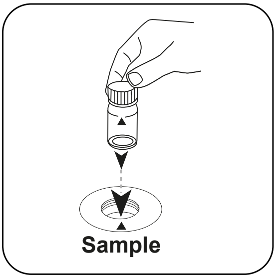
Filtrar unos 14 mL de muestra con un filtro prelavado (porosidad 0,45 µm).



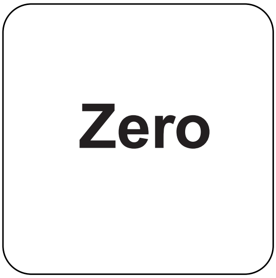
Llenar la cubeta de 24 mm con **10 mL de la muestra preparada** .



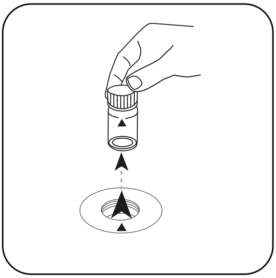
Cerrar la(s) cubeta(s).



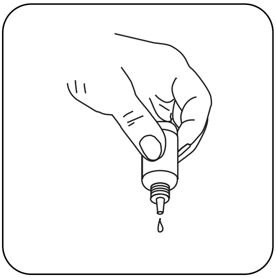
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



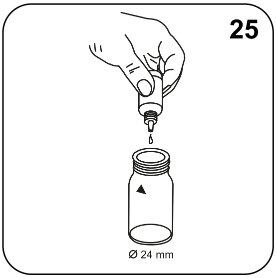
Pulsar la tecla **ZERO**.



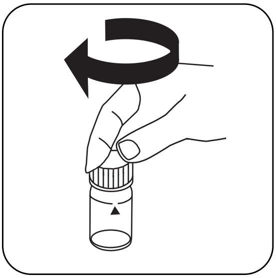
Extraer la cubeta del compartimiento de medición.



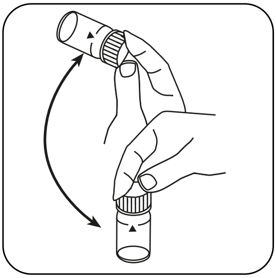
Mantener la botella cuentagotas vertical y añadir gotas del mismo tamaño presionando lentamente.



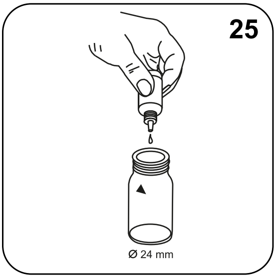
Añadir **25 gotas de KS228 (Ammonium Molybdate)**.



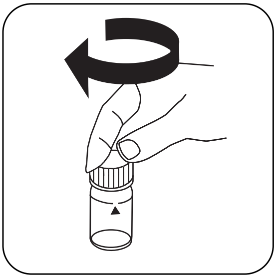
Cerrar la(s) cubeta(s).



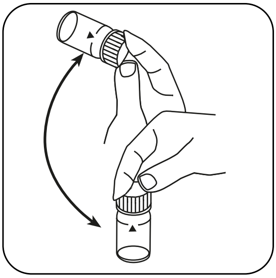
Mezclar el contenido girando.



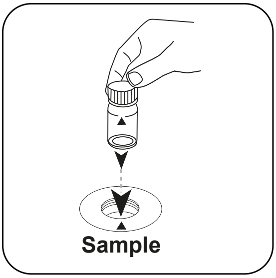
Añadir **25 gotas de KS229 (Ammonium Metavanadate)**.



Cerrar la(s) cubeta(s).



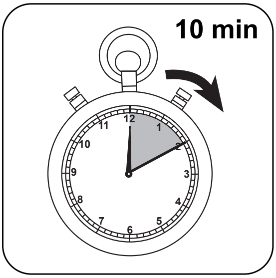
Mezclar el contenido girando.



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 Fosfato.

Ejecución de la determinación Polifosfato con reactivo líquido

Seleccionar el método en el aparato.

Para la determinación de **Polifosfato HR con reactivo líquido realizar la disgregación** descrita.

Este test calcula el contenido de fosfato inorgánico total.El contenido de polifosfatos se obtiene de la diferencia entre el fosfato inorgánico y el ortofosfato.

La determinación de Fosfato total LR con reactivo líquido se desarrolla igual que la indicada en Methodo 335, Fosfato HR con reactivo líquido.

A continuación se visualizará el resultado en mg/L Fosfato total inorgánico (orto-fosfato y polifosfato).

Ejecución de la determinación Fosfato total con reactivo líquido

Seleccionar el método en el aparato.

Para la determinación de **Fosfato total HR con reactivo líquido realizar la disgregación** descrita.

Este test determina todos los compuestos de fósforo existentes en la muestra, incluido el ortofosfato, polifosfato y compuestos orgánicos de fósforo.

La determinación de Fosfato total HR con reactivo líquido se desarrolla igual que la indicada en Methodo 335, Fosfato HR con reactivo líquido.

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

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	P	1
mg/l	PO_4^{3-}	3.066177
mg/l	P_2O_5	2.29137

Método químico

Vanadomolibdato

Apéndice

Interferencia

Interferencias persistentes

- Si hay grandes cantidades de sustancias no disueltas pueden causar resultados de medición no reproducibles.

Interferencia	de / [mg/L]
Al	200
AsO_4^{3-}	en todas las cantidades
Cr	100
Cu	10
Fe	100
Ni	300
SiO_2	50
$Si(OH)_4$	10
S^{2-}	en todas las cantidades
Zn	80

De acuerdo a

Método estándar 4500-P C

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

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.

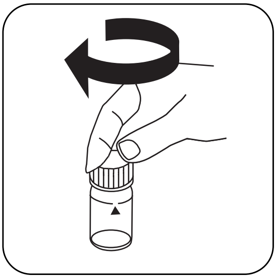
Notas

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.

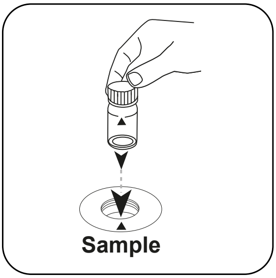
Ejecución de la determinación Poliacrilato con reactivo líquido

Seleccionar el método en el aparato.

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



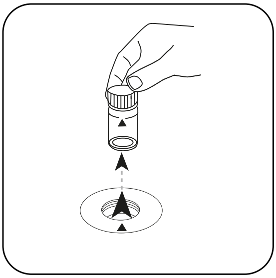
Cerrar la(s) cubeta(s).



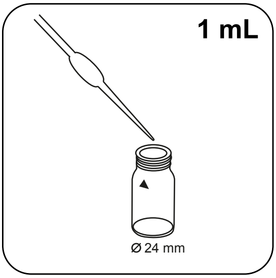
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

Zero

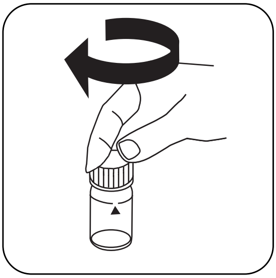
Pulsar la tecla **ZERO**.



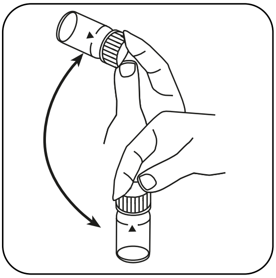
Extraer la cubeta del compartimiento de medición.



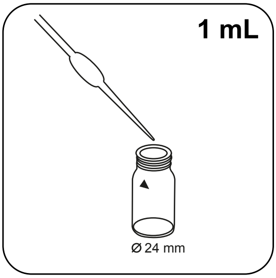
Añadir **1 mL de solución (25 drops) Polyacrylate Buffer A1** en la cubeta de muestra.



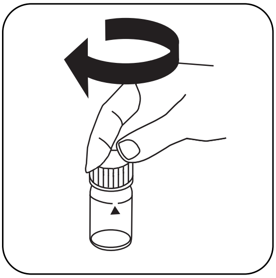
Cerrar la(s) cubeta(s).



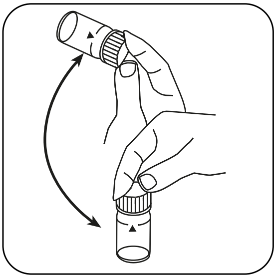
Mezclar el contenido girando.



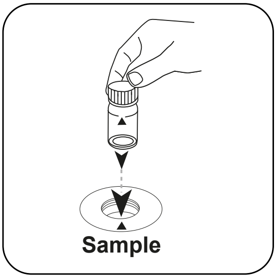
Añadir **1 mL de solución (25 drops) Polyacrylate Precipitant A2** en la cubeta de muestra.



Cerrar la(s) cubeta(s).



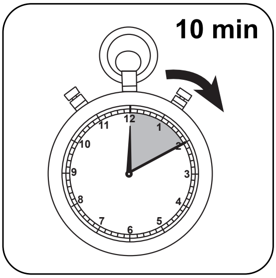
Mezclar el contenido girando.



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

Silicato HR PP M352

1 - 90 mg/L SiO_2 SiHr

Silicomolibdato

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Reactivo para sílice HR VARIO, juego F10	1 Set	535700

Preparación

1. La temperatura de la muestra deberá encontrarse entre 15 °C y 25 °C.

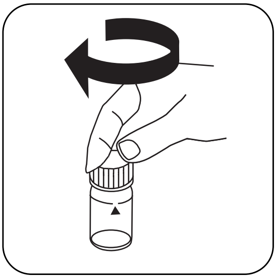
Notas

1. El método realiza la medición en el flanco de la curva de absorción de la coloración resultante. Por consiguiente, en los fotómetros de filtro, el usuario puede mejorar la precisión del método, si es necesario, utilizando un silicato estándar (aprox. 70 mg/ L SiO_2).

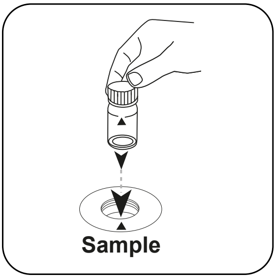
Ejecución de la determinación Dióxido de silicio HR con sobres de polvos Vario

Seleccionar el método en el aparato.

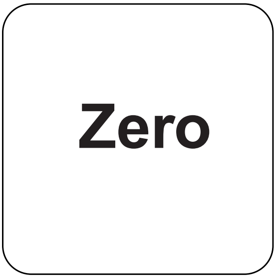
Llenar la cubeta de 24 mm con **10 mL de muestra** .



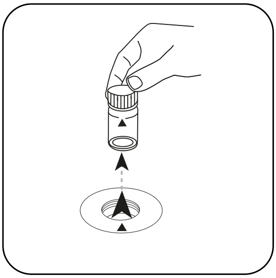
Cerrar la(s) cubeta(s).



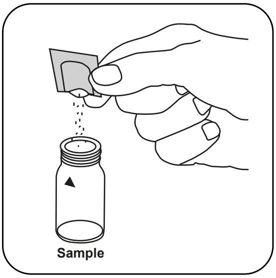
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



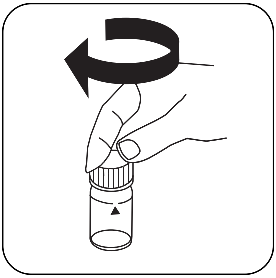
Pulsar la tecla **ZERO**.



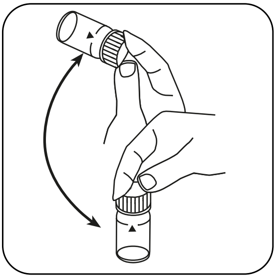
Extraer la cubeta del compartimiento de medición.



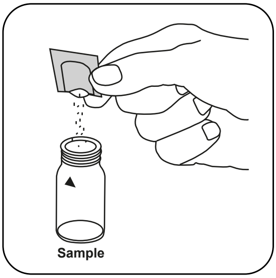
Añadir un **sobre de polvos Vario Silica HR Molybdate F10** .



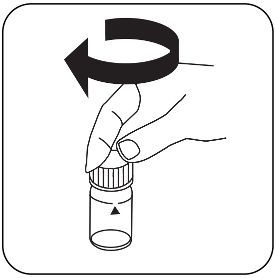
Cerrar la(s) cubeta(s).



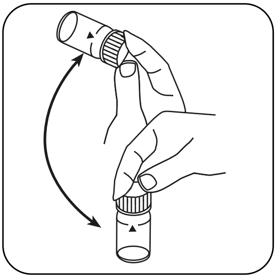
Disolver los polvos girando.



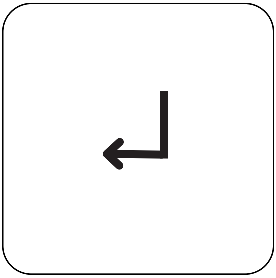
Añadir un **sobre de polvos Vario Silica HR Acid Rgt. F10** .



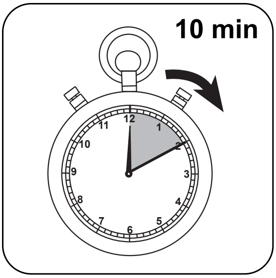
Cerrar la(s) cubeta(s).



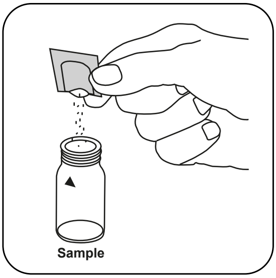
Mezclar el contenido girando.



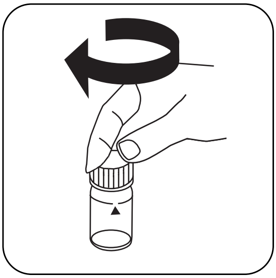
Pulsar la tecla **ENTER**.



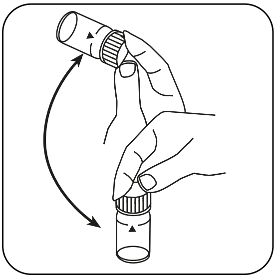
Esperar **10 minutos como periodo de reacción**.



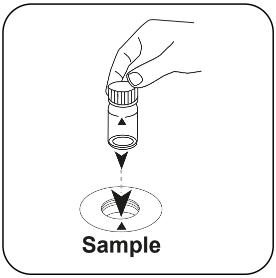
Añadir un **sobre de polvos Vario Silica Citric Acid F10** .



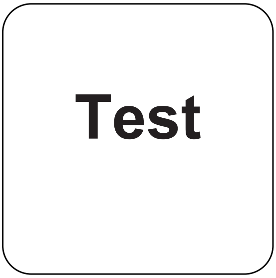
Cerrar la(s) cubeta(s).



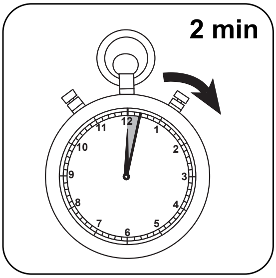
Disolver los polvos girando.



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



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 Silica.

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	SiO_2	1
mg/l	Si	0.47

Método químico

Silicomolibdato

Apéndice

Interferencia

Interferencias extraibles

- Ocasionalmente, las muestras acuosas contienen formas de ácido silícico que reaccionan muy lentamente con molibdato. La clase exacta de estas formas se desconoce por el momento. Mediante un pretratamiento con bicarbonato sódico y seguidamente con ácido sulfúrico se pueden transformar estas formas en sustancias más reactivas (instrucciones en "Standard Methods for the Examination of Water and Wastewater" en "Silica-Digenstion with Sodium Bicarbonate").
- La presencia de dióxido de silicio o fosfato producirá un color amarillo.
  El color amarillo producido por el fosfato se eliminará añadiendo el sobre de polvos Silica Citric Acid F10.

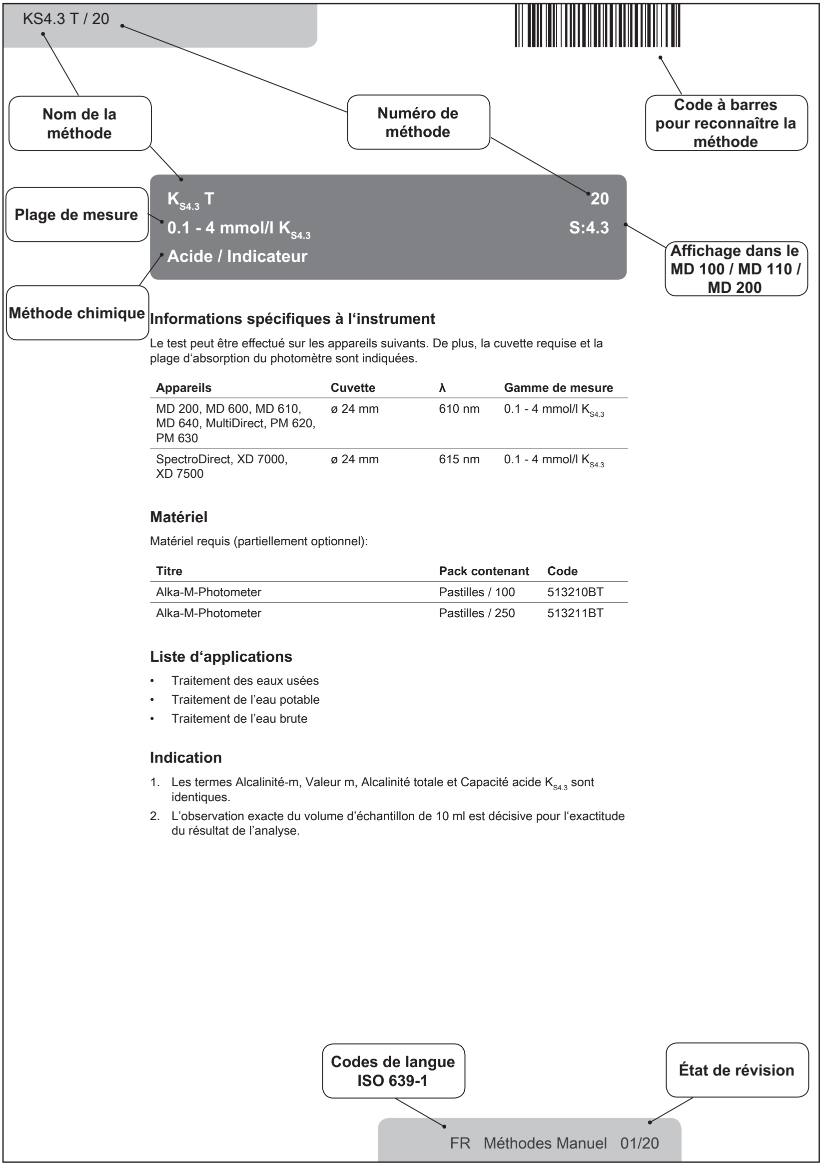
Interferencia	de / [mg/L]	Influencia
Fe	grandes cantidades	
PO_4^{3-}	50	
PO_4^{3-}	60	La perturbación es del aproximadamente -2 %
PO_4^{3-}	75	La perturbación es del aproximadamente -11 %
S^{2-}	en todas las cantidades	

Validación del método

Límite de detección	0.38 mg/L
Límite de determinación	1.14 mg/L
Límite del rango de medición	100 mg/L
Sensibilidad	120 mg/L / Abs
Intervalo de confianza	1.69 mg/L
Desviación estándar	0.70 mg/L
Coeficiente de variación	1.38 %

Derivado de

Método estándar 4500-SiO2 C



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

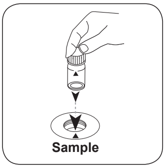
Réalisation de la quantification Capacité acide $K_{S4.3}$ avec pastille

Sélectionnez la méthode sur l’appareil.

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

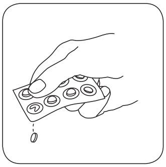
Remplissez une cuvette de 24 mm de **10 ml d’échantillon**.

Fermez la(les) cuvette(s).

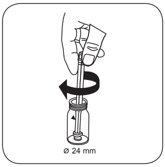


Placez la **cuvette réservée à l’échantillon** dans la chambre de mesure. Attention à la positionner correctement.

• • •



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):

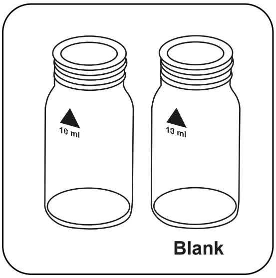
Réactifs	Pack contenant	Code
VARIO kit aluminium 20 ml	1 Pièces	535000

Préparation

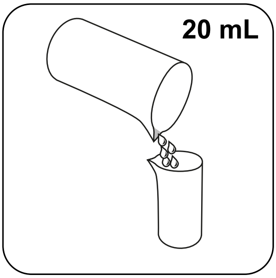
1. Pour obtenir des résultats exacts, la température de l’échantillon sera comprise entre 20 °C et 25 °C.
2. Pour éviter les erreurs causées par des impuretés, lavez la cuvette et les accessoires avant l’analyse en utilisant une solution d’acide chlorhydrique (à 20% env.) puis rincez à l’eau déminéralisée.

Réalisation de la quantification Aluminium avec sachet de poudre Vario

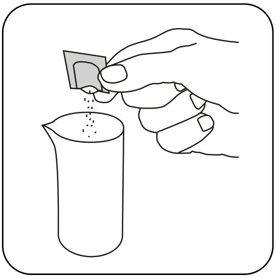
Sélectionnez la méthode sur l’appareil.



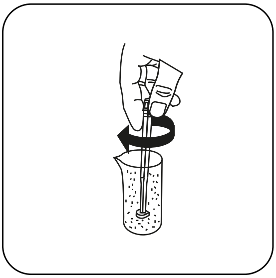
Préparez deux cuvettes propres de 24 mm. L’une des deux cuvettes sera la cuvette du blanc. Étiquetez-la.



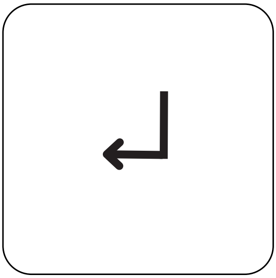
Versez **20 mL d’échantillon** dans un bécher de mesure de 100 mL.



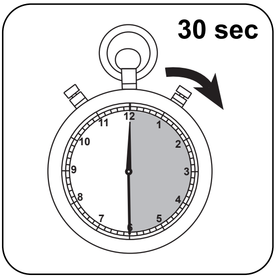
Ajoutez un **sachet de poudre Vario ALUMINIUM ECR F20**.



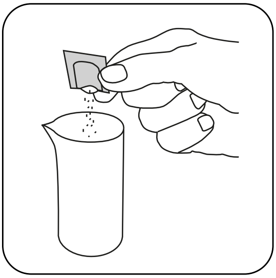
Dissolvez la poudre en mélangeant.



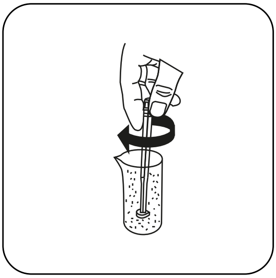
Appuyez sur la touche **ENTER**.



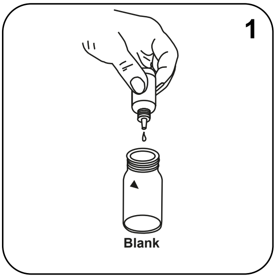
Attendez la fin du **temps de réaction de 30 secondes** .



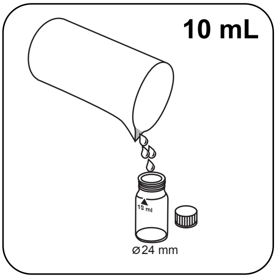
Ajoutez un **sachet de poudre Vario HEXAMINE F20**.



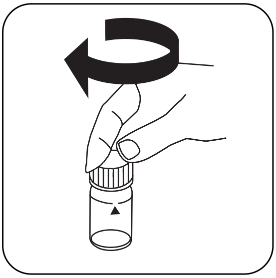
Dissolvez la poudre en mélangeant.



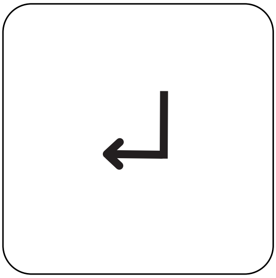
Ajoutez **1 gouttes de Vario ALUMINIUM ECR Masking Reagent** dans la cuvette du blanc.



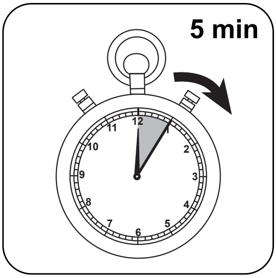
Dans chaque cuvette, versez **10 mL d’échantillon préparé**.



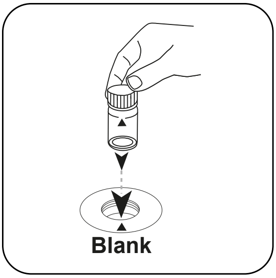
Fermez la(les) cuvette(s).



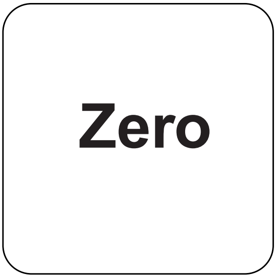
Appuyez sur la touche **ENTER**.



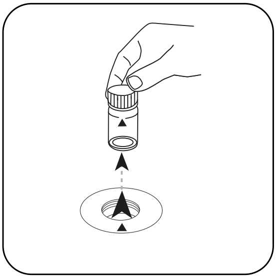
Attendez la fin du **temps de réaction de 5 minute(s)** .



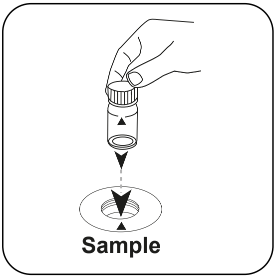
Placez la **cuvette du blanc** dans la chambre de mesure. Attention à la positionner correctement.



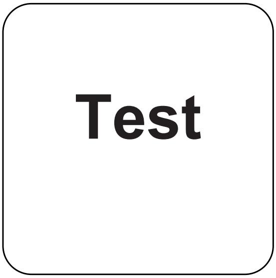
Appuyez sur la touche **ZERO**.



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

Chlorure L (B) M92

0.5 - 20 mg/L Cl^- CL-

Thiocyanate de mercure / Nitrate de fer

Matériel

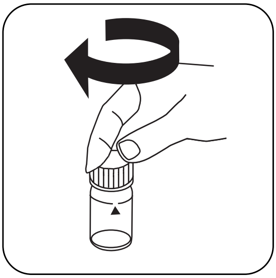
Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
Chloride Reagent Set	1 Pièces	56R018490

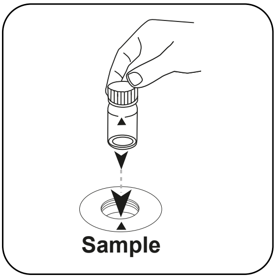
Réalisation de la quantification Chlorure avec réactif liquide

Sélectionnez la méthode sur l’appareil.

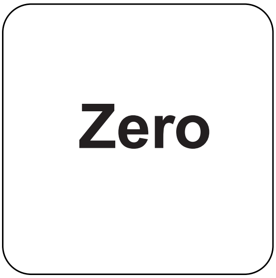
Remplissez une cuvette de 24 mm de **10 mL d’échantillon**.



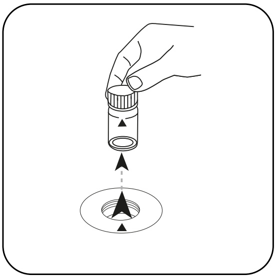
Fermez la(les) cuvette(s).



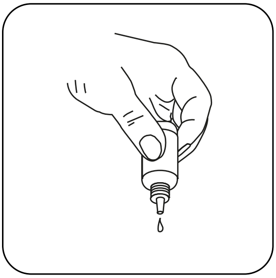
Placez la **cuvette réservée à l’échantillon** dans la chambre de mesure. Attention à la positionner correctement.



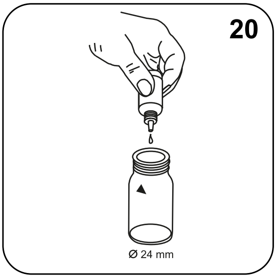
Appuyez sur la touche **ZERO**.



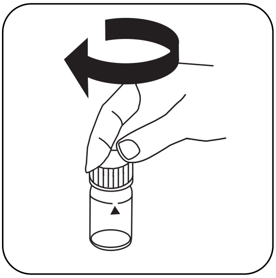
Retirez la cuvette de la chambre de mesure.



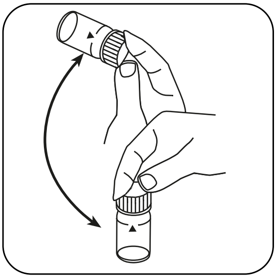
Tenez les flacons compte-goutte à la verticale et ajoutez des gouttes uniformes en appuyant lentement.



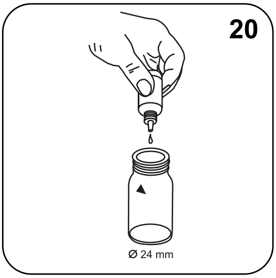
Ajoutez **20 gouttes de KS251 (Chloride Reagenz A)**.



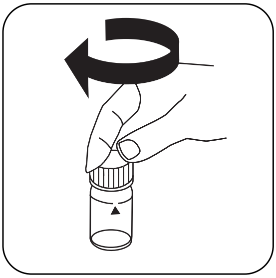
Fermez la(les) cuvette(s).



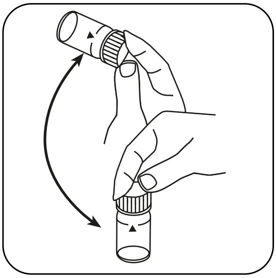
Mélangez le contenu en mettant le tube plusieurs fois à l’envers puis à l’endroit.



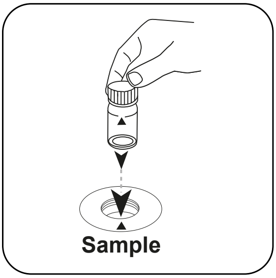
Ajoutez **20 gouttes de KS253 (Chloride Reagenz B)**.



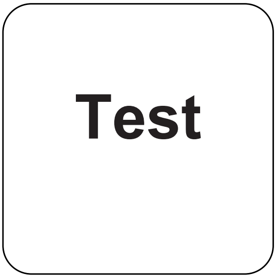
Fermez la(les) cuvette(s).



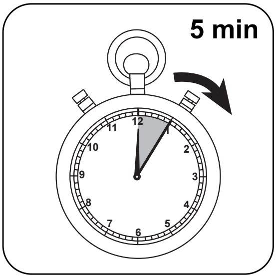
Mélangez le contenu en mettant le tube plusieurs fois à l’envers puis à l’endroit.



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 chlorure.

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	Cl^-	1
mg/l	NaCl	1.65

Méthode chimique

Thiocyanate de mercure / Nitrate de fer

Appendice

Interférences

Interférences persistantes

1. Les substances réductrices comme le sulfite et le thiosulfate, capables de réduire le fer (III) pour obtenir du fer (II) ou le mercure (II) pour obtenir du mercure (I) risquent d’interférer. Les cyanures, l’iode et le brome interfèrent de manière positive.

Dérivé de

DIN 15682-D31
DIN ISO 15923-1 D49

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

Préparation

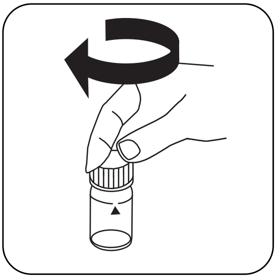
1. Avant l'analyse, les eaux fortement alcalines ou acides devraient être ajustées sur un pH 4 à 6.

Réalisation de la quantification Cuivre, libre avec pastille

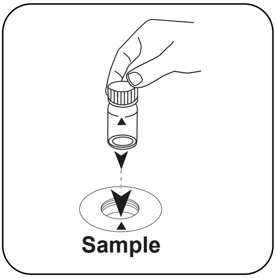
Sélectionnez la méthode sur l’appareil.

Sélectionnez également la quantification : libre

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



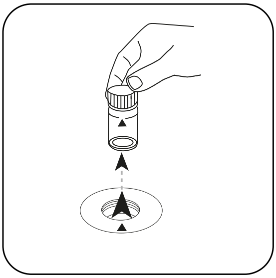
Fermez la(les) cuvette(s).



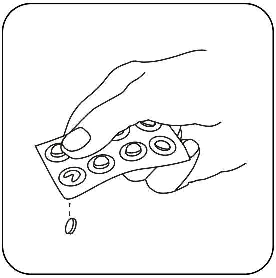
Placez la **cuvette réservée à l’échantillon** dans la chambre de mesure. Attention à la positionner correctement.

Zero

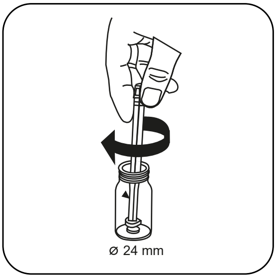
Appuyez sur la touche **ZERO**.



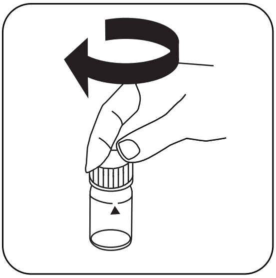
Retirez la cuvette de la chambre de mesure.



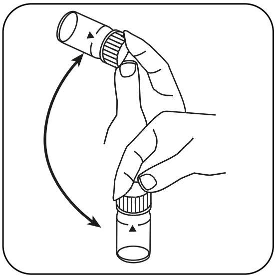
Ajoutez une **pastille de COPPER No. 1**.



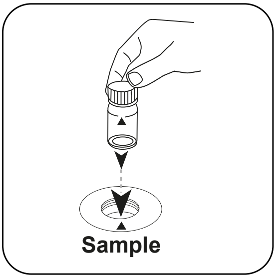
Écrasez la(les) pastille(s) en la(les) tournant un peu.



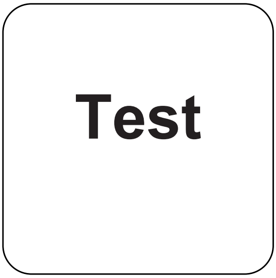
Fermez la(les) cuvette(s).



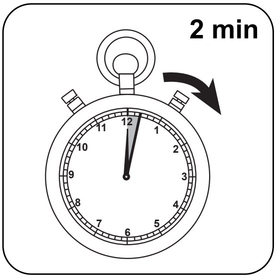
Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



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.

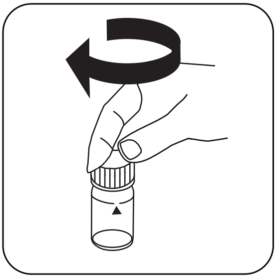
Le résultat s'affiche à l’écran en mg/L Cuivre, libre.

Réalisation de la quantification Cuivre, total avec pastille

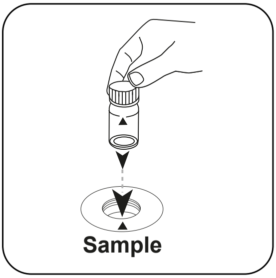
Sélectionnez la méthode sur l’appareil.

Sélectionnez également la quantification : total

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



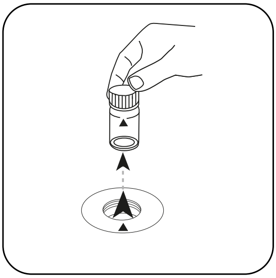
Fermez la(les) cuvette(s).



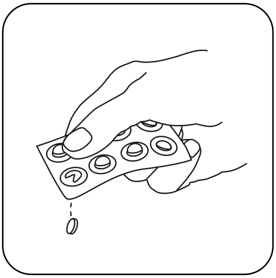
Placez la **cuvette réservée à l’échantillon** dans la chambre de mesure. Attention à la positionner correctement.

Zero

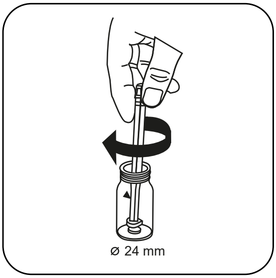
Appuyez sur la touche **ZERO**.



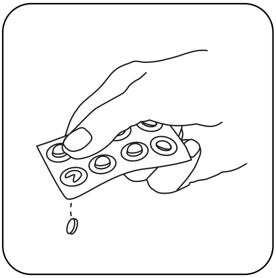
Retirez la cuvette de la chambre de mesure.



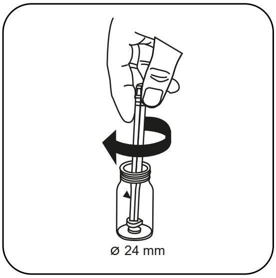
Ajoutez une **pastille de COPPER No. 1**.



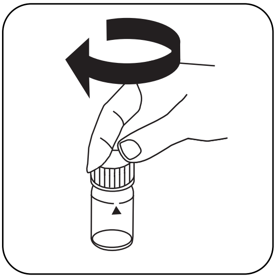
Écrasez et dissolvez la(les) pastille(s) en la(les) tournant un peu.



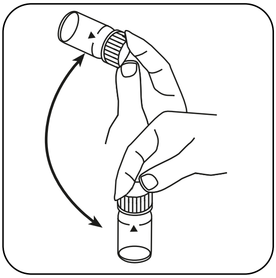
Ajoutez une **pastille de COPPER No. 2**.



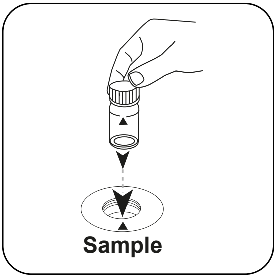
Écrasez la(les) pastille(s) en la(les) tournant un peu.



Fermez la(les) cuvette(s).



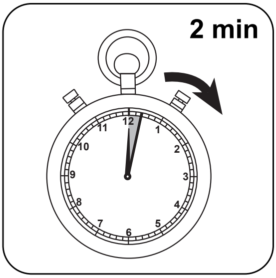
Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



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

DEHA PP **M167**

0.02 - 0.5 mg/L DEHA **DEHA**

PPST

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
VARIO DEHA kit de réactifs	1 Pièces	536000

Préparation

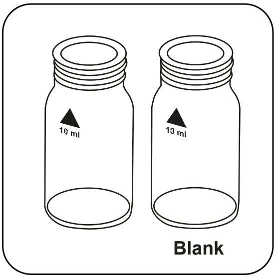
1. Pour éviter les erreurs causées par les dépôts de fer, lavez les instruments en verre avant l’analyse en utilisant une solution d’acide chlorhydrique (à 20% env.) puis rincez à l’eau déminéralisée.

Indication

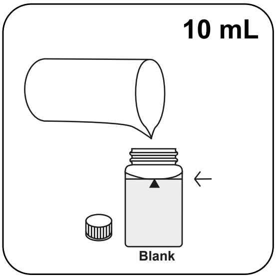
1. La réaction dépendant de la température, la température de l’échantillon devra être comprise entre 20 °C ± 2 °C.
2. Placez la cuvette réservée à l’échantillon dans la chambre de mesure ou dans un endroit sombre pour permettre le développement optimal de la coloration. (Si la solution de réactif est exposée aux UV (lumière du soleil), on aura une augmentation des résultats.)

Réalisation de la quantification DEHA (N,N-diéthylhydroxylamine) avec sachet de poudre Vario et réactif liquide

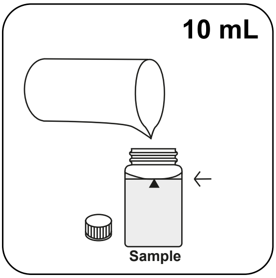
Sélectionnez la méthode sur l’appareil.



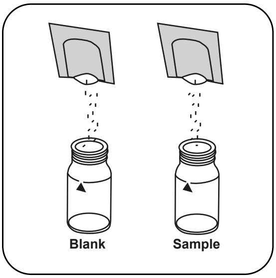
Préparez deux cuvettes propres de 24 mm. L’une des deux cuvettes sera la cuvette du blanc. Étiquetez-la.



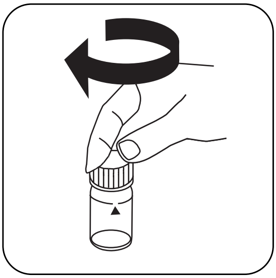
Versez **10 mL d'eau déminéralisée** dans la cuvette du blanc.



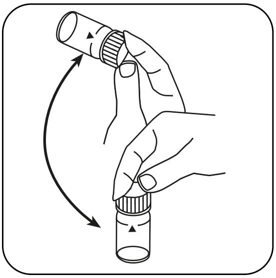
Versez **10 mL d’échantillon** dans la cuvette réservée à l’échantillon.



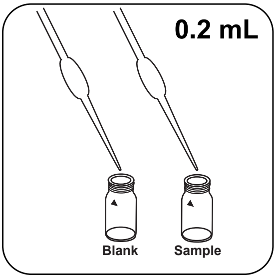
Dans chaque cuvette, versez **un sachet de poudre Vario OXYSCAV 1 Rgt** .



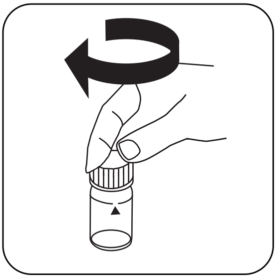
Fermez la(les) cuvette(s).



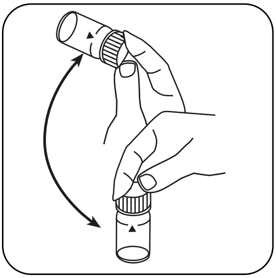
Mélangez le contenu en mettant le tube plusieurs fois à l’envers puis à l’endroit.



Dans chaque cuvette, versez **0.2 mL de solution Vario DEHA 2 Rgt** .



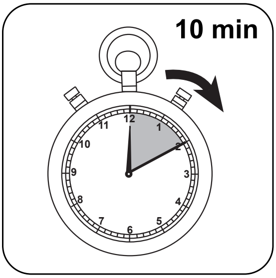
Fermez la(les) cuvette(s).



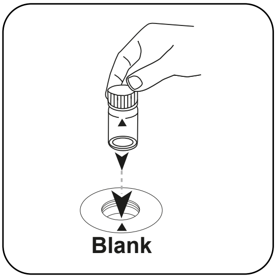
Mélangez le contenu en mettant le tube plusieurs fois à l’envers puis à l’endroit.

↵

Appuyez sur la touche **ENTER**.



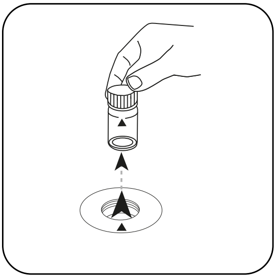
Attendez la fin du **temps de réaction de 10 minute(s)** .



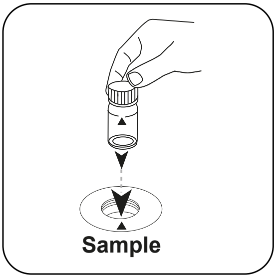
Placez la **cuvette du blanc** dans la chambre de mesure. Attention à la positionner correctement.

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 DEHA.

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	DEHA	1
µg/l	DEHA	1000
mg/l	Hydrochinon	2.63
mg/l	MEKO	4.5
mg/l	Carbohydrazid	1.31
mg/l	ISA	3.9

Méthode chimique

PPST

Appendice

Interférences

Interférences exclues

1. Perturbations :
   Le fer (III) perturbe quelle qu'en soit la quantité : Pour quantifier la concentration de fer (II), le test est répété sans apport d'une solution DEHA. Si la concentration est supérieure à 20 µg/L, la valeur affichée est diminuée du résultat de la quantification DEHA.
2. Les substances réductrices du fer (III) causent des interférences. Les substances causant la formation de forts complexes du fer, peuvent avoir un effet perturbateur.

Interférences	de / [mg/L]
Zn	50
$Na_2B_4O_7$	500
Co	0,025
Cu	8
$CaCO_3$	1000
Lignosulfonate	0,05
Mn	0,8
Mo	80
Ni	0,8

Interférences	de / [mg/L]
PO_4^{3-}	10
$R\text{-}PO(OH)_2$	10
SO_4^{2-}	1000

Bibliographie

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989

Hydrazine P M205

0.05 - 0.5 mg/L N_2H_4 Hydr

Diméthylaminobenzaldéhyde

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
Poudre de réactif Hydrazine	Poudre / 30 g	462910

Les accessoires suivants sont requis.

Accessoires	Pack contenant	Code
Cuiller à doser, 1 g	1 Pièces	384930

Préparation

1. Si l’échantillon d'eau est trouble, il devra être filtré avant d'effectuer la compensation à zéro.
2. La température de l’échantillon ne devrait pas dépasser 21 °C.

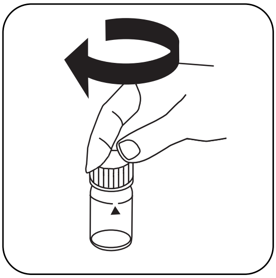
Indication

1. Lors de l’utilisation de la cuiller de mesure d’hydrazine, 1 g correspond à une cuiller de mesure rase.
2. Pour éliminer la turbidité causée par les réactifs, les filtres plissés de qualité ont fait leurs preuves pour les précipités moyennement fins.
3. Pour contrôler l’état du réactif après un stockage prolongé, le test sera effectué comme décrit ici avec de l'eau du robinet. Si le résultat est supérieur à la limite de détection de 0,05 mg/L, n’utilisez le réactif que dans certains cas (écarts supérieurs de la valeur mesurée).

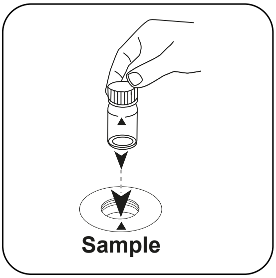
Réalisation de la quantification Hydrazine avec poudre de réactif

Sélectionnez la méthode sur l'appareil.

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



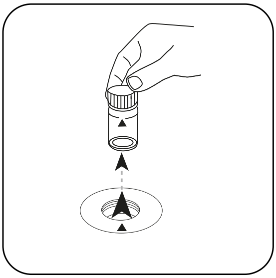
Fermez la(les) cuvette(s).



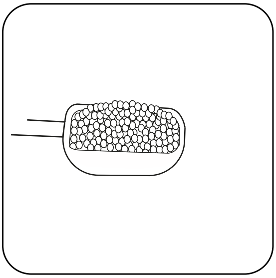
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.

Zero

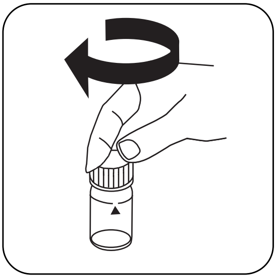
Appuyez sur la touche **ZERO**.



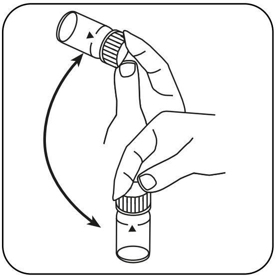
Retirez la cuvette de la chambre de mesure.



Ajoutez **1 g de poudre de HYDRAZIN Test**.



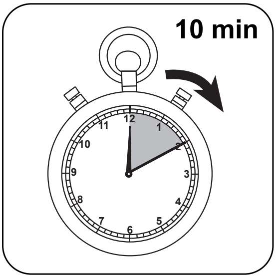
Fermez la(les) cuvette(s).



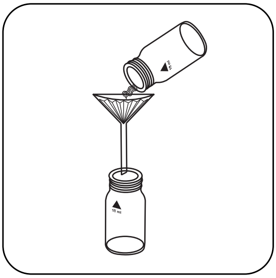
Mélangez le contenu en mettant le tube plusieurs fois à l'envers puis à l'endroit.

↵

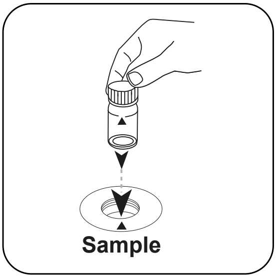
Appuyez sur la touche **ENTER**.



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



Éliminez la légère turbidité qui se forme par filtration.



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 Hydrazine.

Méthode chimique

Diméthylaminobenzaldéhyde

Appendice

Interférences

Interférences exclues

1. Éliminez les perturbations causées par des échantillons très colorés ou troubles : Mélangez 1 part d'eau déminéralisée et 1 part d'eau de Javel. Ajoutez 1 goutte de cette solution à 25 ml d'échantillon et mélangez. Pour le blanc, utilisez 10 ml de cet échantillon au lieu d'eau déminéralisée. Attention : Pour mesurer l'échantillon d'eau, utilisez impérativement l'échantillon non traité.
   Principe : l'hydrazine est oxydée par l'eau de Javel. Les interférences dues à la couleur sont éliminées en faisant une compensation à zéro.

Interférences	de / [mg/L]
NH_4^+	10
C_4H_9NO	10
VO_4^{3-}	1

Dérivé de

DIN 38413-P1

Fer LR L (A) M225

0.03 - 2 mg/L Fe FE

Ferrozine / Thioglycolate

Matériel

Matériel requis (partiellement optionnel):

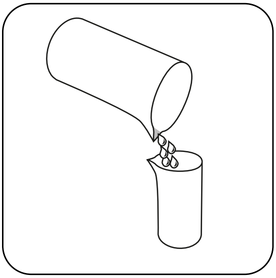
Réactifs	Pack contenant	Code
Acidité / Alcalinité P Indicateur PA1	65 mL	56L013565
Dureté du calcium tampon CH2	65 mL	56L014465
KP962 Poudre persulphate d'ammonium	Poudre / 40 g	56P096240
KS63-FE6-Thioglycolate/Molybdate HR RGT	30 mL	56L006330
KS63-FE6-Thioglycolate/Molybdate HR RGT	65 mL	56L006365
KS61-FE5-Ferrozine/Thioglycolate	65 mL	56L006165

Préparation

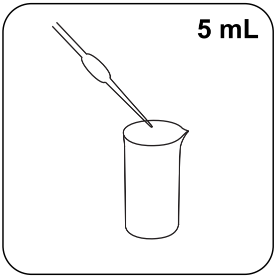
1. En présence de puissants séquestrants dans l'échantillon, il faudra augmenter le temps de réaction jusqu'à ce qu'il n'y ait plus aucune autre coloration visible. Les complexes du fer très forts ne sont pas pris en compte dans la mesure. Dans ce cas, les séquestrants doivent être détruits par oxydation 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

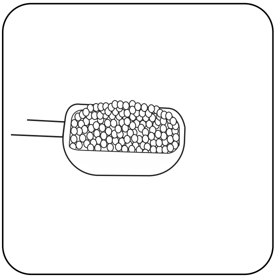
Le fer total est constitué de fer soluble, d'un complexe ferreux et de fer en suspension. Ne pas filtrer l'échantillon avant la mesure. Pour assurer l'homogénéisation de l'échantillon, les particules déposées devront être réparties uniformément directement avant le prélèvement en agitant fortement le 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.



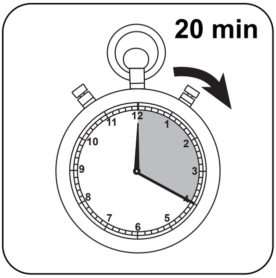
Versez **50 mL d'échantillon homogénéisé** dans un tube de fractionnement adéquat.



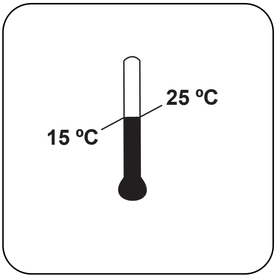
Ajoutez **5 mL de 1:1 d'acide chlorhydrique** .



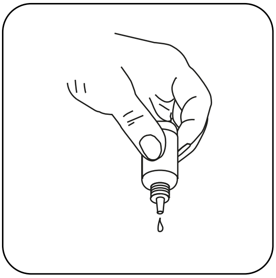
Ajoutez **une cuiller de mesure rase de KP 962 (Ammonium Persulfat Powder)**.



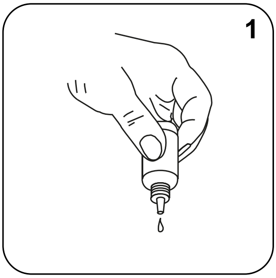
Mettez l'échantillon à ébullition et **maintenez la température pendant 20 minutes** . Il est recommandé de conserver un volume d'échantillon de 25 mL ; faites éventuellement l'appoint avec de l'eau déminéralisée.



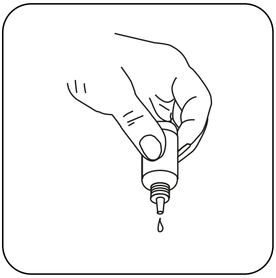
Laissez refroidir l'échantillon à **température ambiante**.



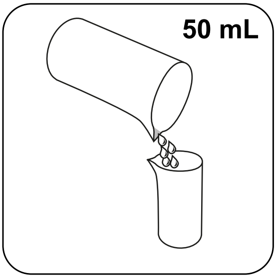
Tenez les flacons compte-goutte à la verticale et ajoutez des gouttes uniformes en appuyant lentement.



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 !)**



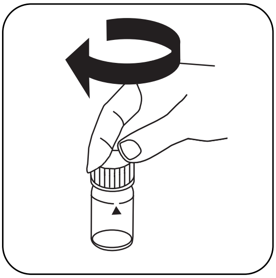
Complétez l’échantillon en ajoutant **d’eau déminéralisée pour obtenir 50 mL** .

Réalisation de la quantification Fer, LR total (A) avec réactif liquide

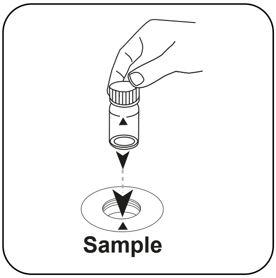
Sélectionnez la méthode sur l’appareil.

Pour la quantification de **Fer, LR total, procédez au fractionnement** décrit .

Remplissez une cuvette de 24 mm de **10 mL d’eau déminéralisée**.



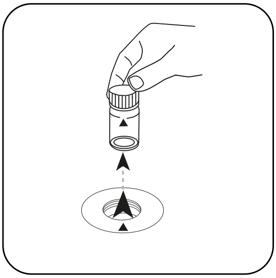
Fermez la(les) cuvette(s).



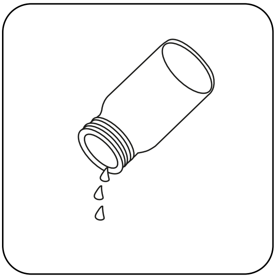
Placez la **cuvette réservée à l’échantillon** dans la chambre de mesure. Attention à la positionner correctement.

Zero

Appuyez sur la touche **ZERO**.

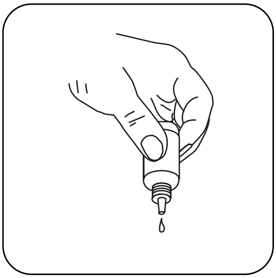


Retirez la cuvette de la chambre de mesure.

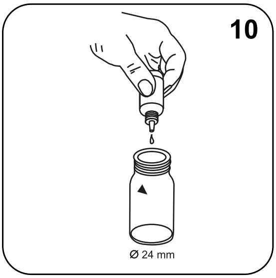


Videz la cuvette.

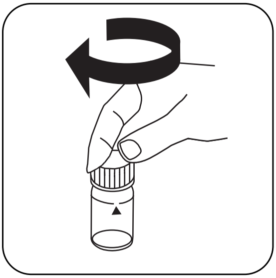
Remplissez une cuvette de 24 mm de **10 mL d'échantillon préparé**.



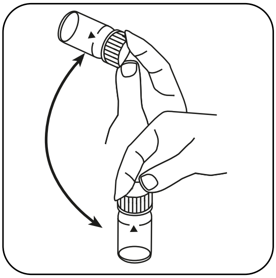
Tenez les flacons compte-goutte à la verticale et ajoutez des gouttes uniformes en appuyant lentement.



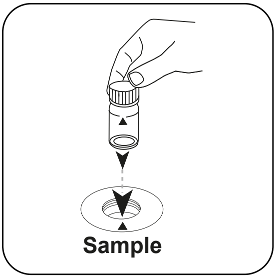
Ajoutez **10 gouttes de Iron Reagent FE5**.



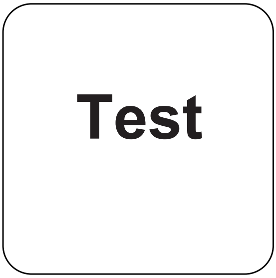
Fermez la(les) cuvette(s).



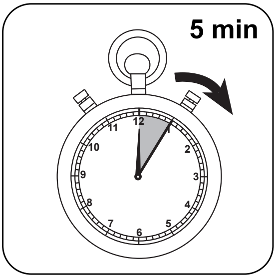
Mélangez le contenu en mettant le tube plusieurs fois à l'envers puis à l'endroit.



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)** .

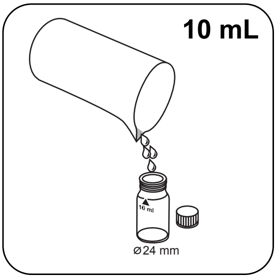
À l'issue du temps de réaction, la mesure est effectuée automatiquement.

Le résultat s'affiche à l'écran en mg/L Fer total ou avec un échantillon filtré, fer total résolu en mg/l.

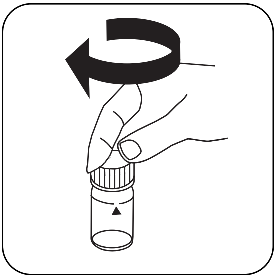
Réalisation de la quantification Fer, LR (A) avec réactif liquide

Sélectionnez la méthode sur l'appareil.

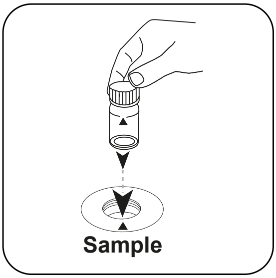
Pour la quantification du fer total dissous, l'échantillon doit être filtré avant la quantification (taille des pores 0,45 µm). Sinon, les particules de fer et le fer en suspension seront également quantifiés.



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



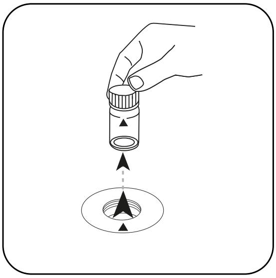
Fermez la(les) cuvette(s).



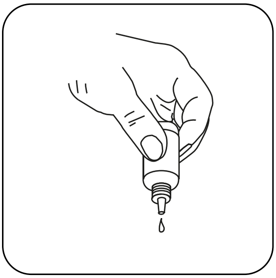
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.

Zero

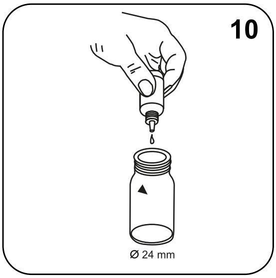
Appuyez sur la touche **ZERO**.



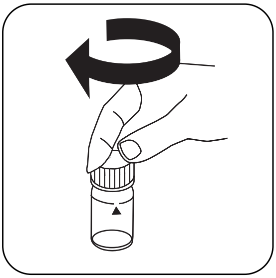
Retirez la cuvette de la chambre de mesure.



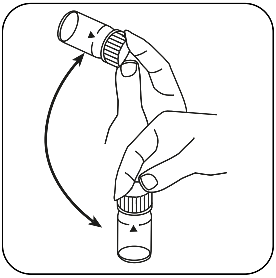
Tenez les flacons compte-goutte à la verticale et ajoutez des gouttes uniformes en appuyant lentement.



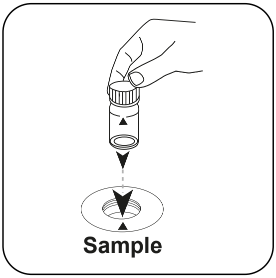
Ajoutez **10 gouttes de Iron Reagent FE5**.



Fermez la(les) cuvette(s).



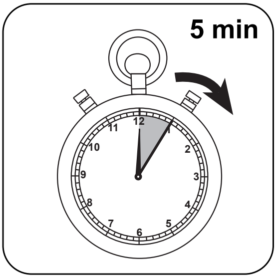
Mélangez le contenu en mettant le tube plusieurs fois à l’envers puis à l’endroit.



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

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 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)

Oxygène dissous C M292

10 - 800 µg/L O_2 [c)] O2

Rhodazine D TM

FR

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
Kit d’analyse Vacu-vial oxygène	1 Kit	380450

Les accessoires suivants sont requis.

Accessoires	Pack contenant	Code
Adaptateur pour cuves rondes 13 mm	1 Pièces	19802192
Adaptateur (13 mm) MultiDirect pour Vacu-vial	1 Pièces	192075

Préparation

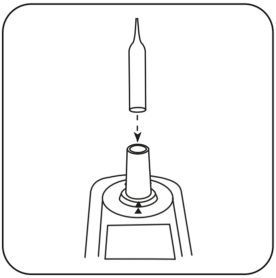
1. Avant de réaliser le test, veuillez absolument lire l’instruction de travail originale et les consignes de sécurité jointes au lot de test (MSDS sont disponibles sur la page d’accueil du site www.chemetrics.com).

Indication

1. Cette méthode est un produit de CHEMetrics. La plage de mesure indiquée dans ce photomètre et la longueur d’onde utilisée peuvent cependant différer des instructions de CHEMetrics. 2. Conservez Vacu-Vials® dans un endroit sombre, à température ambiante. 4. Vacu-Vials® est une marque déposée de la société CHEMetrics, Inc. / Calverton, U.S.A.

Réalisation de la quantification Oxygène dissous avec Vacu Vials® K-7553

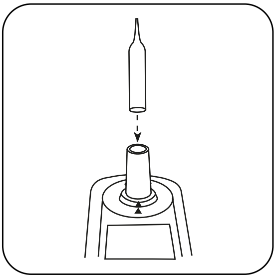
Sélectionnez la méthode sur l'appareil.



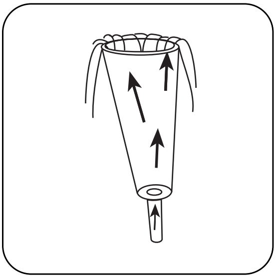
Placez l'**ampoule du blanc** dans la chambre de mesure.

Zero

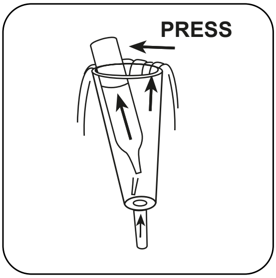
Appuyez sur la touche **ZERO**.



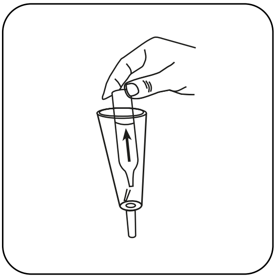
Retirez l'ampoule du blanc de la chambre de mesure.



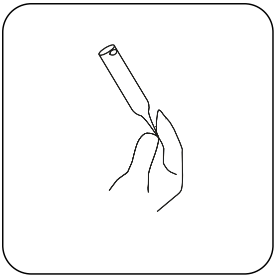
Mettez plusieurs fois le tube d'échantillon à l'envers et à l'endroit pendant quelques minutes pour mélanger l'eau test et éliminer les bulles d'air.



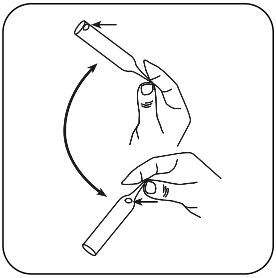
Placez une ampoule Vacu-vial® dans le tube de réactif. Brisez la pointe de l'ampoule en pressant légèrement contre la paroi du tube. Patientez jusqu'à ce que l'ampoule soit pleine.



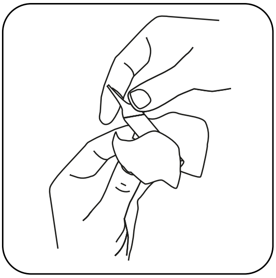
Ensuite, retirez rapidement l'ampoule pleine du tube de réactif, en dirigeant la pointe vers le bas.



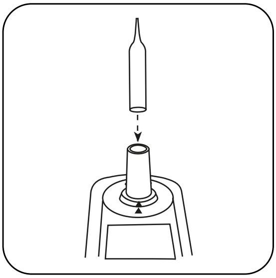
Obturez l'ouverture du doigt pour empêcher tout contact de l'air.



Mettez l'ampoule plusieurs fois à l'envers.



Séchez l'ampoule de l'extérieur.



Placez l’ampoule dans la chambre de mesure.

Test

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

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

Méthode chimique

Rhodazine D TM

Appendice

Dérivé de

ASTM D 5543-15

[c]MultiDirect: Adaptateur pour Vacu-vials® nécessaire (code 192075)

Phosphate HR L M335

5 - 80 mg/L PO_4 PO4

Vanadomolybdate

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
KS278-Acide sulfurique 50 %	65 mL	56L027865
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
Phosphate HR, Ortho Reagent Set	1 Pièces	56R019090

Les accessoires suivants sont requis.

Accessoires	Pack contenant	Code
Agitateur et cuiller à poudre	1 Pièces	56A006601

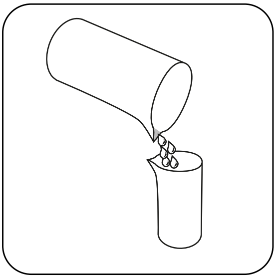
Préparation

1. Avant l'analyse, les échantillons très tamponnés ou les échantillons ayant des pH extrêmes devraient être ajustés sur un pH compris entre 6 et 7 (avec 1 mol/l d'acide chlorhydrique ou 1 mol/l de soude caustique).
2. L'analyse des polyphosphates et du phosphate total doit être précédée d'un fractionnement.

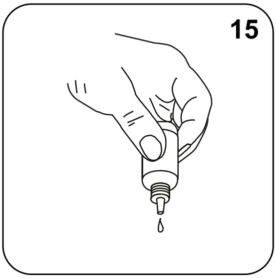
Indication

1. Les réactifs et les accessoires sont disponibles sur demande.

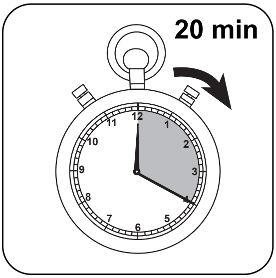
Fractionnement Polyphosphate HR avec réactifs liquides



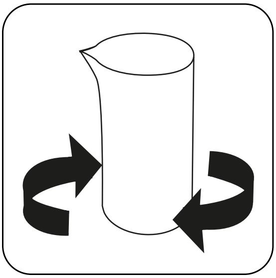
Versez **50 mL d’échantillon homogénéisé** dans un tube de fractionnement adéquat.



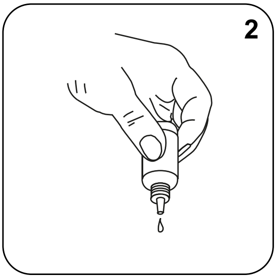
Ajoutez **15 gouttes de KS278 (50% acide sulfurique)**.



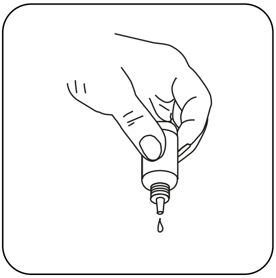
Mettez l’échantillon à ébullition et **maintenez la température pendant 20 minutes** . Il est recommandé de conserver un volume d’échantillon de 25 mL ; faites éventuellement l’appoint avec de l’eau déminéralisée.



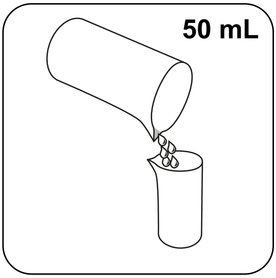
Mettez le tube de fractionnement plusieurs fois à l’envers et laissez-le refroidir à température ambiante.



Ajoutez **2 gouttes de Acidity / Alkalinity P Indicator PA1**.

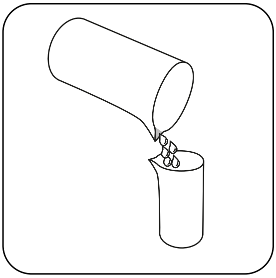


Ajoutez au goutte à goutte **Hardness Calcium Buffer CH2** au même échantillon jusqu’à obtention d’une coloration rosée à rouge. **(Attention : agitez l’échantillon après chaque goutte ajoutée !)**

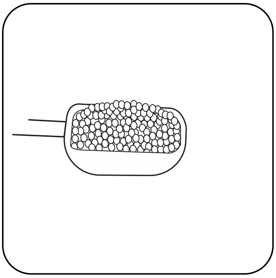


Complétez l’échantillon en ajoutant **d’eau déminéralisée pour obtenir 50 mL** .

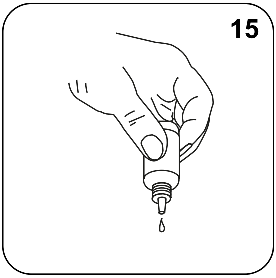
Fractionnement Phosphate total HR avec réactifs liquides



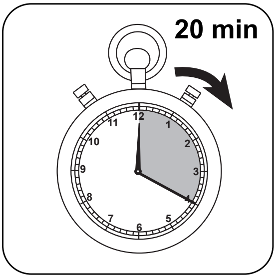
Versez **50 mL d’échantillon homogénéisé** dans un tube de fractionnement adéquat.



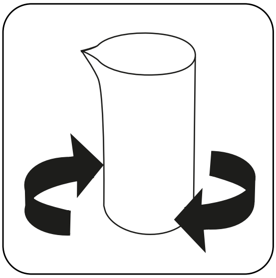
Ajoutez **une cuiller de mesure rase de KP962 (Ammonium Persulfate Powder)**.



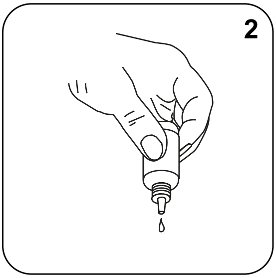
Ajoutez **15 gouttes de KS278 (50% sulfuric acid)**.



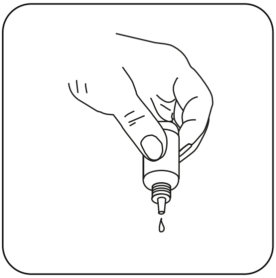
Mettez l’échantillon à ébullition et **maintenez la température pendant 20 minutes** . Il est recommandé de conserver un volume d’échantillon de 25 mL ; faites éventuellement l’appoint avec de l’eau déminéralisée.



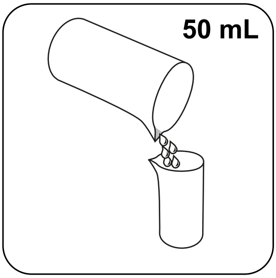
Mettez le tube de fractionnement plusieurs fois à l’envers et laissez-le refroidir à température ambiante.



Ajoutez **2 gouttes de Acidity / Alkalinity P Indicator PA1**.



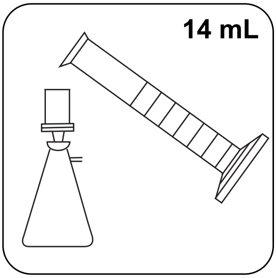
Ajoutez au goutte à goutte **Hardness Calcium Buffer CH2** au même échantillon jusqu’à obtention d’une coloration rosée à rouge. **(Attention : agitez l’échantillon après chaque goutte ajoutée !)**



Complétez l’échantillon en ajoutant **d’eau déminéralisée pour obtenir 50 mL** .

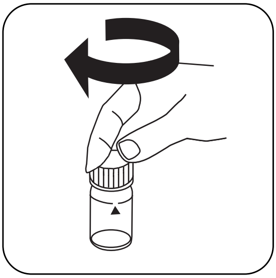
Réalisation de la quantification Phosphate HR avec réactif liquide

Sélectionnez la méthode sur l’appareil.

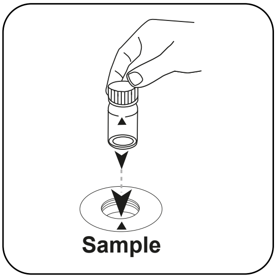


Filtrez environ 14 mL d’échantillon avec un filtre prélavé (taille des pores 0,45 µm).

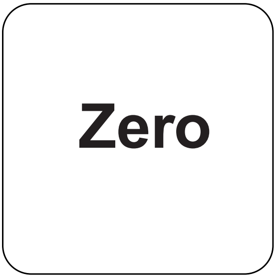
Remplissez une cuvette de 24 mm de **10 mL d’échantillon préparé**.



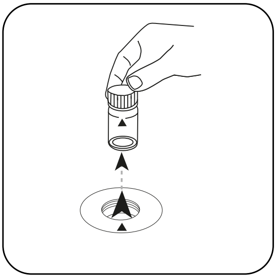
Fermez la(les) cuvette(s).



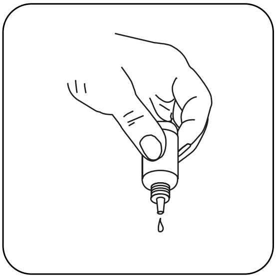
Placez la **cuvette réservée à l’échantillon** dans la chambre de mesure. Attention à la positionner correctement.



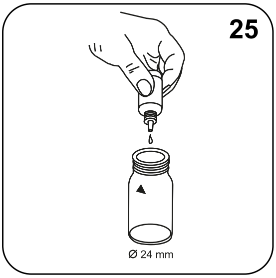
Appuyez sur la touche **ZERO**.



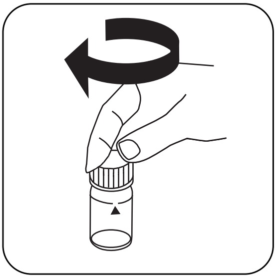
Retirez la cuvette de la chambre de mesure.



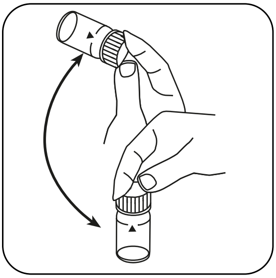
Tenez les flacons compte-goutte à la verticale et ajoutez des gouttes uniformes en appuyant lentement.



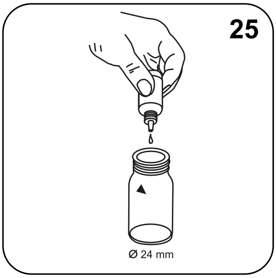
Ajoutez **25 gouttes de KS228 (Ammonium Molybdate)**.



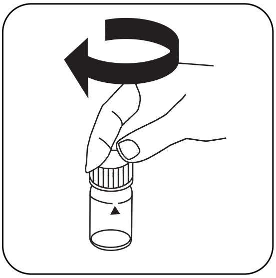
Fermez la(les) cuvette(s).



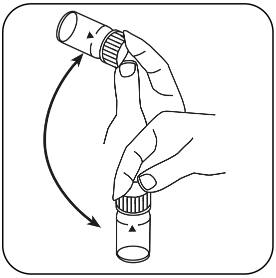
Mélangez le contenu en mettant le tube plusieurs fois à l’envers puis à l’endroit.



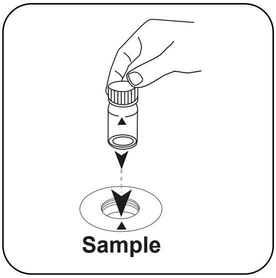
Ajoutez **25 gouttes de KS229 (Ammonium Metavanadate)**.



Fermez la(les) cuvette(s).



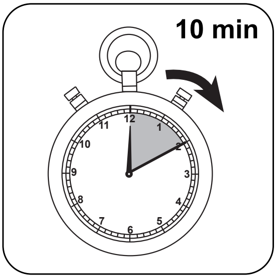
Mélangez le contenu en mettant le tube plusieurs fois à l’envers puis à l’endroit.



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 Phosphate.

Réalisation de la quantification Polyphosphate avec réactifs liquides

Sélectionnez la méthode sur l’appareil.

Pour la quantification de **Polyphosphate HR with liquid reagents, procédez au fractionnement** décrit .

Ce test détermine la teneur en phosphate total inorganique.La teneur en polyphosphates est la différence entre le phosphate organique et l’orthophosphate.

La quantification de Phosphate total LR avec réactifs liquides est similaire à celle effectuée avec Méthode 335, phosphate HR avec réactifs liquides.

Le résultat s'affiche à l’écran en mg/L Phosphate inorganique total (orthophosphate et polyphosphate).

Réalisation de la quantification Phosphate total avec réactifs liquides

Sélectionnez la méthode sur l’appareil.

Pour la quantification de **Phosphate total HR avec réactifs liquides, procédez au fractionnement** décrit .

Ce test quantifie tous les composés du phosphate existant dans l’échantillon, y compris l’orthophosphate, le polyphosphate et les composés du phosphore organique.

La quantification de Phosphate total HR avec réactifs liquides est similaire à celle effectuée avec Méthode 335, phosphate HR avec réactifs liquides.

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

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	P	1
mg/l	PO_4^{3-}	3.066177
mg/l	P_2O_5	2.29137

Méthode chimique

Vanadomolybdate

Appendice

Interférences

Interférences persistantes

- Les grandes quantités d'éléments non dissous peuvent compromettre la reproductibilité des résultats.

Interférences	de / [mg/L]
Al	200
AsO_4^{3-}	en toutes les quantités
Cr	100
Cu	10
Fe	100
Ni	300
SiO_2	50
$Si(OH)_4$	10
S^{2-}	en toutes les quantités
Zn	80

Selon

Standard Method 4500-P C

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

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.

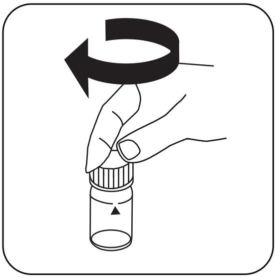
Indication

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.

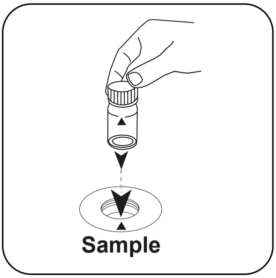
Réalisation de la quantification Polyacrylates avec réactif liquide

Sélectionnez la méthode sur l’appareil.

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



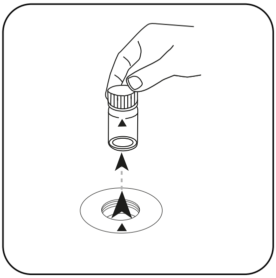
Fermez la(les) cuvette(s).



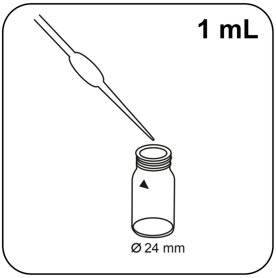
Placez la **cuvette réservée à l’échantillon** dans la chambre de mesure. Attention à la positionner correctement.

Zero

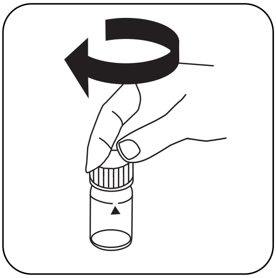
Appuyez sur la touche **ZERO**.



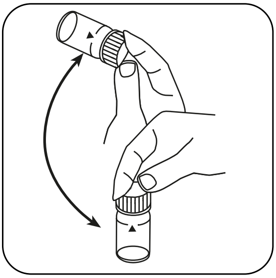
Retirez la cuvette de la chambre de mesure.



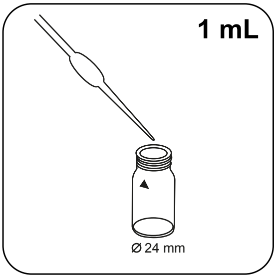
Ajoutez **1 mL de solution (25 drops) Polyacrylate Buffer A1** dans la cuvette réservée à l’échantillon.



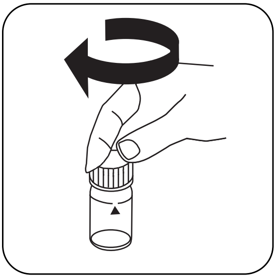
Fermez la(les) cuvette(s).



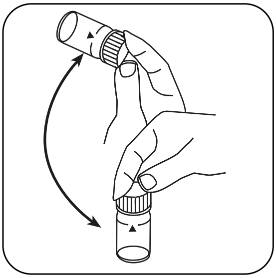
Mélangez le contenu en mettant le tube plusieurs fois à l’envers puis à l’endroit.



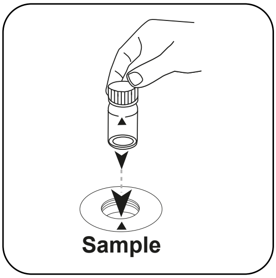
Ajoutez **1 mL de solution (25 drops) Polyacrylate Precipitant A2** dans la cuvette réservée à l’échantillon.



Fermez la(les) cuvette(s).



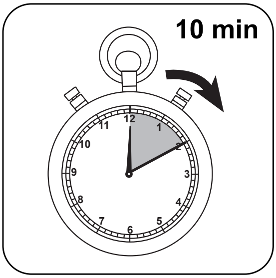
Mélangez le contenu en mettant le tube plusieurs fois à l’envers puis à l’endroit.



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

Silicate HR PP M352

1 - 90 mg/L SiO_2 SiHr

Silico-molybdate

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
VARIO réactif Silice HR, kit F10	1 Kit	535700

Préparation

1. La température de l'échantillon doit être comprise entre 15 °C et 25 °C.

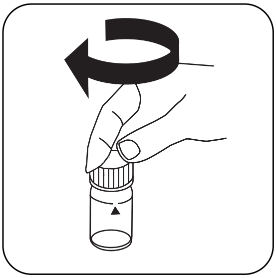
Indication

1. La méthode consiste à mesurer dans le flanc de la courbe d'absorption de la coloration résultante. Sur les photomètres à filtre, la précision de la méthode peut donc être améliorée, si nécessaire, en ajustant à l'aide d'un étalon de silicate (env. 70 mg/L SiO_2).

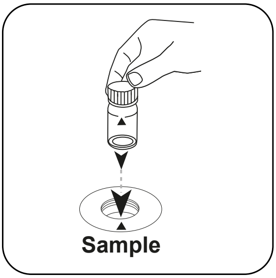
Réalisation de la quantification Dioxyde de silicium HR avec sachet de poudre Vario

Sélectionnez la méthode sur l’appareil.

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



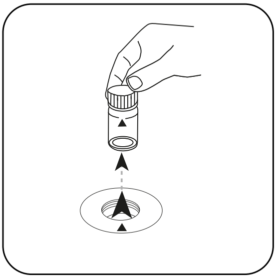
Fermez la(les) cuvette(s).



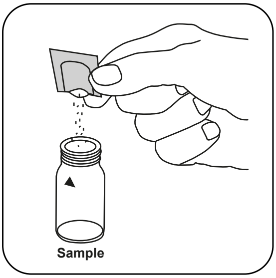
Placez la **cuvette réservée à l’échantillon** dans la chambre de mesure. Attention à la positionner correctement.

Zero

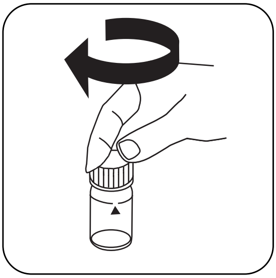
Appuyez sur la touche **ZERO**.



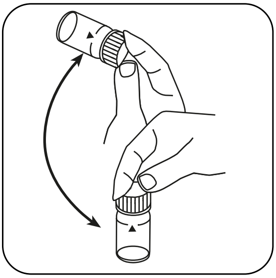
Retirez la cuvette de la chambre de mesure.



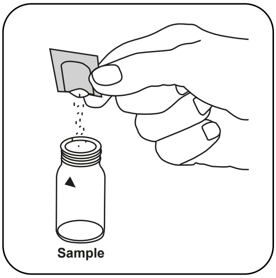
Ajoutez un **sachet de poudre Vario Silica HR Molybdate F10**.



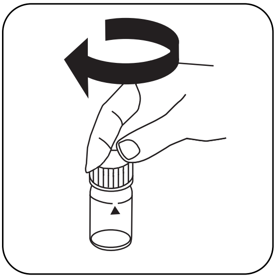
Fermez la(les) cuvette(s).



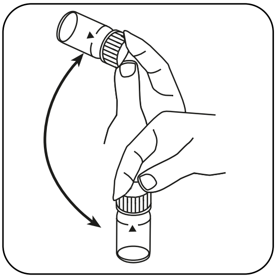
Dissolvez la poudre en mettant plusieurs fois le tube à l'envers puis à l'endroit.



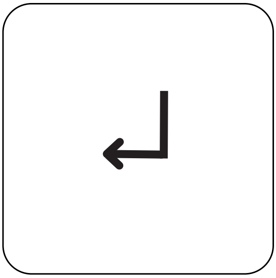
Ajoutez un **sachet de poudre Vario Silica HR Acid Rgt. F10**.



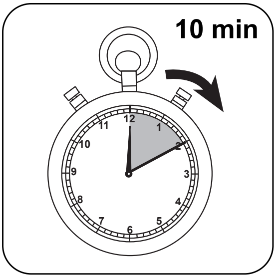
Fermez la(les) cuvette(s).



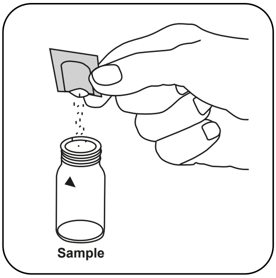
Mélangez le contenu en mettant le tube plusieurs fois à l’envers puis à l’endroit.



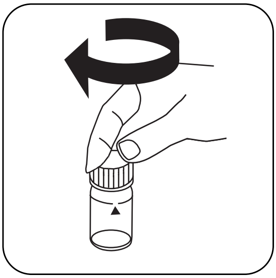
Appuyez sur la touche **ENTER**.



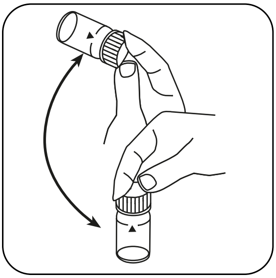
Attendez la fin du **temps de réaction de 10 minute(s)** .



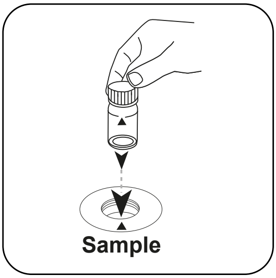
Ajoutez un **sachet de poudre Vario Silica Citric Acid F10**.



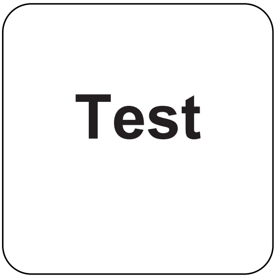
Fermez la(les) cuvette(s).



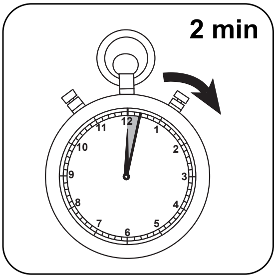
Dissolvez la poudre en mettant plusieurs fois le tube à l'envers puis à l'endroit.



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



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



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 Dioxyde de silicium.

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	SiO_2	1
mg/l	Si	0.47

Méthode chimique

Silico-molybdate

Appendice

Interférences

Interférences exclues

- Les échantillons d'eau contiennent parfois certaines formes d’acides siliciques qui réagissent très lentement avec le molybdate. Actuellement, le type exact de ces formes n'est pas connu. En procédant à un prétraitement au bicarbonate de sodium puis à l'acide sulfurique, il est possible de les transformer en des formes plus aptes à réagir (description dans « Standard Methods for the Examination of Water and Wastewater » dans la section « Silica-Digenstion with Sodium Bicarbonate »).
- En présence de dioxyde de silicium ou de phosphate, il se forme une couleur jaune. En ajoutant le sachet de poudre Silica Citric Acid F10, la couleur jaune due au phosphate est éliminée.

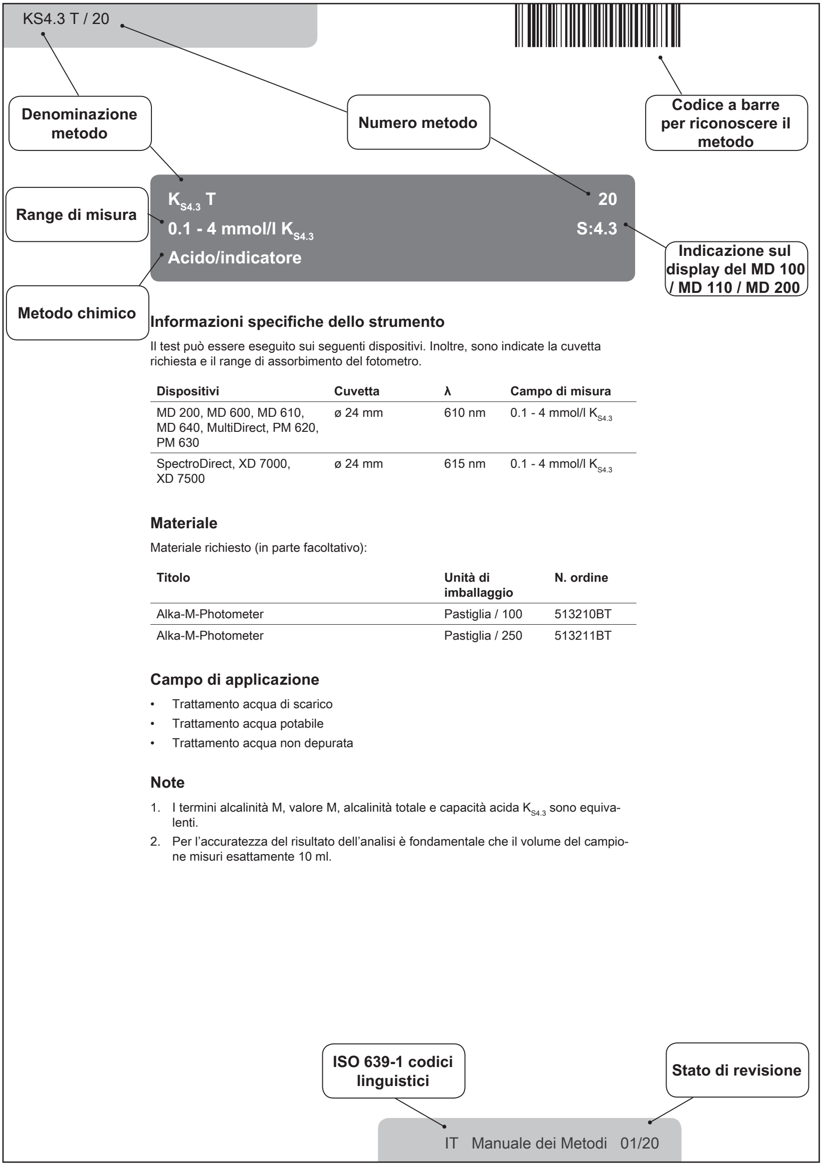
Interférences	de / [mg/L]	Influence
Fe	grandes quantités	
PO_4^{3-}	50	
PO_4^{3-}	60	La perturbation est d'env. -2 %
PO_4^{3-}	75	La perturbation est d'env. -11 %
S^{2-}	en toutes les quantités	

Méthode Validation

Limite de détection	0.38 mg/L
Limite de détermination	1.14 mg/L
Fin de la gamme de mesure	100 mg/L
Sensibilité	120 mg/L / Abs
Intervalle de confiance	1.69 mg/L
Déviation standard	0.70 mg/L
Coefficient de variation	1.38 %

Dérivé de

Standard Method 4500-SiO2 C



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

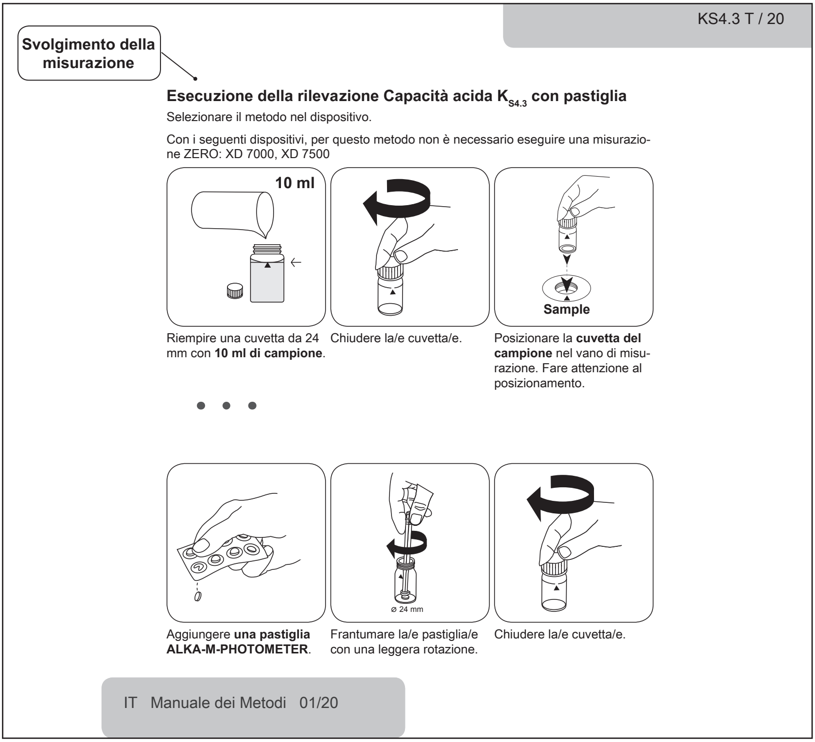
Campo di applicazione

- 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):

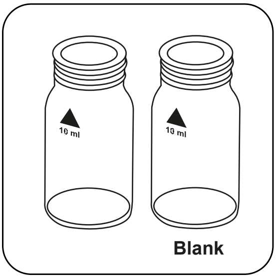
Reagenti	Unità di imballaggio	N. ordine
VARIO Aluminium Set 20 ml	1 pz.	535000

Preparazione

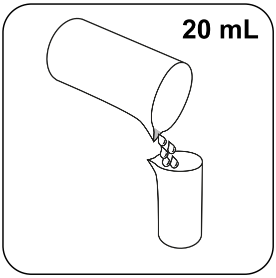
1. Perché i risultati dell'analisi siano accurati è necessario che il campione abbia una temperatura compresa tra 20 °C e 25 °C.
2. Per evitare errori dovuti alla presenza di impurità, prima dell'analisi sciacquare la cuvetta e gli accessori con una soluzione di acido cloridrico (al 20% circa) e successivamente con acqua demineralizzata.

Esecuzione della rilevazione Alluminio con polvere in bustine Vario

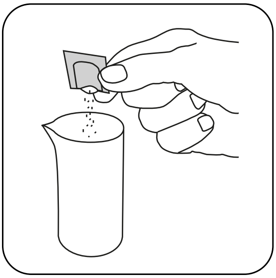
Selezionare il metodo nel dispositivo.



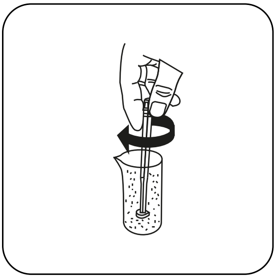
Preparare due cuvette pulite da 24 mm. Contrassegnare una cuvetta come cuvetta zero.



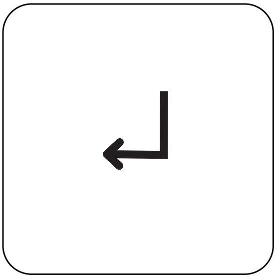
Immettere **20 mL di campione** in un misurino da 100 mL.



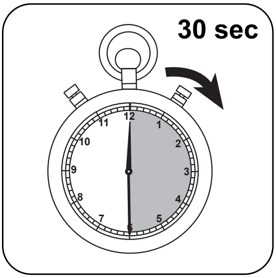
Aggiungere **una bustina di polvere Vario ALUMINIUM ECR F20**.



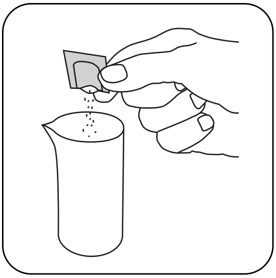
Far sciogliere la polvere agitando.



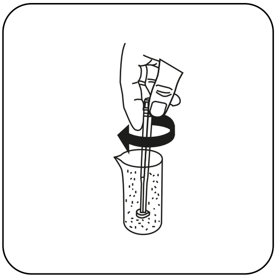
Premere il tasto **ENTER**.



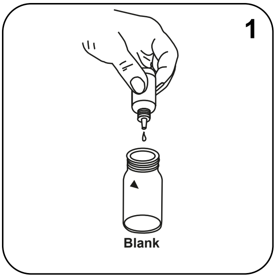
Attendere un **tempo di reazione di 30 secondi** .



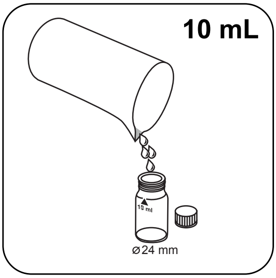
Aggiungere **una bustina di polvere Vario HEXAMINE F20**.



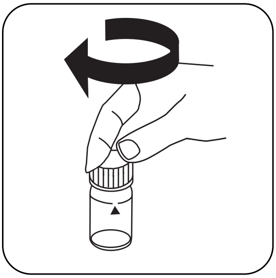
Far sciogliere la polvere agitando.



Introdurre **1 gocce di Vario ALUMINIUM ECR Masking Reagent** nella cuvetta zero.



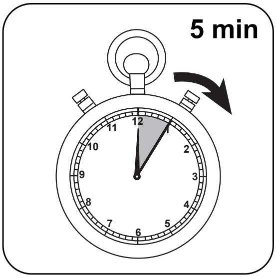
Immettere **10 mL di campione pretrattato** in ogni cuvetta.



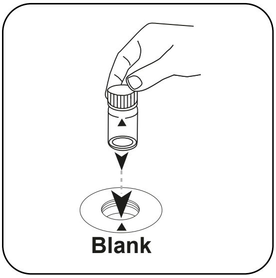
Chiudere la/e cuvetta/e.

↵

Premere il tasto **ENTER**.



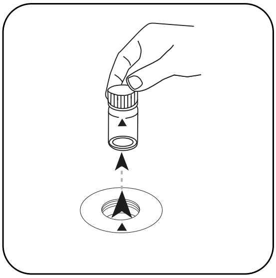
Attendere un **tempo di reazione di 5 minuto/i** .



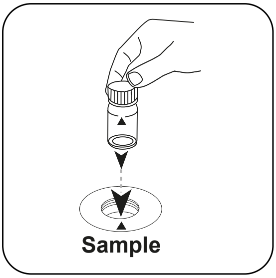
Posizionare la **cuvetta zero** nel vano di misurazione. Fare attenzione al posizionamento.

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

Cloruro L (B) M92

0.5 - 20 mg/L Cl^- CL-

Tiocianato mercurico / nitrato ferrico

Materiale

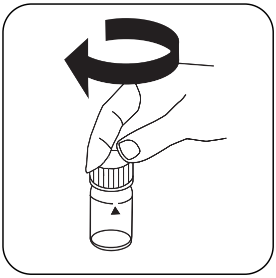
Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
Chloride Reagent Set	1 pz.	56R018490

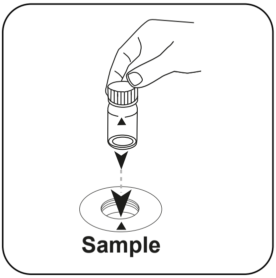
Esecuzione della rilevazione Cloruro con reagente liquido

Selezionare il metodo nel dispositivo.

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



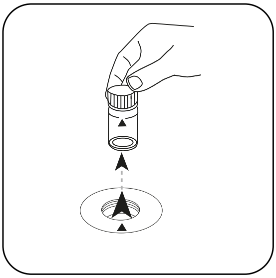
Chiudere la/e cuvetta/e.



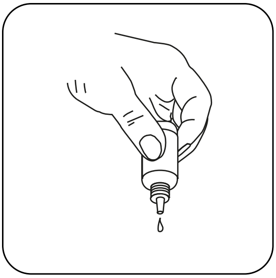
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

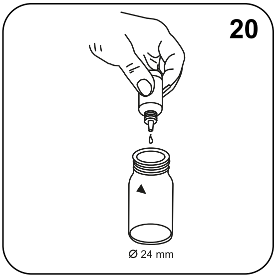
Premere il tasto **ZERO**.



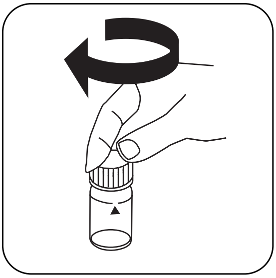
Prelevare la cuvetta dal vano di misurazione.



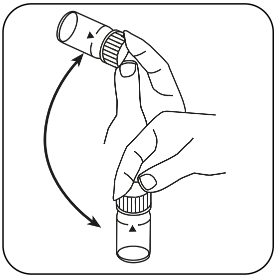
Tenere le boccette contagocce in posizione verticale e introdurre, premendo lentamente, gocce della stessa dimensione nella cuvetta.



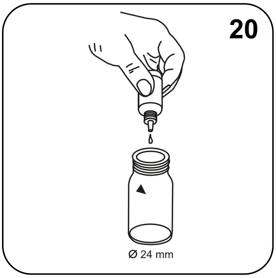
Aggiungere **20 gocce di KS251 (Chloride Reagenz A)**.



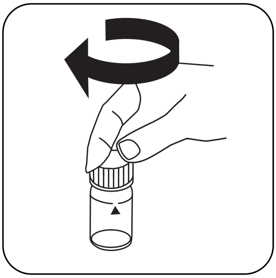
Chiudere la/e cuvetta/e.



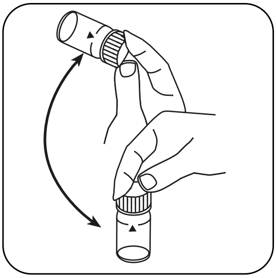
Miscelare il contenuto capovolgendo.



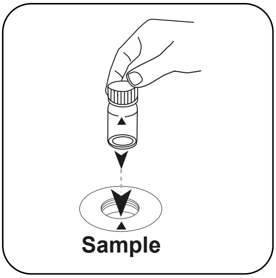
Aggiungere **20 gocce di KS253 (Chloride Reagenz B)**.



Chiudere la/e cuvetta/e.

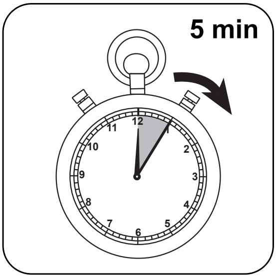


Miscelare il contenuto capovolgendo.



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 Cloruro.

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	Cl^-	1
mg/l	NaCl	1.65

Metodo chimico

Tiocianato mercurico / nitrato ferrico

Appendice

Interferenze

Interferenze permanenti

1. Sostanze riducenti quali solfito e tiosolfato, che riducono il ferro (III) a ferro (II) o il mercurio (II) a mercurio (I), possono interferire. Il cianuro, lo iodio e il bromo producono un’interferenza positiva.

Derivato di

DIN 15682-D31
DIN ISO 15923-1 D49

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

Preparazione

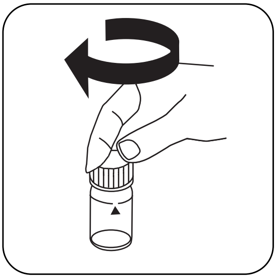
1. Le acque fortemente alcaline o acide dovrebbero essere regolate prima dell’analisi su un valore di pH da 4 a 6.

Esecuzione della rilevazione Rame, libero con pastiglia

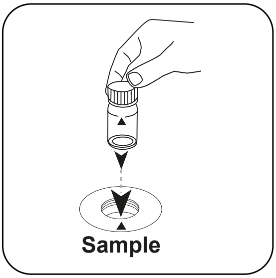
Selezionare il metodo nel dispositivo.

Selezionare inoltre la determinazione: libero

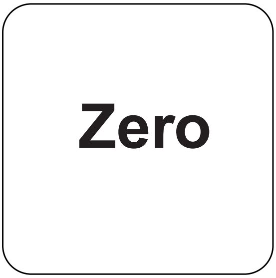
Riempire una cuvetta da 24 mm con **10 mL di campione**.



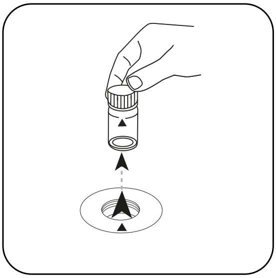
Chiudere la/e cuvetta/e.



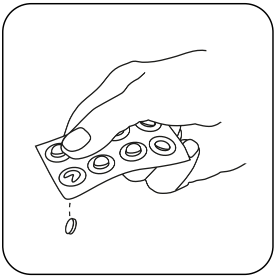
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



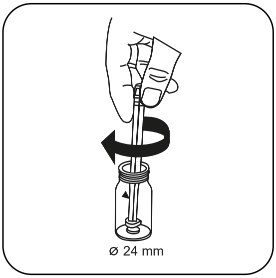
Premere il tasto **ZERO**.



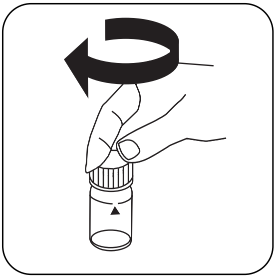
Prelevare la cuvetta dal vano di misurazione.



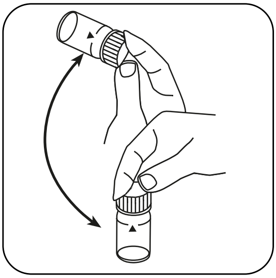
Aggiungere **una pastiglia COPPER No. 1**.



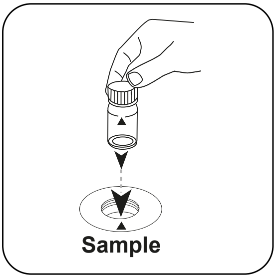
Frantumare la/e pastiglia/e con una leggera rotazione.



Chiudere la/e cuvetta/e.



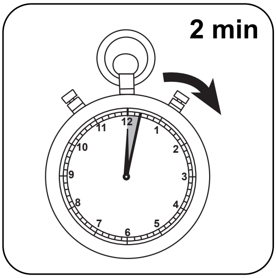
Far sciogliere la/e pastiglia/e agitando.



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.

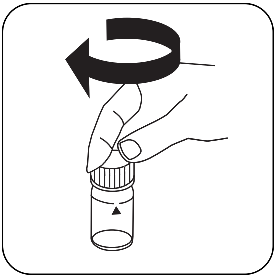
Sul display compare il risultato in mg/L di Rame libero.

Esecuzione della rilevazione Rame, totale con pastiglia

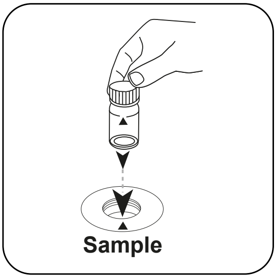
Selezionare il metodo nel dispositivo.

Selezionare inoltre la determinazione: totale

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



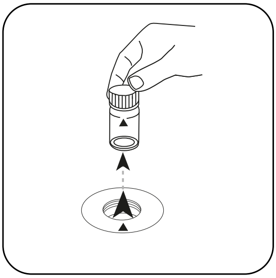
Chiudere la/e cuvetta/e.



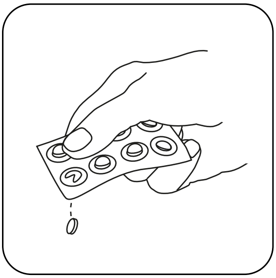
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

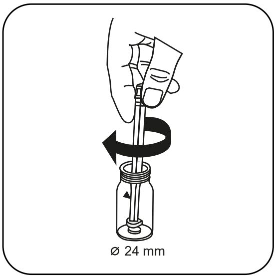
Premere il tasto **ZERO**.



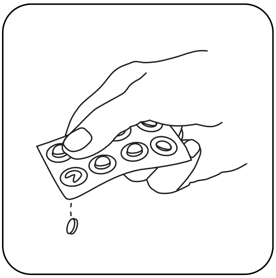
Prelevare la cuvetta dal vano di misurazione.



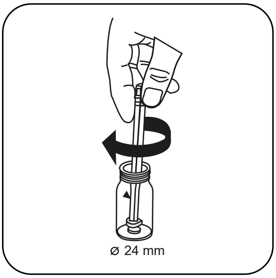
Aggiungere **una pastiglia COPPER No. 1**.



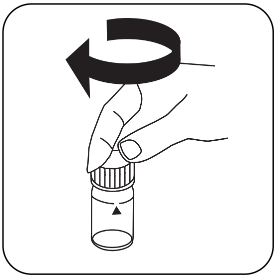
Frantumare e far sciogliere la/e pastiglia/e con una leggera rotazione.



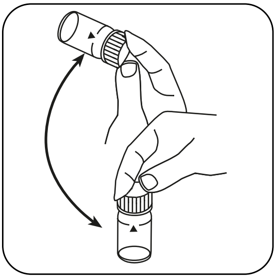
Aggiungere **una pastiglia COPPER No. 2**.



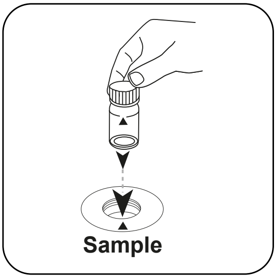
Frantumare la/e pastiglia/e con una leggera rotazione.



Chiudere la/e cuvetta/e.



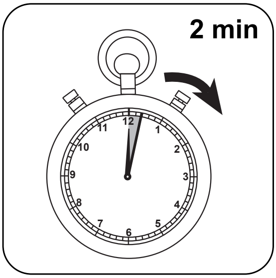
Far sciogliere la/e pastiglia/e agitando.



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

DEHA PP M167

0.02 - 0.5 mg/L DEHA DEHA

PPST

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
VARIO DEHA Reagent Set	1 pz.	536000

Preparazione

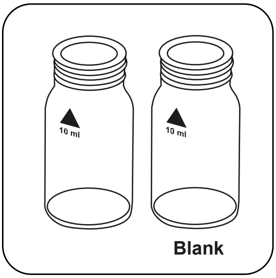
1. Per evitare errori dovuti a depositi di ferro, prima dell’analisi sciacquare i dispositivi in vetro con una soluzione di acido cloridrico (al 20% circa) e successivamente con acqua demineralizzata.

Note

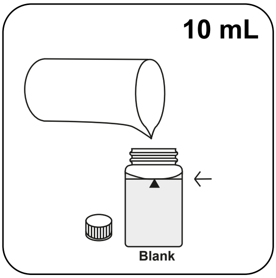
1. Poiché la reazione dipende dalla temperatura, questa deve misurare 20 °C ± 2 °C.
2. Durante il tempo di sviluppo della colorazione posizionare la cuvetta con il campione nel vano di misura o al buio (se la soluzione reagente viene esposta ai raggi UV, ovvero alla luce solare, si ottengono valori di misura troppo elevati).

Esecuzione della rilevazione DEHA (N,N-dietilidrossilammina) con polvere in bustine Vario e reagente liquido

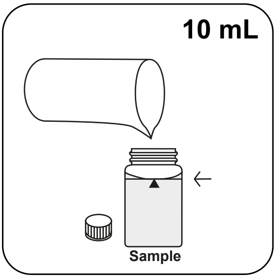
Selezionare il metodo nel dispositivo.



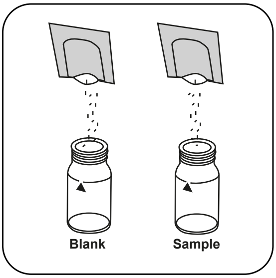
Preparare due cuvette pulite da 24 mm. Contrassegnare una cuvetta come cuvetta zero.



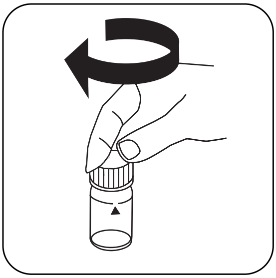
Immettere **10 mL di acqua demineralizzata** nella cuvetta zero.



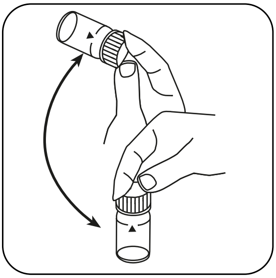
Immettere **10 mL di campione** nella cuvetta del campione.



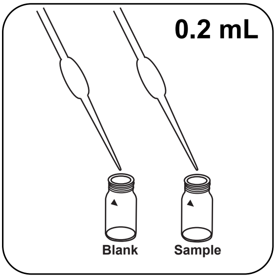
Immettere **una bustina di polvere Vario OXYSCAV 1 Rgt** in ogni cuvetta.



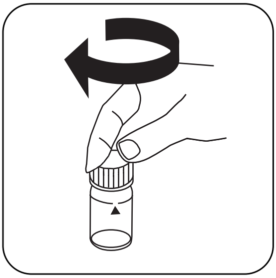
Chiudere la/e cuvetta/e.



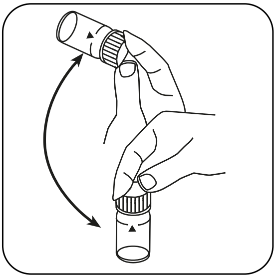
Miscelare il contenuto capovolgendo.



Immettere **0.2 mL di soluzione Vario DEHA 2 Rgt** in ogni cuvetta.



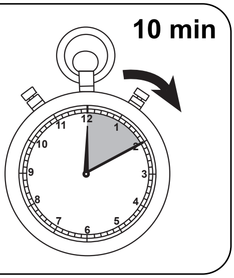
Chiudere la/e cuvetta/e.



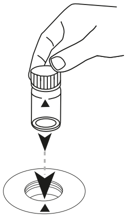
Miscelare il contenuto capovolgendo.

↵

Premere il tasto **ENTER**.



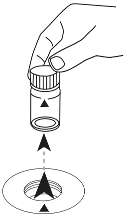
Attendere un **tempo di reazione di 10 minuto/i** .



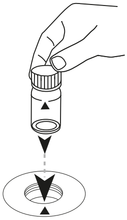
Posizionare la **cuvetta zero** nel vano di misurazione. Fare attenzione al posizionamento.

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 come DEHA.

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	DEHA	1
µg/l	DEHA	1000
mg/l	Hydrochinon	2.63
mg/l	MEKO	4.5
mg/l	Carbohydrazid	1.31
mg/l	ISA	3.9

Metodo chimico

PPST

Appendice

Interferenze

Interferenze escludibili

1. Interferenze:
   Il ferro(II) interferisce in qualunque quantità. Per rilevare la concentrazione di ferro(II) si ripete il test senza aggiunta di soluzione DEHA. Se la concentrazione è maggiore di 20 µg/L, il valore visualizzato viene sottratto dal risultato della rilevazione DEHA.
2. Le sostanze che riducono il ferro(III) provocano interferenze. Le sostanze che complessano fortemente il ferro(III) possono provocare interferenze.

Interferenze	da / [mg/L]
Zn	50
$Na_2B_4O_7$	500
Co	0,025
Cu	8
$CaCO_3$	1000
Lignosulfonate	0,05
Mn	0,8
Mo	80
Ni	0,8

Interferenze	da / [mg/L]
PO_4^{3-}	10
$R\text{-}PO(OH)_2$	10
SO_4^{2-}	1000

Riferimenti bibliografici

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stoccarda 1989

Idrazina P M205

$0.05 - 0.5$ mg/L N_2H_4 Hydr

Dimetilamminobenzaldeide

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
Test idrazina in polvere	Polvere / 30 g	462910

Sono necessari inoltre i seguenti accessori.

Accessori	Unità di imballaggio	N. ordine
Cucchiaio dosatore, 1 g	1 pz.	384930

Preparazione

1. Se il campione di acqua è torbido deve essere filtrato prima dell’esecuzione della taratura a zero.
2. La temperatura del campione non deve superare i 21 °C.

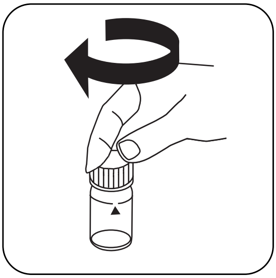
Note

1. Se si utilizza il cucchiaio dosatore per l’idrazina, 1 g corrisponde a un cucchiaio dosatore raso.
2. Per eliminare la torbidità provocata dai reagenti è risultato efficace l’uso di filtri a pieghe per precipitati medio-fini.
3. Per verificare che il reagente non sia deteriorato dopo un immagazzinamento prolungato, il test viene eseguito come descritto con acqua corrente. Se il risultato supera il valore del limite di rilevabilità di 0,05 mg/L, il reagente può ancora essere utilizzato soltanto in misura limitata (divergenze elevate dei valori di misura).

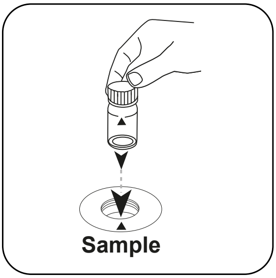
Esecuzione della rilevazione Idrazina con reagente in polvere

Selezionare il metodo nel dispositivo.

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



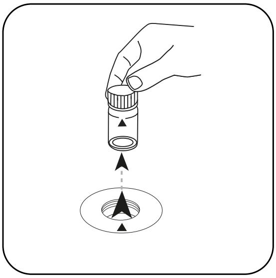
Chiudere la/e cuvetta/e.



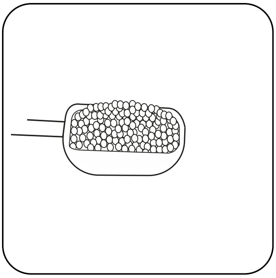
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

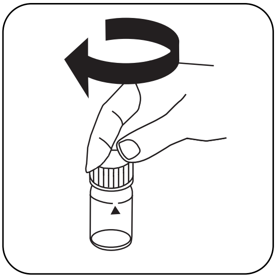
Premere il tasto **ZERO**.



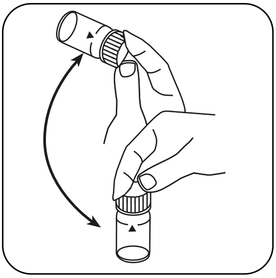
Prelevare la cuvetta dal vano di misurazione.



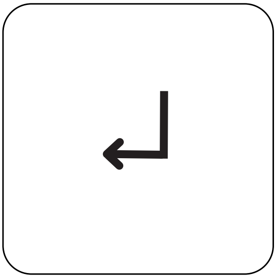
Aggiungere **1 g di polvere HYDRAZIN Test**.



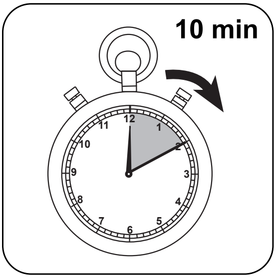
Chiudere la/e cuvetta/e.



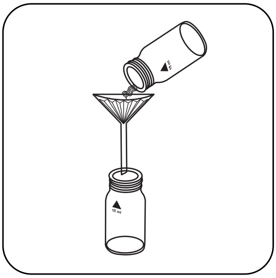
Miscelare il contenuto capovolgendo.



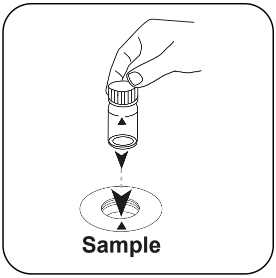
Premere il tasto **ENTER**.



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



Rimuovere la leggera torbidità risultante tramite filtrazione.



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 come Idrazina.

Metodo chimico

Dimetilamminobenzaldeide

Appendice

Interferenze

Interferenze escludibili

1. Eliminare le interferenze dovute a campioni fortemente colorati o torbidi: miscelare 1 parte di acqua demineralizzata e 1 parte di candeggiante ad uso domestico. Immettere 1 gocce di questa soluzione in 25 ml di campione e miscelare. Utilizzare 10 ml di questo campione invece dell’acqua demineralizzata per il campione zero. Attenzione: per la misurazione del campione di acqua utilizzare esclusivamente il campione non trattato.
   Principio: l’idrazina viene ossidata dal candeggiante e l’interferenza cromatica viene annullata nella taratura a zero.

Interferenze	da / [mg/L]
NH_4^+	10
C_4H_9NO	10
VO_4^{3-}	1

Derivato di

DIN 38413-P1

Ferro LR L (A) M225

0.03 - 2 mg/L Fe FE

Ferrozine / acido tioglicolico

Materiale

Materiale richiesto (in parte facoltativo):

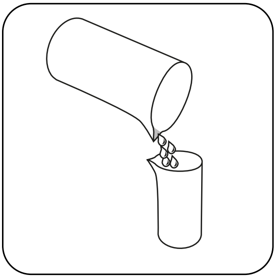
Reagenti	Unità di imballaggio	N. ordine
Acidità / Alcalinità P Indicatore PA1	65 mL	56L013565
Tampone di durezza del calcio CH2	65 mL	56L014465
KP962-Persolfato di ammonio in polvere	Polvere / 40 g	56P096240
KS63-FE6-Tioglicolato/molibdato HR RGT	30 mL	56L006330
KS63-FE6-Tioglicolato/molibdato HR RGT	65 mL	56L006365
KS61-FE5-Ferrozine/Tioglicolato	65 mL	56L006165

Preparazione

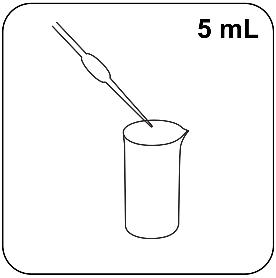
1. Se nel campione sono presenti forti complessanti, il tempo di reazione deve essere prolungato finché non sarà più visibile alcuno sviluppo di colore. I complessi di ferro molto forti tuttavia non vengono rilevati nella misurazione. In questo caso i complessanti devono essere disgregati tramite ossidazione 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

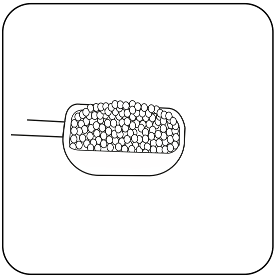
Il ferro totale è costituito da ferro solubile, complessato e sospeso. Prima della misurazione il campione non deve essere filtrato. Per garantire l’omogeneizzazione del campione è necessario distribuire uniforme le particelle sedimentate appena prima del prelievo del campione agitando energicamente. 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.



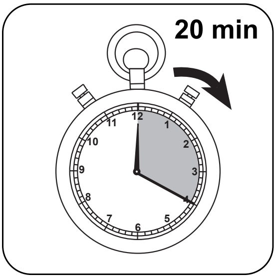
Riempire un recipiente di digestione adeguato con **50 mL di campione omogeneizzato**.



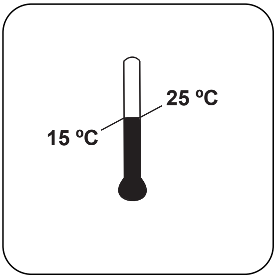
Aggiungere **5 mL di 1:1 acido cloridrico**.



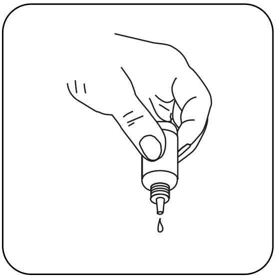
Aggiungere **un cucchiaio dosatore di KP 962 (Ammonium Persulfat Powder)**.



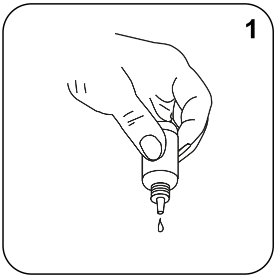
Cuocere il campione per 20 minuti . Il volume del campione dovrebbe restare al di sopra dei 25 mL; se necessario, rabboccare con acqua demineralizzata.



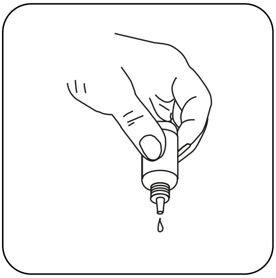
Lasciar raffreddare il campione a **temperatura ambiente**.



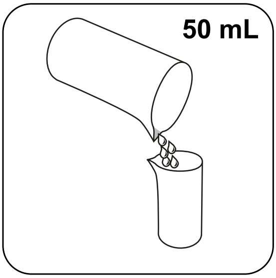
Tenere le boccette contagocce in posizione verticale e introdurre, premendo lentamente, gocce della stessa dimensione nella cuvetta.



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!)**



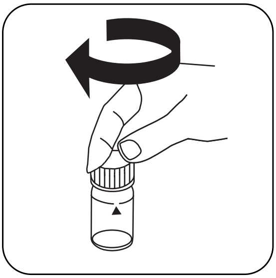
Aggiungere al campione **acqua demineralizzata fino a raggiungere i 50 mL** .

Esecuzione della rilevazione Ferro, LR totale (A) con reagente liquido

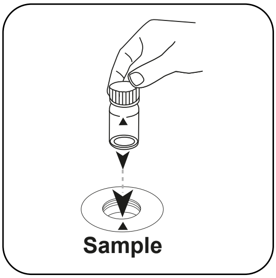
Selezionare il metodo nel dispositivo.

Per la determinazione di **Ferro, LR totale** eseguire la **digestione** descritta.

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



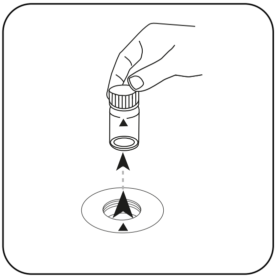
Chiudere la/e cuvetta/e.



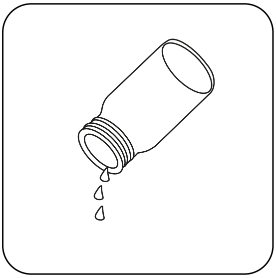
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

Premere il tasto **ZERO**.

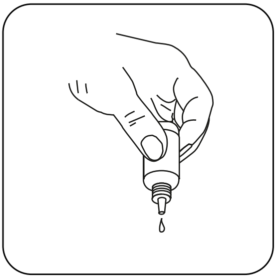


Prelevare la cuvetta dal vano di misurazione.

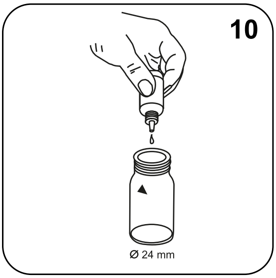


Svuotare la cuvetta.

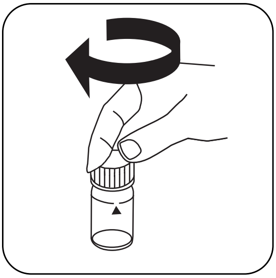
Riempire una cuvetta da 24 mm con **10 mL del campione preparato**.



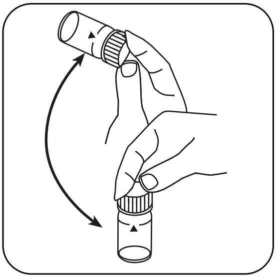
Tenere le boccette contagocce in posizione verticale e introdurre, premendo lentamente, gocce della stessa dimensione nella cuvetta.



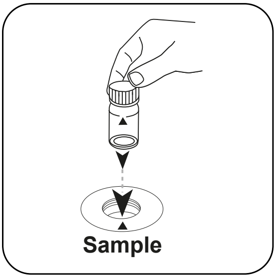
Aggiungere **10 gocce di Iron Reagent FE5**.



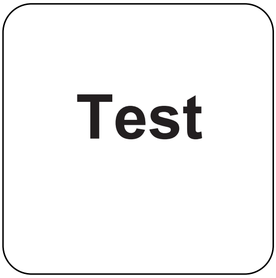
Chiudere la/e cuvetta/e.



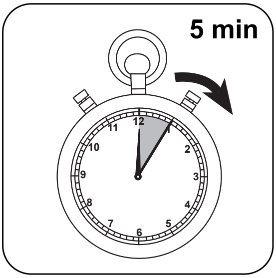
Miscelare il contenuto capovolgendo.



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** .

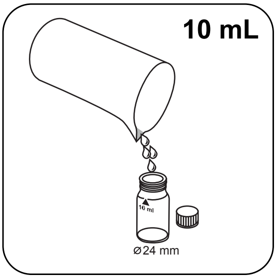
Allo scadere del tempo di reazione viene effettuata automaticamente la misurazione.

Sul display compare il risultato in mg/L di ferro totale o quando si utilizza un campione filtrato, ferro solubile totale in mg/l.

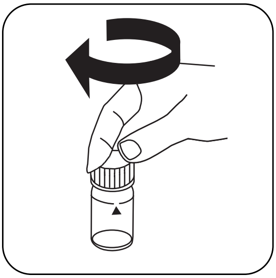
Esecuzione della rilevazione Ferro, LR (A) con reagente liquido

Selezionare il metodo nel dispositivo.

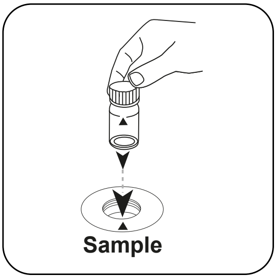
Per la determinazione del ferro disciolto totale è necessario filtrare il campione prima della rilevazione (diametro pori 0,45 µm). In caso contrario verranno rilevate anche particelle di ferro e ferro sospeso.



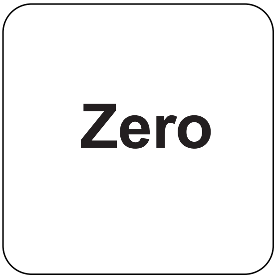
Riempire una cuvetta da 24 mm con **10 mL del campione preparato**.



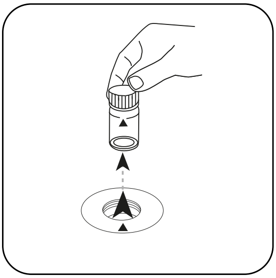
Chiudere la/e cuvetta/e.



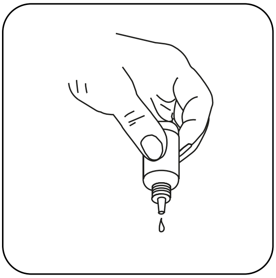
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



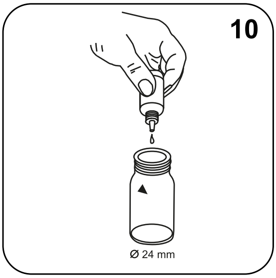
Premere il tasto **ZERO**.



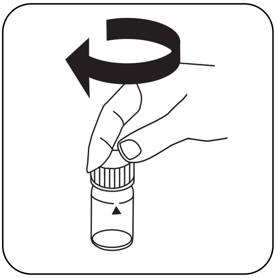
Prelevare la cuvetta dal vano di misurazione.



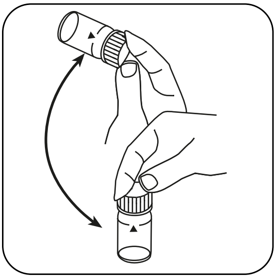
Tenere le boccette contagocce in posizione verticale e introdurre, premendo lentamente, gocce della stessa dimensione nella cuvetta.



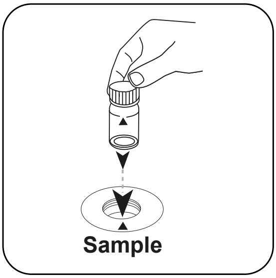
Aggiungere **10 gocce di Iron Reagent FE5**.



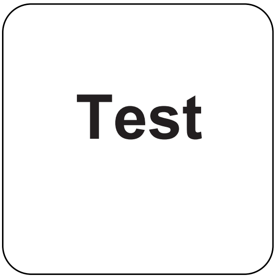
Chiudere la/e cuvetta/e.



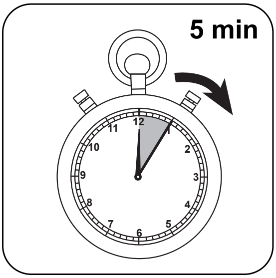
Miscelare il contenuto capovolgendo.



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



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)

Ossigeno disciolto C M292

10 - 800 µg/L O_2 [c)] O2

Rodazina D TM

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
Kit di analisi dell'ossigeno Vacu-vial	1 set	380450

Sono necessari inoltre i seguenti accessori.

Accessori	Unità di imballaggio	N. ordine
Adattatore per cuvette rotonde 13 mm	1 pz.	19802192
Adattatore (13 mm) MultiDirect per Vacu-vial	1 pz.	192075

Preparazione

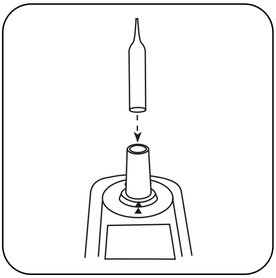
1. Prima di eseguire il test leggere le istruzioni originali e le avvertenze di sicurezza accluse al kit di test (gli MSDS sono disponibili sul sito www.chemetrics.com).

Note

1. Questo metodo è un prodotto CHEMetrics. Il range di misura specificato in questo fotometro e la lunghezza d’onda utilizzata possono tuttavia differire dalle indicazioni di CHEMetrics. 2. Conservare i Vacu-Vials® al buio a temperatura ambiente. 4. Vacu-Vials® è un marchio protetto dell’azienda CHEMetrics, Inc. / Calverton, U.S.A.

Esecuzione della rilevazione Ossigeno disciolto con Vacu Vials® K-7553

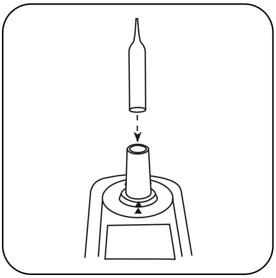
Selezionare il metodo nel dispositivo.



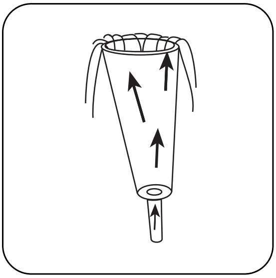
Posizionare la **fiala zero** nel vano di misurazione.

Zero

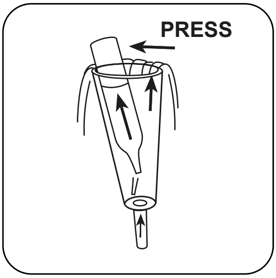
Premere il tasto **ZERO**.



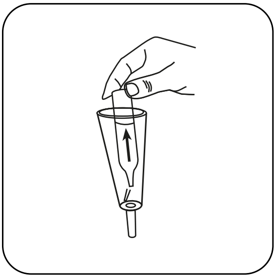
Prelevare la fiala zero dal vano di misurazione.



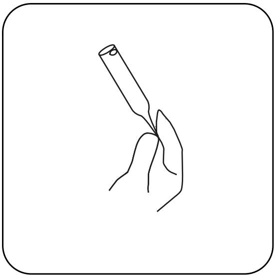
Far scorrere l’acqua campione nel recipiente di campionamento per diversi minuti dal basso verso l’alto per rimuovere le bolle d'aria.



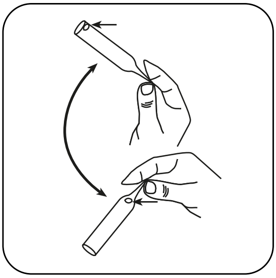
Posizionare una fiala Vacu-vial® nel recipiente di campionamento. Rompere la punta della fiala premendo leggermente contro la parete del recipiente. Attendere il completo riempimento della fiala.



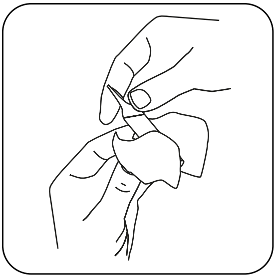
Successivamente prelevare velocemente la fiala piena dal recipiente di campionamento con la punta rivolta verso il basso.



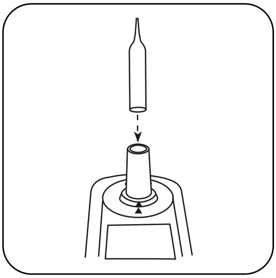
Chiudere l’apertura con un dito per evitare il contatto con l’aria.



Capovolgere più volte la fiala.



Asciugare esternamente la fiala.



Posizionare la fiala nel vano di misurazione.

Test

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

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

Metodo chimico

Rodazina D TM

Appendice

Derivato di

ASTM D 5543-15

[c]MultiDirect: necessario adattatore per Vacu-vials®(numero d'ordine 19 20 75)

Fosfato HR L

M335

5 - 80 mg/L PO_4

PO4

Molibdato di vanadio

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
KS278-Acido solforico 50%	65 mL	56L027865
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
Phosphate HR, Ortho Reagent Set	1 pz.	56R019090

Sono necessari inoltre i seguenti accessori.

Accessori	Unità di imballaggio	N. ordine
Asta di agitazione e cucchiaio per la polvere	1 pz.	56A006601

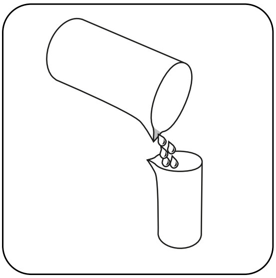
Preparazione

1. I campioni fortemente tamponati o i campioni con valori di pH estremi dovrebbero essere portati prima dell’analisi entro un range di pH compreso tra 6 e 7 (con 1 mol/l di acido cloridrico o 1 mol/l di liscivia).
2. Per l’analisi di polifosfati e fosfato totale è necessaria una digestione.

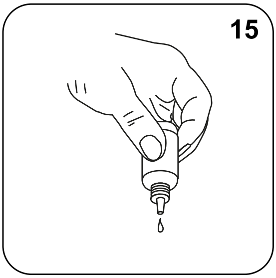
Note

1. Reagenti e accessori disponibili su richiesta.

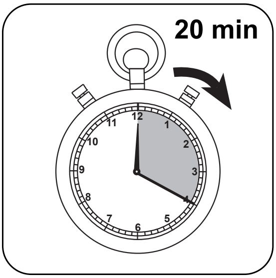
Digestione Polifosfato HR con reagenti liquidi



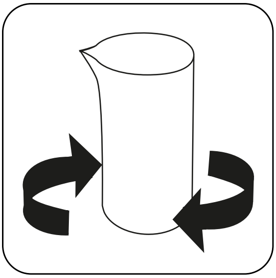
Riempire un recipiente di digestione adeguato con **50 mL di campione omogeneizzato**.



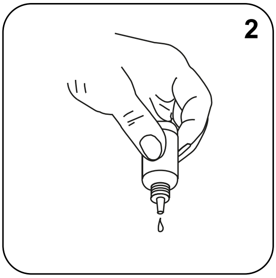
Aggiungere **15 gocce di KS278 (50% acido solforico)**.



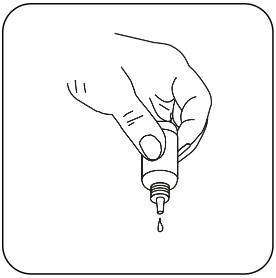
Cuocere il campione per 20 minuti . Il volume del campione dovrebbe restare al di sopra dei 25 mL; se necessario, rabboccare con acqua demineralizzata.



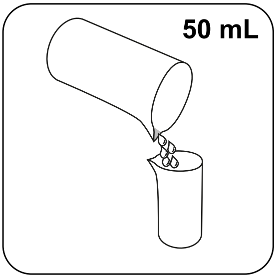
Capovolgere il recipiente di digestione e lasciarla raffreddare a temperatura ambiente.



Aggiungere **2 gocce di Acidity / Alkalinity P Indicator PA1**.

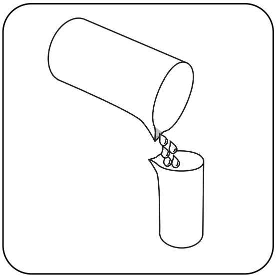


Aggiungere allo stesso campione **Hardness Calcium Buffer CH2** in gocce finché non si presenta una colorazione da rosa chiaro a rosso. **(Attenzione: dopo l’aggiunta di ogni goccia far oscillare il campione!)**

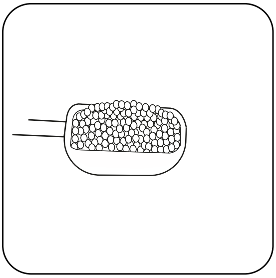


Aggiungere al campione **acqua demineralizzata fino a raggiungere i 50 mL** .

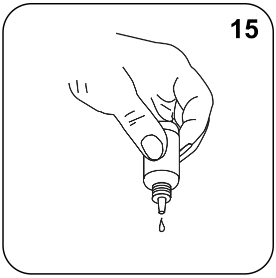
Digestione Fosfato, HR totale con reagenti liquidi



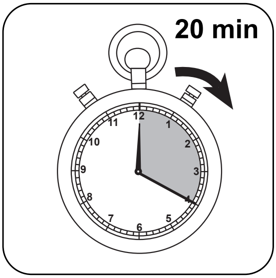
Riempire un recipiente di digestione adeguato con **50 mL di campione omogeneizzato**.



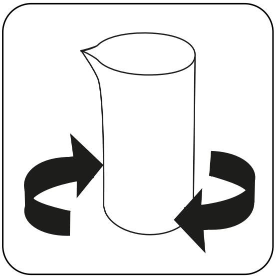
Aggiungere **un cucchiaio dosatore di KP962 (Ammonium Persulfate Powder)**.



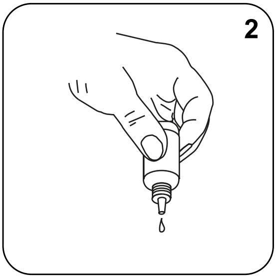
Aggiungere **15 gocce di KS278 (50% sulfuric acid)**.



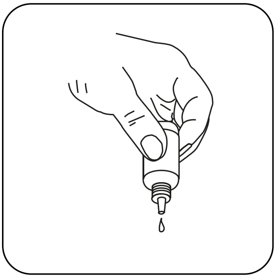
Cuocere il campione per 20 minuti . Il volume del campione dovrebbe restare al di sopra dei 25 mL; se necessario, rabboccare con acqua demineralizzata.



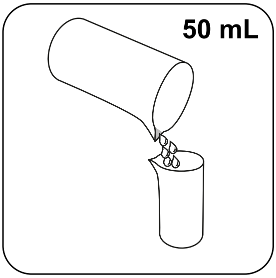
Capovolgere il recipiente di digestione e lasciarla raffreddare a temperatura ambiente.



Aggiungere **2 gocce di Acidity / Alkalinity P Indicator PA1**.



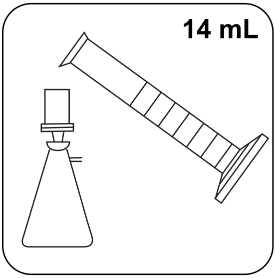
Aggiungere allo stesso campione **Hardness Calcium Buffer CH2** in gocce finché non si presenta una colorazione da rosa chiaro a rosso. **(Attenzione: dopo l’aggiunta di ogni goccia far oscillare il campione!)**



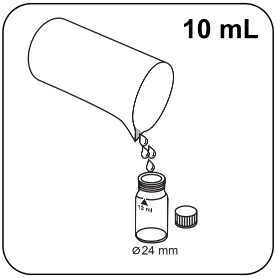
Aggiungere al campione **acqua demineralizzata fino a raggiungere i 50 mL** .

Esecuzione della rilevazione Fosfato HR con reagente liquido

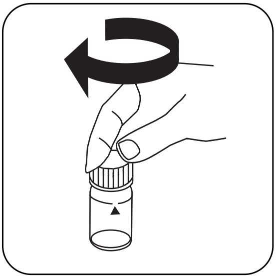
Selezionare il metodo nel dispositivo.



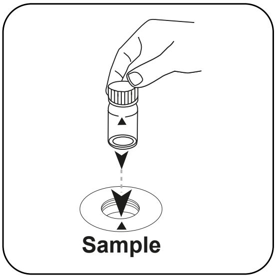
Filtrare circa 14 mL di campione con un filtro precedentemente risciacquato (diametro pori 0,45 µm).



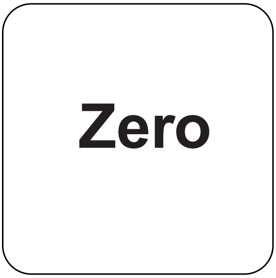
Riempire una cuvetta da 24 mm con **10 mL del campione preparato**.



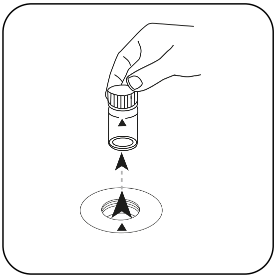
Chiudere la/e cuvetta/e.



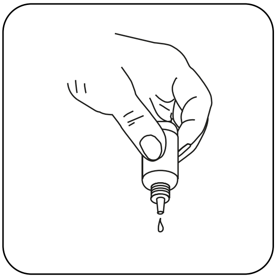
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



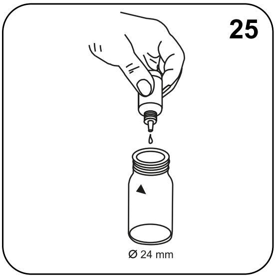
Premere il tasto **ZERO**.



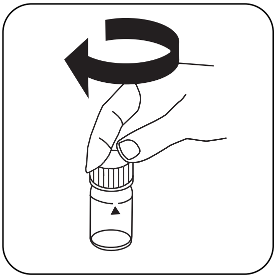
Prelevare la cuvetta dal vano di misurazione.



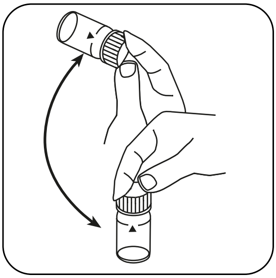
Tenere le boccette contagocce in posizione verticale e introdurre, premendo lentamente, gocce della stessa dimensione nella cuvetta.



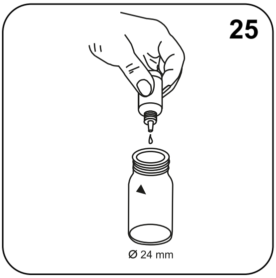
Aggiungere **25 gocce di KS228 (Ammonium Molybdate)**.



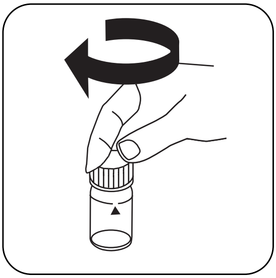
Chiudere la/e cuvetta/e.



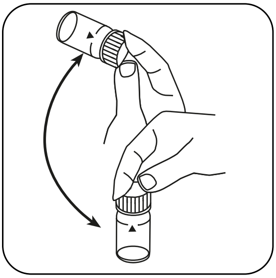
Miscelare il contenuto capovolgendo.



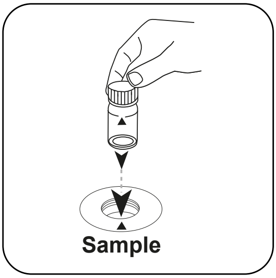
Aggiungere **25 gocce di KS229 (Ammonium Metavanadate)**.



Chiudere la/e cuvetta/e.



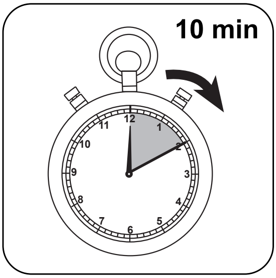
Miscelare il contenuto capovolgendo.



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 Fosfato.

Esecuzione della rilevazione Polifosfato con reagenti liquidi

Selezionare il metodo nel dispositivo.

Per la determinazione di **Polifosfato HR con reagenti liquidi** eseguire la **digestione** descritta.

Questo test rileva il tenore di fosfato totale inorganico.Il tenore di polifosfati si ottiene dalla differenza tra il fosfato organico e l’ortofosfato.

La determinazione di Fosfato, LR totale con reagenti liquidi si esegue come la determinazione descritta in Metodo 335, fosfato HR con reagenti liquidi.

Sul display compare il risultato in mg/L di Fosfato totale inorganico (orto-fosfato e polifosfato).

Esecuzione della rilevazione Fosfato, totale con reagenti liquidi

Selezionare il metodo nel dispositivo.

Per la determinazione di **Fosfato, HR totale con reagenti liquidi** eseguire la **digestione** descritta.

Questo test rileva tutti i composti di fosforo presenti nel campione, inclusi ortofosfato, polifosfato e composti di fosforo organici.

La determinazione di Fosfato, HR totale con reagenti liquidi si esegue come la determinazione descritta in Metodo 335, fosfato HR con reagenti liquidi.

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

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	P	1
mg/l	PO_4^{3-}	3.066177
mg/l	P_2O_5	2.29137

Metodo chimico

Molibdato di vanadio

Appendice

Interferenze

Interferenze permanenti

- Grandi quantità di sostanze non disciolte possono provocare risultati di misura non riproducibili.

Interferenze	da / [mg/L]
Al	200
AsO_4^{3-}	in tutte le quantità
Cr	100
Cu	10
Fe	100
Ni	300
SiO_2	50
$Si(OH)_4$	10
S^{2-}	in tutte le quantità
Zn	80

Secondo

Standard Method 4500-P C

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

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.

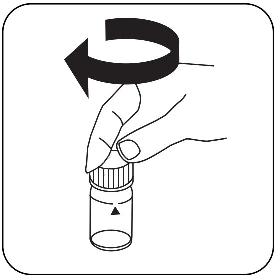
Note

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.

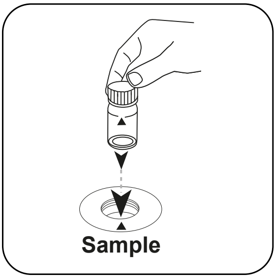
Esecuzione della rilevazione Poliacrilati con reagente liquido

Selezionare il metodo nel dispositivo.

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



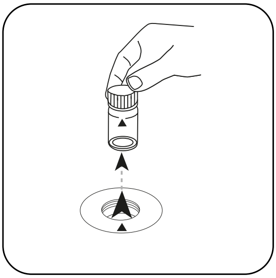
Chiudere la/e cuvetta/e.



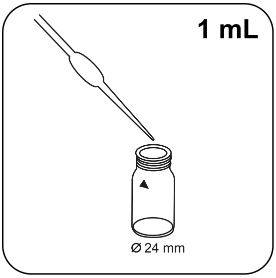
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

Zero

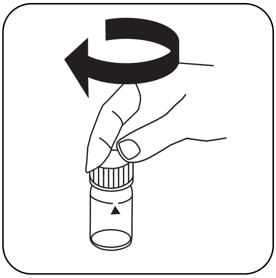
Premere il tasto **ZERO**.



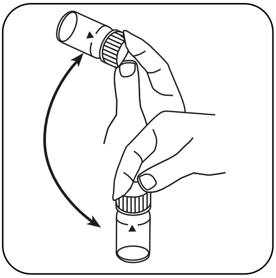
Prelevare la cuvetta dal vano di misurazione.



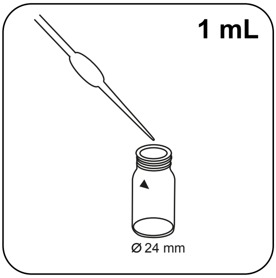
Introdurre **1 mL di soluzione (25 drops) Polyacrylate Buffer A1** nella cuvetta del campione.



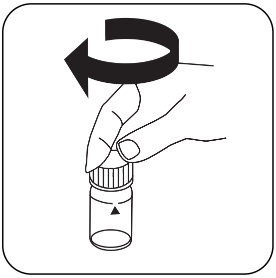
Chiudere la/e cuvetta/e.



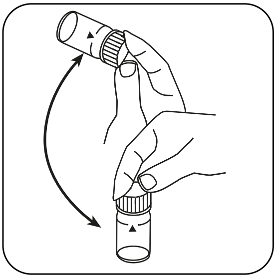
Miscelare il contenuto capovolgendo.



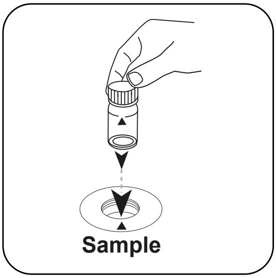
Introdurre **1 mL di soluzione (25 drops) Polyacrylate Precipitant A2** nella cuvetta del campione.



Chiudere la/e cuvetta/e.



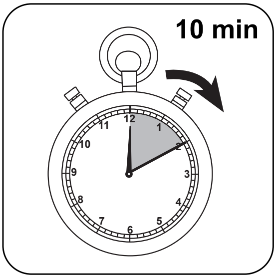
Miscelare il contenuto capovolgendo.



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

Silicato HR PP M352

1 - 90 mg/L SiO_2 SiHr

Molibdato di silicio

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
VARIO Reagente per silice HR, set F10	1 set	535700

Preparazione

1. La temperatura del campione deve essere compresa tra 15 °C e 25 °C.

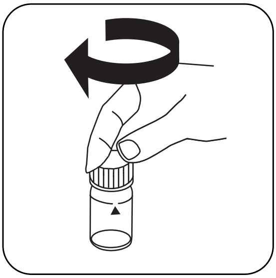
Note

1. Il metodo effettua la misurazione sul lato della curva di assorbimento della colorazione risultante. Nei fotometri con filtro l'accuratezza del metodo può quindi essere migliorata, se necessario, tramite regolazione con un silicato standard (circa 70 mg/L SiO_2).

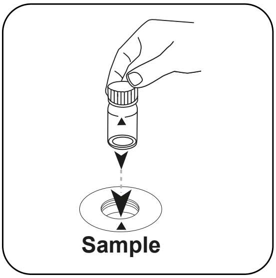
Esecuzione della rilevazione Biossido di silicio HR con polvere in bustine Vario

Selezionare il metodo nel dispositivo.

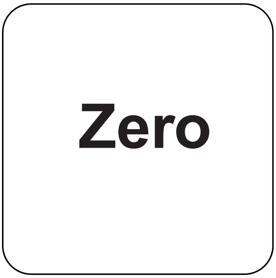
Riempire una cuvetta da 24 mm con **10 mL di campione**.



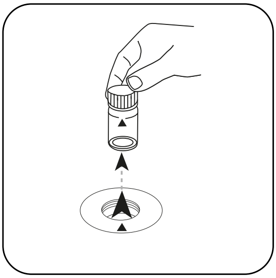
Chiudere la/e cuvetta/e.



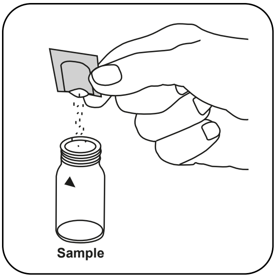
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



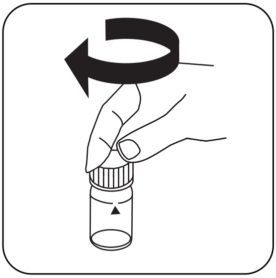
Premere il tasto **ZERO**.



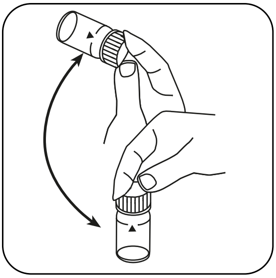
Prelevare la cuvetta dal vano di misurazione.



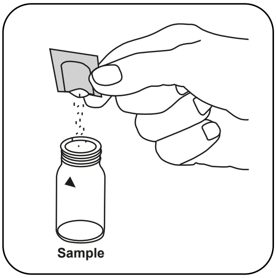
Aggiungere **una bustina di polvere Vario Silica HR Molybdate F10**.



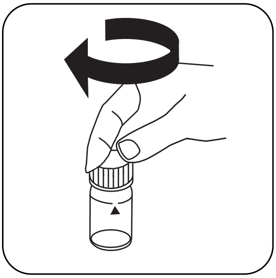
Chiudere la/e cuvetta/e.



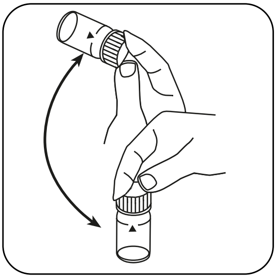
Far sciogliere la polvere capovolgendo.



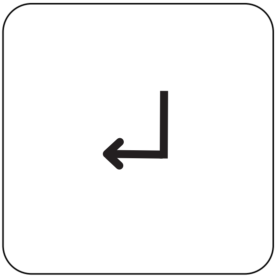
Aggiungere **una bustina di polvere Vario Silica HR Acid Rgt. F10**.



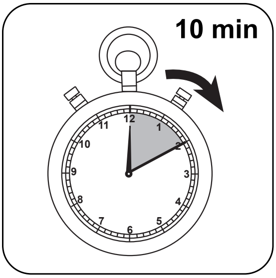
Chiudere la/e cuvetta/e.



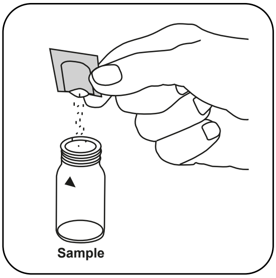
Miscelare il contenuto capovolgendo.



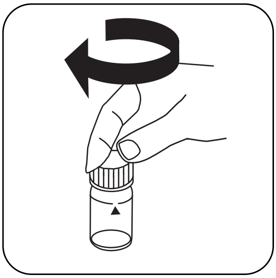
Premere il tasto **ENTER**.



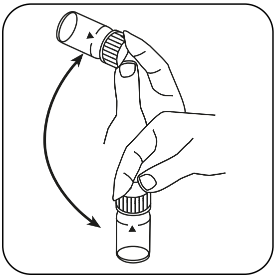
Attendere un **tempo di reazione di 10 minuto/i** .



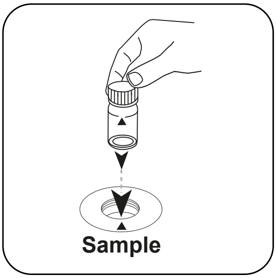
Aggiungere **una bustina di polvere Vario Silica Citric Acid F10**.



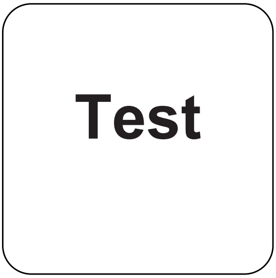
Chiudere la/e cuvetta/e.



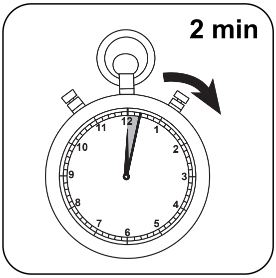
Far sciogliere la polvere capovolgendo.



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



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



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 Silicato.

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	SiO_2	1
mg/l	Si	0.47

Metodo chimico

Molibdato di silicio

Appendice

Interferenze

Interferenze escludibili

- Talvolta i campioni di acqua contengono forme di acido silicico che reagiscono molto lentamente con il molibdato. Il tipo esatto di tali forme non è attualmente noto. Attraverso un pretrattamento con bicarbonato di sodio e successivamente con acido solforico è possibile trasformarle in forme più reattive (descrizione in "Standard Methods for the Examination of Water and Wastewater" alla sezione "Silica-Digestion with Sodium Bicarbonate").
- Se sono presenti biossido di silicio o fosfato si sviluppa una colorazione gialla. Aggiungendo la polvere in bustine Silica Citric Acid F10 si elimina il colore giallo prodotto dal fosfato.

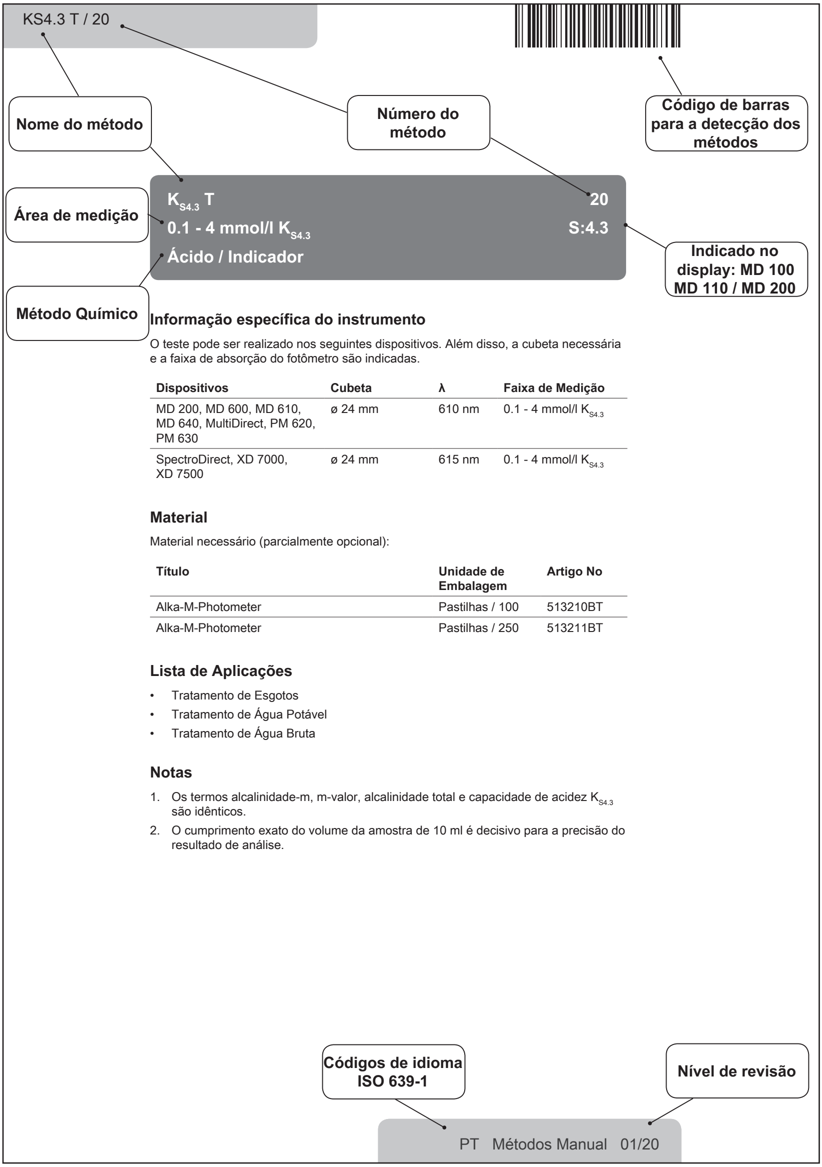
Interferenze	da / [mg/L]	Influenza
Fe	grandi quantità	
PO_4^{3-}	50	
PO_4^{3-}	60	Il disturbo è di circa -2 %
PO_4^{3-}	75	Il disturbo è di circa-11 %
S^{2-}	in tutte le quantità	

Validazione metodo

Limite di rilevabilità	0.38 mg/L
Limite di quantificazione	1.14 mg/L
Estremità campo di misura	100 mg/L
Sensibilità	120 mg/L / Abs
Intervallo di confidenza	1.69 mg/L
Deviazione standard della procedura	0.70 mg/L
Coefficiente di variazione della procedura	1.38 %

Derivato di

Standard Method 4500-SiO2 C



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

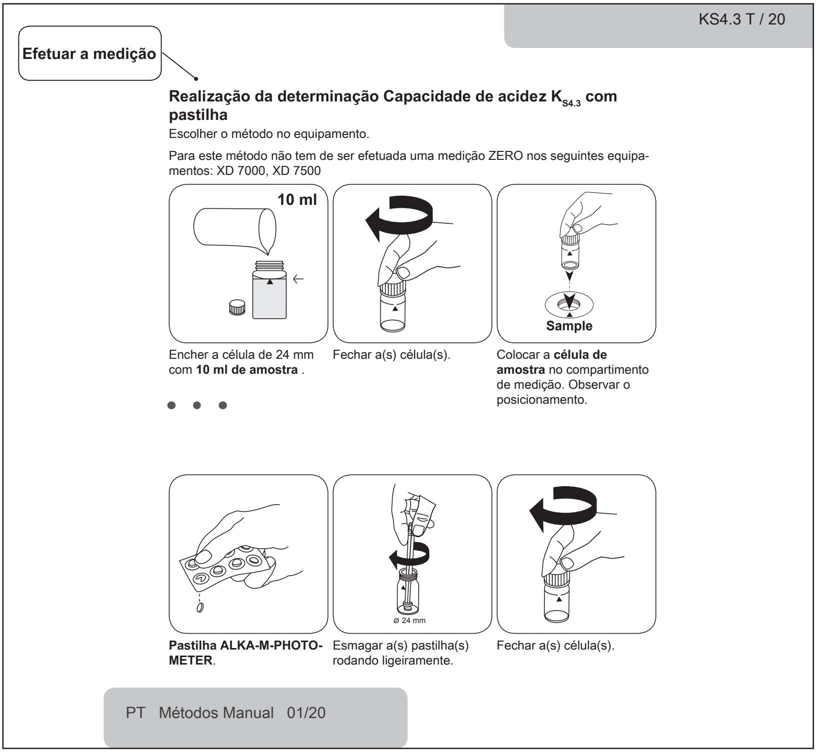
Lista de Aplicações

- 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):

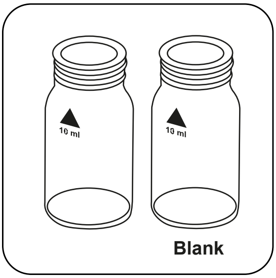
Reagentes	**Unidade de Embalagem**	**Código do Produto**
Jogo de alumínio VARIO 20 ml	1 pc.	535000

Preparação

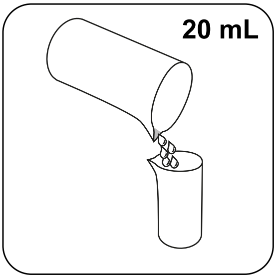
1. Para conseguir resultados de análise precisos, a temperatura da amostra deve ser mantida entre 20 °C e 25 °C.
2. Para evitar erros por causa da sujidade, deve enxaguar a célula e o acessório antes da análise com solução de ácido clorídrico (aprox. de 20 %) e depois com água desmineralizada.

Realização da determinação Alumínio com pacote de pó Vario

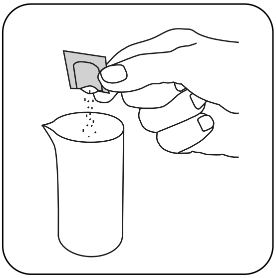
Escolher o método no equipamento.



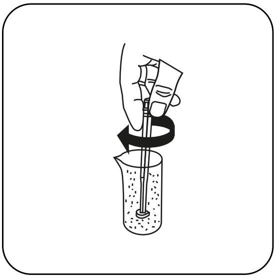
Preparar duas células de 24 mm limpas. Identificar uma célula como célula zero.



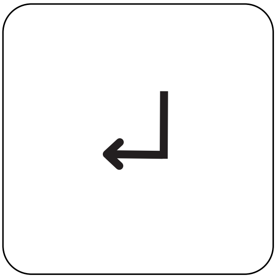
Introduzir **20 mL de amostra** num copo medida de 100 mL.



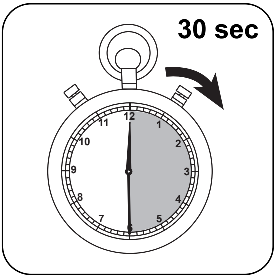
Adicionar um **pacote de pó Vario ALUMINIUM ECR F20** .



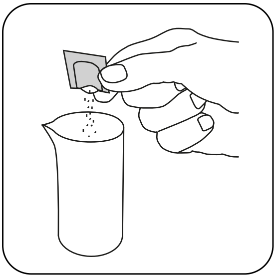
Soltar o pó por agitação.



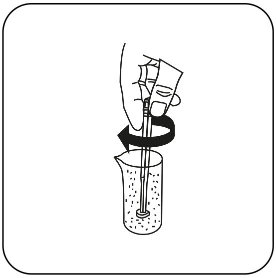
Premir a tecla **ENTER**.



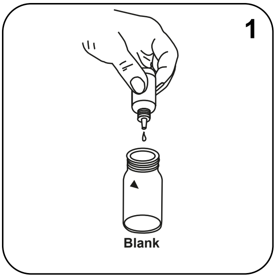
Aguardar **30 segundos de tempo de reação**.



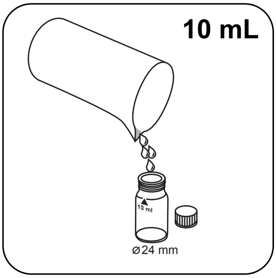
Adicionar um **pacote de pó Vario HEXAMINE F20** .



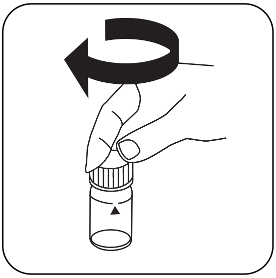
Soltar o pó por agitação.



Adicionar **1 gotas Vario ALUMINIUM ECR Masking Reagent** à célula zero.

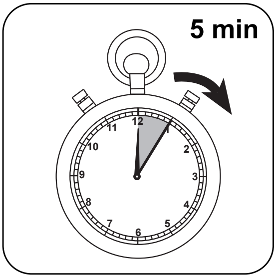


Introduzir em cada célula **10 mL de amostra preparada** .

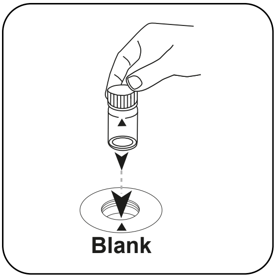


Fechar a(s) célula(s).

Premir a tecla **ENTER**.



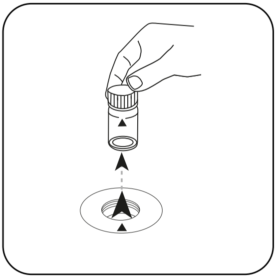
Aguardar **5 minuto(s) de tempo de reação**.



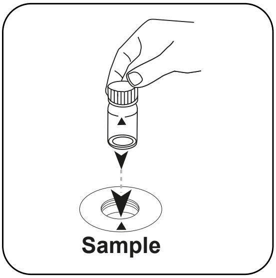
Colocar a **célula zero** no compartimento de medição. Observar o posicionamento.

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

Cloreto L (B) M92

0.5 - 20 mg/L Cl^- CL-

Mercury Thiocyanate / Iron Nitrate

Material

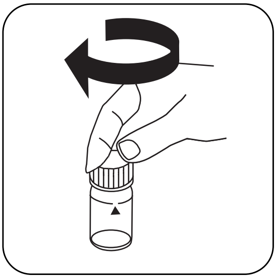
Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
Chloride Reagent Set	1 pc.	56R018490

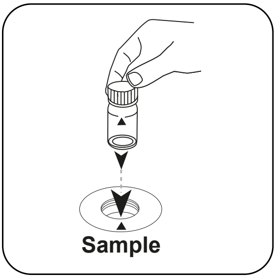
Realização da determinação Cloreto com reagente líquido

Escolher o método no equipamento.

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



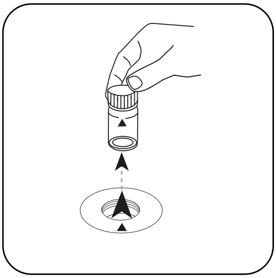
Fechar a(s) célula(s).



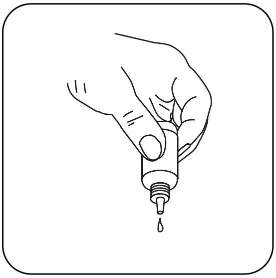
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Zero

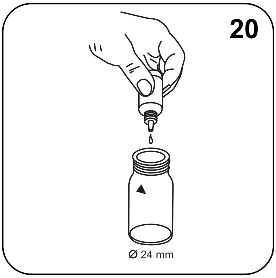
Premir a tecla **ZERO**.



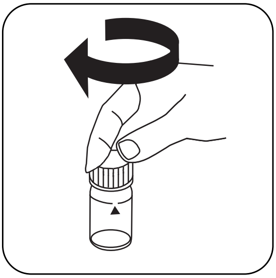
Retirar a célula do compartimento de medição.



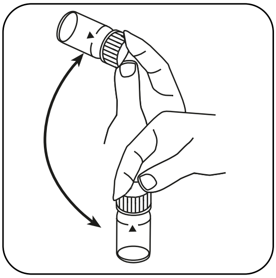
Manter os frascos conta gotas na vertical e pressionar lentamente para adicionar gotas de igual dimensão.



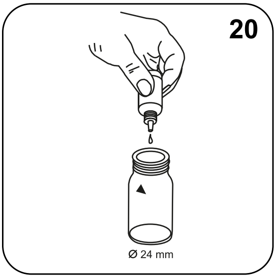
Adicionar **20 gotas KS251 (Chloride Reagenz A)**.



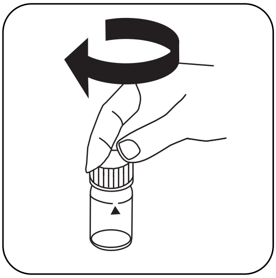
Fechar a(s) célula(s).



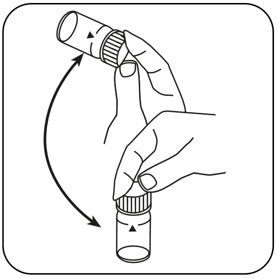
Misturar o conteúdo girando.



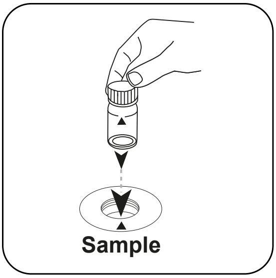
Adicionar **20 gotas KS253 (Chloride Reagenz B)**.



Fechar a(s) célula(s).



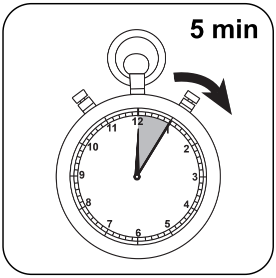
Misturar o conteúdo girando.



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 Cloreto.

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	Cl^-	1
mg/l	NaCl	1.65

Método Químico

Mercury Thiocyanate / Iron Nitrate

Apêndice

Texto de Interferências

Interferências Pesistentes

1. Substâncias redutoras, como sulfito e tiossulfato, que podem reduzir o ferro (III) ao ferro (II) ou o mercúrio (II) ao mercúrio (I) podem interferir. O cianeto, o iodo e o brometo causam uma interferência positiva.

Derivado de

DIN 15682-D31
DIN ISO 15923-1 D49

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

Preparação

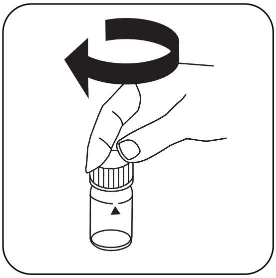
1. As águas fortemente alcalinas ou ácidas deviam, antes da análise, ser ajustadas para um valor pH de 4 a 6.

Realização da determinação Cobre, livre com pastilha

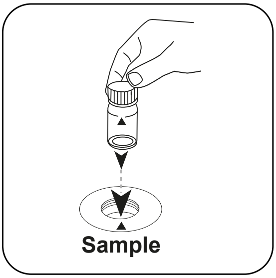
Escolher o método no equipamento.

Escolha ainda a determinação: livre

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



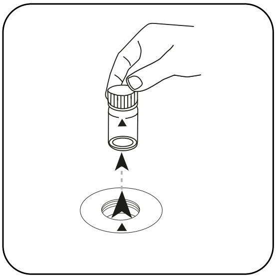
Fechar a(s) célula(s).



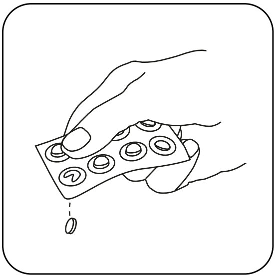
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Zero

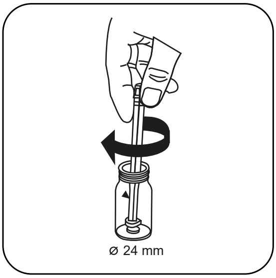
Premir a tecla **ZERO**.



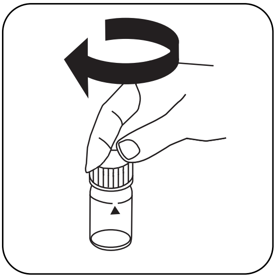
Retirar a célula do compartimento de medição.



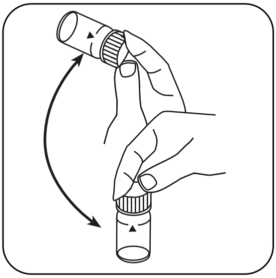
Pastilha COPPER No. 1.



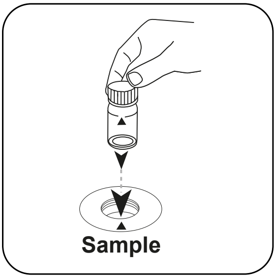
Esmagar a(s) pastilha(s) rodando ligeiramente.



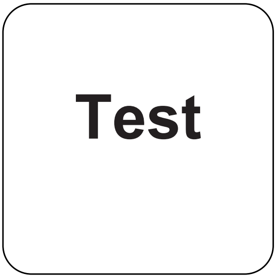
Fechar a(s) célula(s).



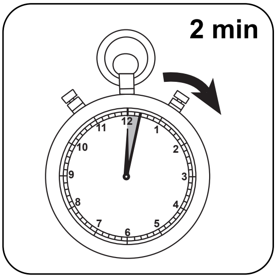
Dissolver a(s) pastilha(s) girando.



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.

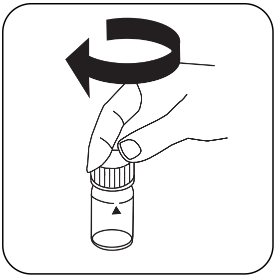
No visor aparece o resultado em mg/L Cobre livre.

Realização da determinação Cobre, total com pastilha

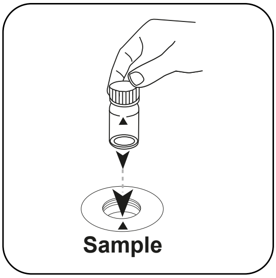
Escolher o método no equipamento.

Escolha ainda a determinação: total

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



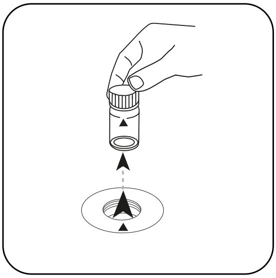
Fechar a(s) célula(s).



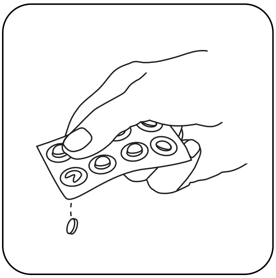
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Zero

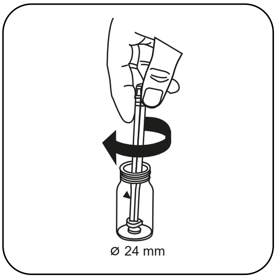
Premir a tecla **ZERO**.



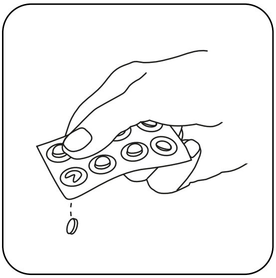
Retirar a célula do compartimento de medição.



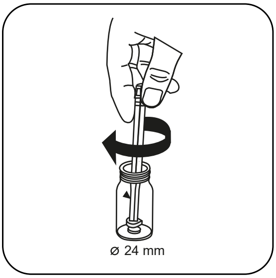
Pastilha COPPER No. 1.



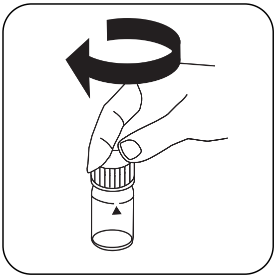
Esmagar a(s) pastilha(s) rodando ligeiramente e dissolver.



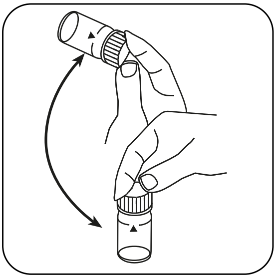
Pastilha COPPER No. 2.



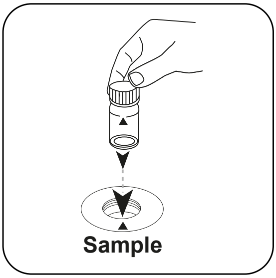
Esmagar a(s) pastilha(s) rodando ligeiramente.



Fechar a(s) célula(s).



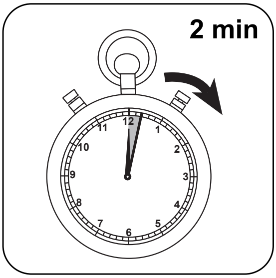
Dissolver a(s) pastilha(s) girando.



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

DEHA PP M167

0.02 - 0.5 mg/L DEHA DEHA

PPST

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
Kit de reagentes VARIO DEHA	1 pc.	536000

Preparação

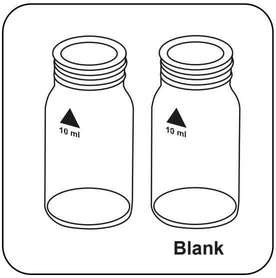
1. Para evitar erros por depósito de ferro, deve enxaguar os equipamentos de vidro antes da análise com solução de ácido clorídrico (aprox. de 20%) e depois com água desmineralizada.

Notas

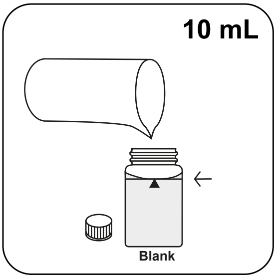
1. Uma vez que a reação depende da temperatura, deve manter uma temperatura de 20 °C ± 2 °C.
2. Colocar a célula de amostra, durante o tempo de formação da cor, no compartimento de medição ou no escuro. (Se a solução de reagente for exposta a luz UV (luz solar), isso causa valores de medição demasiado altos.)

Realização da determinação DEHA (N,N-dietilhidroxilamina) com pacote de pó Vario e reagente líquido

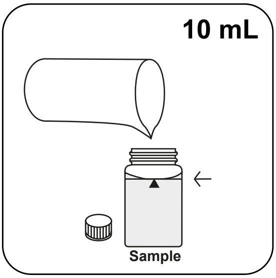
Escolher o método no equipamento.



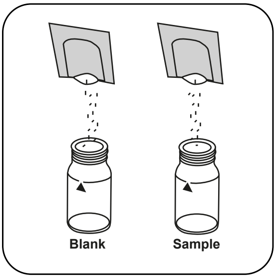
Preparar duas células de 24 mm limpas. Identificar uma célula como célula zero.



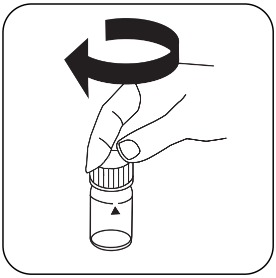
Adicionar **10 mL de água desmineralizada** à célula zero.



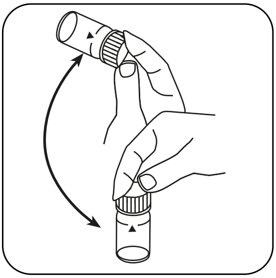
Adicionar **10 mL de amostra** à célula de amostra.



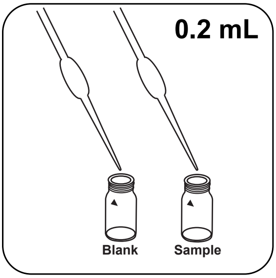
Introduzir em cada célula **um pacote de pó Vario OXYSCAV 1 Rgt** .



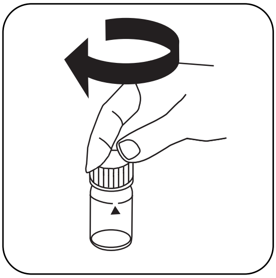
Fechar a(s) célula(s).



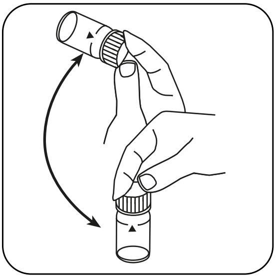
Misturar o conteúdo girando.



Introduzir em cada célula **0.2 mL Vario DEHA 2 Rgt de solução** .



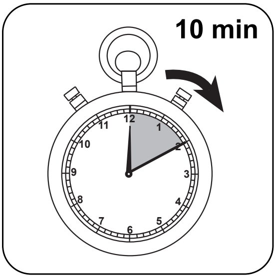
Fechar a(s) célula(s).



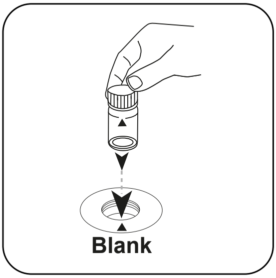
Misturar o conteúdo girando.

↵

Premir a tecla **ENTER**.



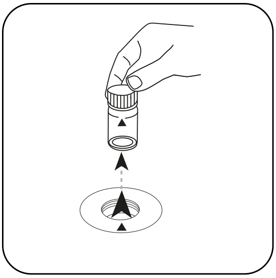
Aguardar **10 minuto(s) de tempo de reação**.



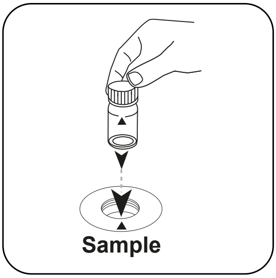
Colocar a **célula zero** no compartimento de medição. Observar o posicionamento.

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 como DEHA.

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	DEHA	1
µg/l	DEHA	1000
mg/l	Hydrochinon	2.63
mg/l	MEKO	4.5
mg/l	Carbohydrazid	1.31
mg/l	ISA	3.9

Método Químico

PPST

Apêndice

Texto de Interferências

Interferências Removíveis

1. Interferências:
   O ferro(II) interfere em todas as quantidades: Para determinar a concentração de ferro (II) repete-se o teste sem adicionar a solução DEHA. Se a concentração estiver acima de 20 µg/L, o valor indicado é deduzido do resultado da determinação DEHA.
2. As substâncias, que reduzem ferro (III), causam interferências. As substâncias, que complexam fortemente o ferro, podem causar interferências.

Interferências	a partir de / [mg/L]
Zn	50
$Na_2B_4O_7$	500
Co	0,025
Cu	8
$CaCO_3$	1000
Lignosulfonate	0,05
Mn	0,8
Mo	80
Ni	0,8

Interferências	a partir de / [mg/L]
PO_4^{3-}	10
$R\text{-}PO(OH)_2$	10
SO_4^{2-}	1000

Bibliografia

Processo de análise fotométrico, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989

Hidrazina P M205

0.05 - 0.5 mg/L N_2H_4 Hydr

Dimethylaminobenzaldehyde

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
Pó para Teste de Hidrazina	Pó / 30 g	462910

São necessários os seguintes acessórios.

Acessórios	Unidade de Embalagem	Código do Produto
Colher de dosagem, 1 g	1 pc.	384930

Preparação

1. Se a amostra de água estiver turva, é necessário filtrá-la antes da realização da calibração zero.
2. A temperatura da amostra não devia exceder 21 °C.

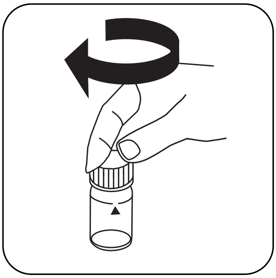
Notas

1. Se utilizar a colher medida de hidrazina, 1 g corresponde a uma colher medida com traços.
2. Os filtros dobrados qualitativos para precipitações de partículas finas são ótimos para remover a turvação que se formou com os reagentes.
3. Para verificar se o reagente envelheceu depois de estar armazenado durante muito tempo, executa-se o teste com água canalizada conforme descrito. Se o resultado ficar acima do valor do limite de prova de 0,05 mg/L, o reagente já só pode ser usado com restrições (maiores desvios do valor de medição).

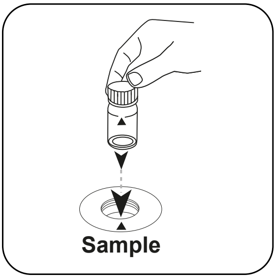
Realização da determinação Hidrazina com reagente em pó

Escolher o método no equipamento.

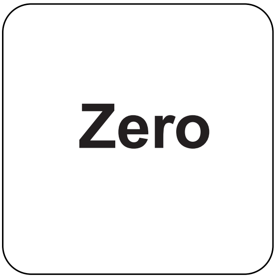
Encher a célula de 24 mm com **10 mL de amostra** .



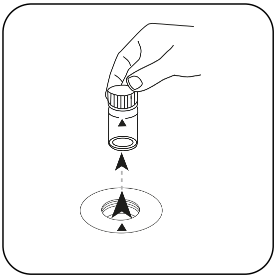
Fechar a(s) célula(s).



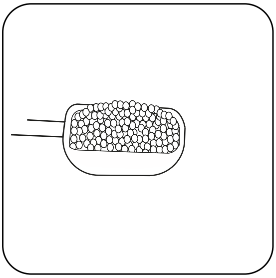
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



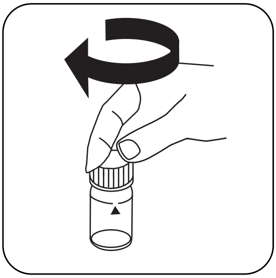
Premir a tecla **ZERO**.



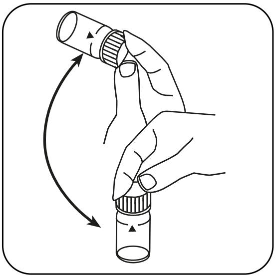
Retirar a célula do compartimento de medição.



Adicionar **1 g HYDRAZIN Test de pó**.



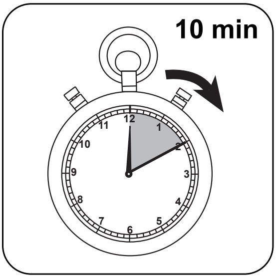
Fechar a(s) célula(s).



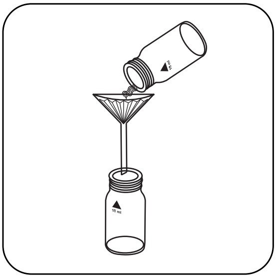
Misturar o conteúdo girando.

↵

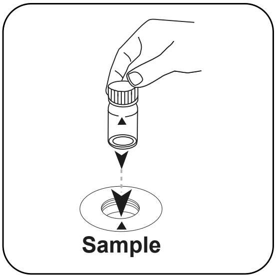
Premir a tecla **ENTER**.



Aguardar **10 minuto(s) de tempo de reação**.



Remover por filtração a ligeira turvação que se formou.



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

Test

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

No visor aparece o resultado como Hidrazina.

Método Químico

Dimethylaminobenzaldehyde

Apêndice

Texto de Interferências

Interferências Removíveis

1. Eliminar interferências por amostras muito coloridas ou turvas: 1 Parte de água desmineralizada e 1 parte de branqueador doméstico misturadas. Desta solução introduza 1 gota em 25 ml de amostra e misture. Use 10 ml desta amostra em vez de água desmineralizada para a amostra zero. Atenção: Para medir a amostra de água é impreterível que use a amostra não tratada.
   Princípio: a hidrazina é oxidada pelo branqueador e a interferência de cor é desligada na calibração zero.

Interferências	**a partir de / [mg/L]**
NH_4^+	10
C_4H_9NO	10
VO_4^{3-}	1

Derivado de

DIN 38413-P1

Ferro LR L (A) M225

0.03 - 2 mg/L Fe FE

Ferrozine / Thioglycolate

Material

Material necessário (parcialmente opcional):

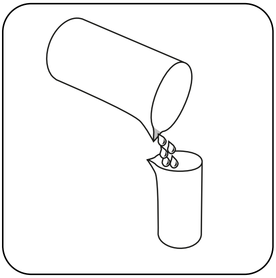
Reagentes	Unidade de Embalagem	Código do Produto
Acidez / Alcalinidade P Indicador PA1	65 mL	56L013565
Tampão de dureza cálcica CH2	65 mL	56L014465
KP962-Amónio Persulfato de amónio em pó	Pó / 40 g	56P096240
KS63-FE6 tioglicolato/molibdato HR RGT	30 mL	56L006330
KS63-FE6 tioglicolato/molibdato HR RGT	65 mL	56L006365
KS61-FE5-Ferrozina/Thioglicolato	65 mL	56L006165

Preparação

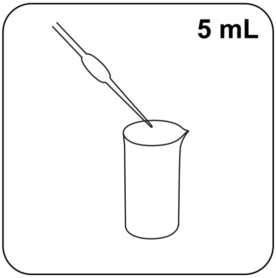
1. Na presença de fortes agentes complexantes na amostra, é necessário aumentar o tempo de reação até deixar de ver mais formações de cor. Os complexos de ferro muito fortes não são, porém, captados na medição. Neste caso, os agentes complexantes têm de ser destruídos por oxidação com ácido/persulfato 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

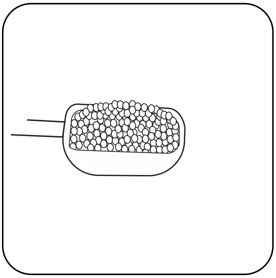
O ferro total é composto por ferro solúvel, complexante e suspenso. A amostra não pode ser filtrada antes da medição. Para assegurar uma homogeneização da amostra, as partículas depositadas têm de ser imediatamente distribuídas antes da recolha da amostra através de uma forte agitação. Para determinar 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.



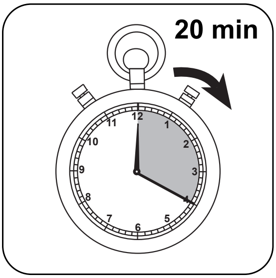
Encher um recipiente de digestão adequado com **50 mL de amostra homogeneizada** .



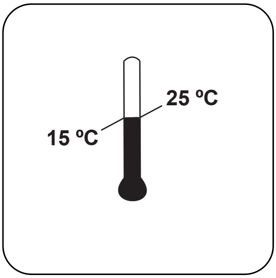
Adicionar **5 mL 1:1 ácido clorídrico** .



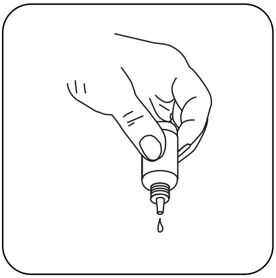
Adicionar **uma colher medida KP 962 (Ammonium Persulfat Powder)** .



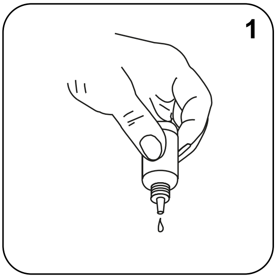
A amostra deve **cozer 20 minutos** . Deve ser mantido um volume de amostra de 25 mL; encher eventualmente com água desmineralizada.



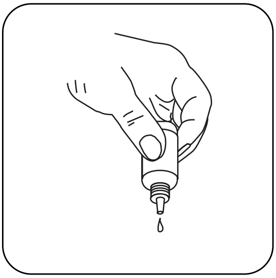
Deixar a amostra arrefecer até à **temperatura ambiente** .



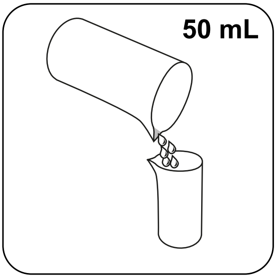
Manter os frascos conta gotas na vertical e pressionar lentamente para adicionar gotas de igual dimensão.



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!)**



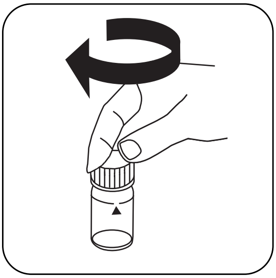
Encher a amostra com **água desmineralizada até 50 mL** .

Realização da determinação Ferro LR (A) total com reagente líquido

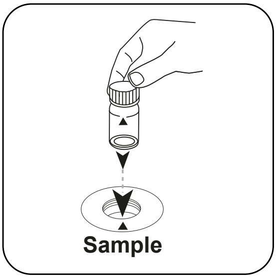
Escolher o método no equipamento.

Para a determinação de **Ferro, total LR** deve realizar a **digestão** descrita.

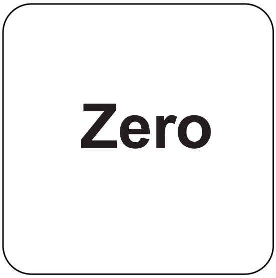
Encher a célula de 24 mm com **10 mL de água desmineralizada**.



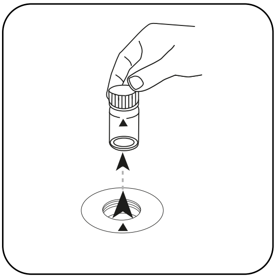
Fechar a(s) célula(s).



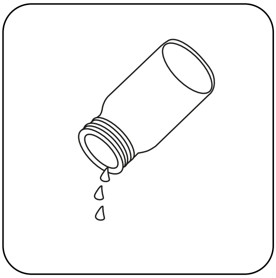
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



Premir a tecla **ZERO**.

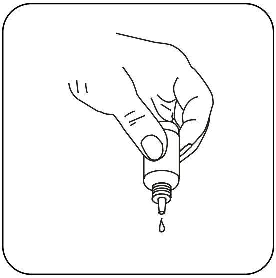


Retirar a célula do compartimento de medição.

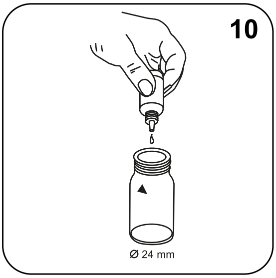


Esvaziar a célula.

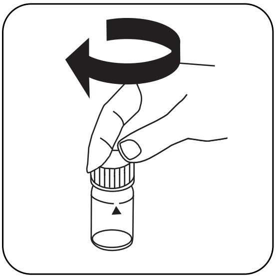
Encher a célula de 24 mm com **10 mL de amostra preparada**.



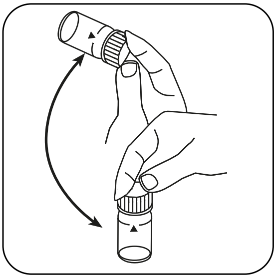
Manter os frascos conta gotas na vertical e pressionar lentamente para adicionar gotas de igual dimensão.



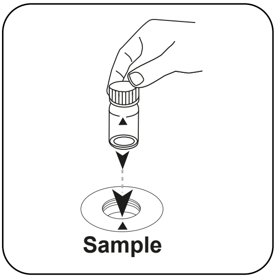
Adicionar **10 gotas Iron Reagent FE5**.



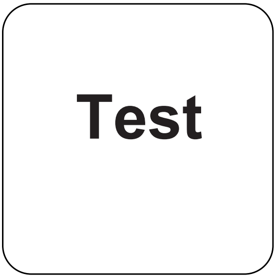
Fechar a(s) célula(s).



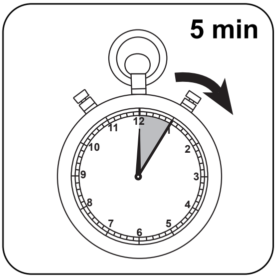
Misturar o conteúdo girando.



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



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



Aguardar **5 minuto(s) de tempo de reação**.

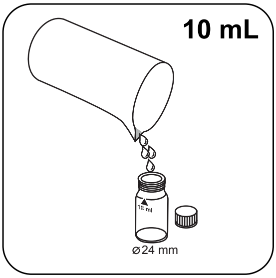
Decorrido o tempo de reação, a medição é efetuada automaticamente.

No visor aparece o resultado em mg/L Ferro total ou ao utilizar uma amostra filtrada em mg/l Ferro solúvel total.

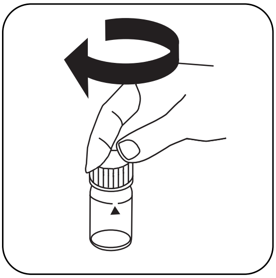
Realização da determinação Ferro LR (A) com reagente líquido

Escolher o método no equipamento.

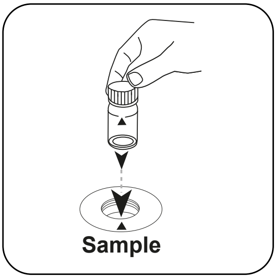
Para uma determinação do ferro total dissolvido, a amostra tem de ser filtrada antes da determinação (dimensão dos poros 0,45 µm). Caso contrário, as partículas de ferro e o ferro suspenso serão igualmente determinados.



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



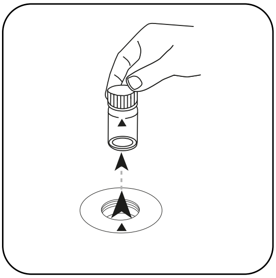
Fechar a(s) célula(s).



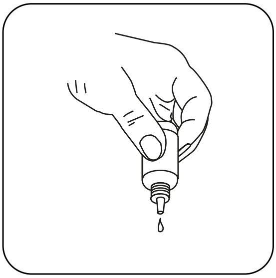
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Zero

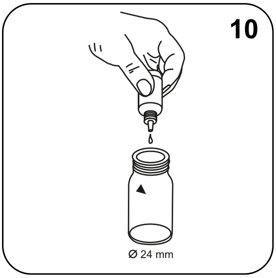
Premir a tecla **ZERO**.



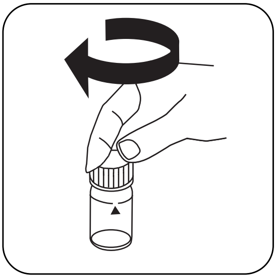
Retirar a célula do compartimento de medição.



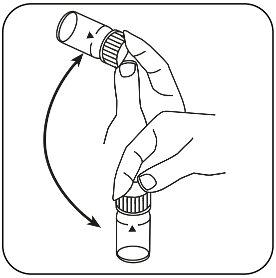
Manter os frascos conta gotas na vertical e pressionar lentamente para adicionar gotas de igual dimensão.



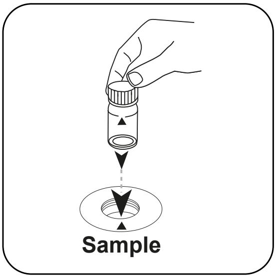
Adicionar **10 gotas Iron Reagent FE5**.



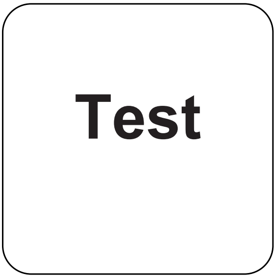
Fechar a(s) célula(s).



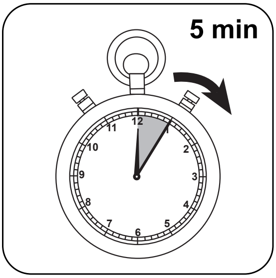
Misturar o conteúdo girando.



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)

Oxigénio dissolvido C M292

10 - 800 µg/L O_2 [c)] O2

Rhodazine D TM

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
Kit de Teste de Oxigénio Vacu-vial	1 Conjunto	380450

São necessários os seguintes acessórios.

Acessórios	Unidade de Embalagem	Código do Produto
Adaptador para cubetas redondas 13 mm	1 pc.	19802192
Adaptador (13 mm) MultiDirect para Vacu-vial	1 pc.	192075

Preparação

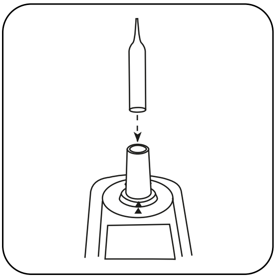
1. Antes de executar o teste, leia impreterivelmente as instruções de trabalho originais e as indicações de segurança anexadas ao conjunto de teste (MSDS estão disponíveis na página inicial www.chemetrics.com).

Notas

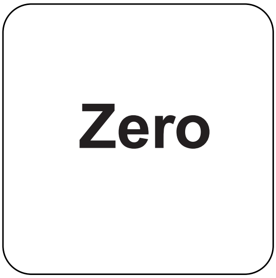
1. Neste método trata-se de um produto da CHEMetrics. A área de medição indicada neste fotómetro e o comprimento de onda utilizado pode, porém, desviar-se dos dados da CHEMetrics. 2. Guardar Vacu-Vials® no escuro à temperatura ambiente. 4. Vacu-Vials® é uma marca comercial protegida da empresa CHEMetrics, inc. / Calverton, E.U.A.

Realização da determinação Oxigénio, dissolvido com Vacu Vials® K-7553

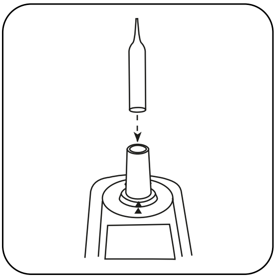
Escolher o método no equipamento.



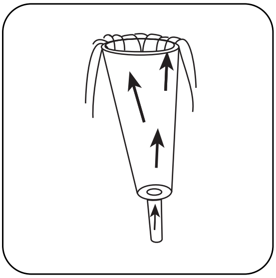
Colocar a **ampola zero** no compartimento de medição.



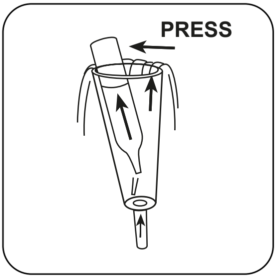
Premir a tecla **ZERO**.



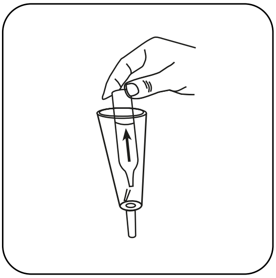
Retirar a ampola zero do compartimento de medição.



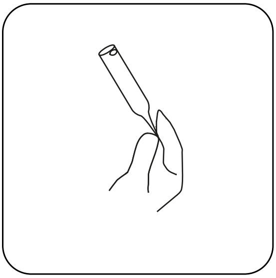
Passar por água de teste o recipiente de recolha de amostras durante vários minutos, de baixo para cima, de modo a remover as bolhas de ar.



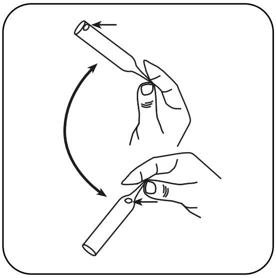
Posicionar uma ampola Vacu-vial® no recipiente de recolha da amostra. Partir a ponta da ampola pressionando ligeiramente contra a parede do recipiente. Aguardar o enchimento total da ampola.



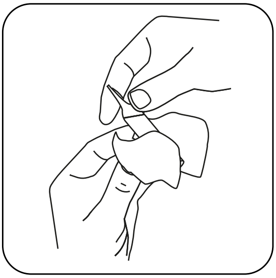
Rapidamente tirar a ampola cheia, com a ponta para baixo, para fora do recipiente de recolha da amostra.



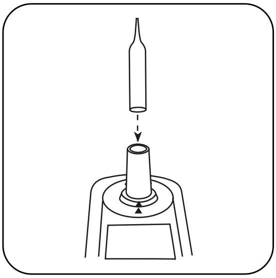
Fechar a abertura com um dedo para evitar o contacto com o ar.



Girar a ampola várias vezes.



Seque a ampola por fora.



Colocar a ampola no compartimento de medição.

Test

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

No visor aparece o resultado em mg/L Oxigénio.

Método Químico

Rhodazine D TM

Apêndice

Derivado de

ASTM D 5543-15

[c]MultiDirect: Adaptador para Vacu-vials® requerido (Pedido nº 19 20 75)

Fosfato HR L M335

5 - 80 mg/L PO_4 PO4

Vanadomolibdato

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
KS278-Ácido sulfúrico 50 % Ácido sulfúrico	65 mL	56L027865
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
Phosphate HR, Ortho Reagent Set	1 pc.	56R019090

São necessários os seguintes acessórios.

Acessórios	Unidade de Embalagem	Código do Produto
Vareta de agitação e colher de pó	1 pc.	56A006601

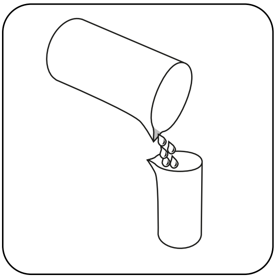
Preparação

1. As amostras muito tamponadas ou as amostras com valores pH extremos deviam, antes da análise, ser ajustadas para um valor pH entre 6 e 7 (com 1 mol/l de ácido sulfúrico ou 1 mol/l soda cáustica).
2. A análise de polifosfatos e do fosfato total requer uma digestão prévia.

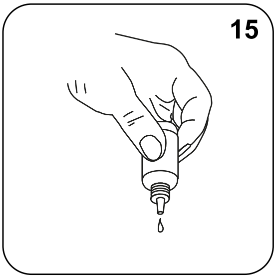
Notas

1. Os reagentes e os acessórios podem ser obtidos sob consulta.

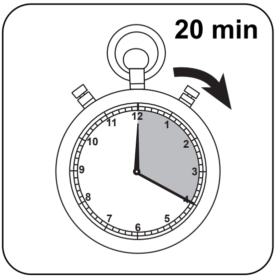
Digestão HR Polifosfato com reagentes líquidos



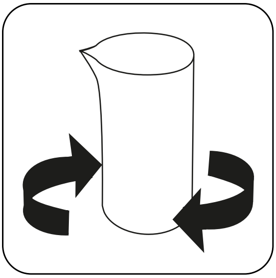
Encher um recipiente de digestão adequado com **50 mL de amostra homogeneizada** .



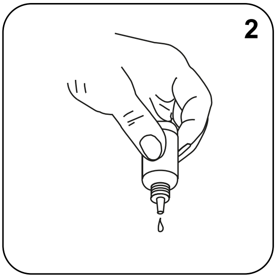
Adicionar **15 gotas KS278 (50% ácido sulfúrico)**.



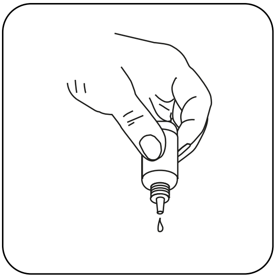
A amostra deve **cozer 20 minutos** . Deve ser mantido um volume de amostra de 25 mL; encher eventualmente com água desmineralizada.



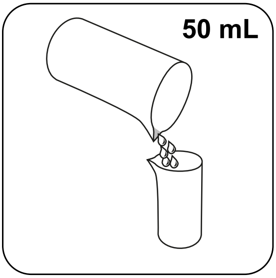
Girar o recipiente de digestão e deixar arrefecer até à temperatura ambiente.



Adicionar **2 gotas Acidity / Alkalinity P Indicator PA1**.

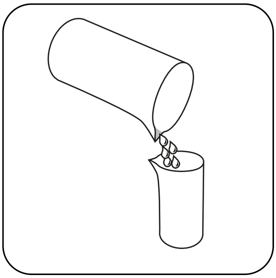


Adicionar **Hardness Calcium Buffer CH2** gota a gota da mesma amostra até aparecer uma coloração ligeiramente rosa a avermelhada. **(Atenção: assim que adicionar cada gota, agite a amostra!)**

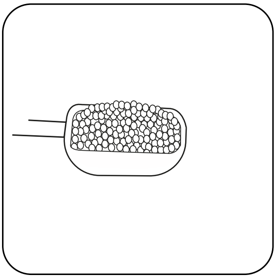


Encher a amostra com **água desmineralizada até 50 mL** .

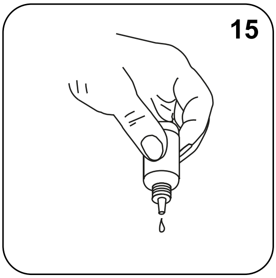
Digestão HR Fosfato total com reagentes líquidos



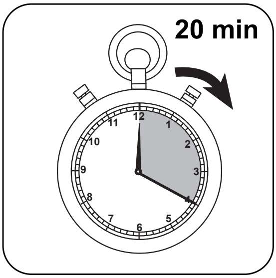
Encher um recipiente de digestão adequado com **50 mL de amostra homogeneizada** .



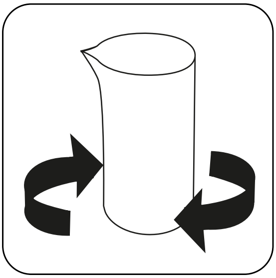
Adicionar **uma colher medida KP962 (Ammonium Persulfate Powder)** .



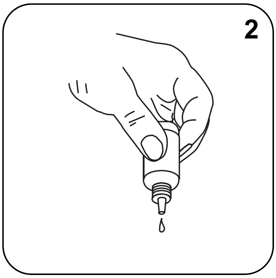
Adicionar **15 gotas KS278 (50% sulfuric acid)**.



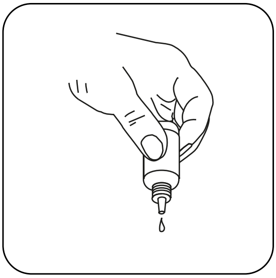
A amostra deve **cozer 20 minutos** . Deve ser mantido um volume de amostra de 25 mL; encher eventualmente com água desmineralizada.



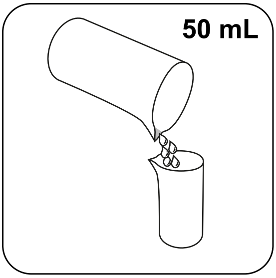
Girar o recipiente de digestão e deixar arrefecer até à temperatura ambiente.



Adicionar **2 gotas Acidity / Alkalinity P Indicator PA1**.



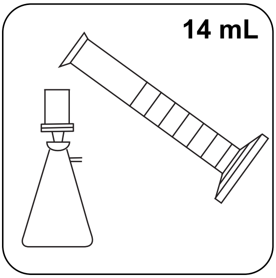
Adicionar **Hardness Calcium Buffer CH2** gota a gota da mesma amostra até aparecer uma coloração ligeiramente rosa a avermelhada. **(Atenção: assim que adicionar cada gota, agite a amostra!)**



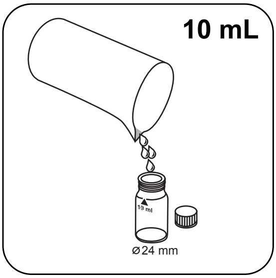
Encher a amostra com **água desmineralizada até 50 mL** .

Realização da determinação Fosfato HR com reagente líquido

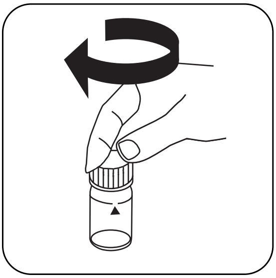
Escolher o método no equipamento.



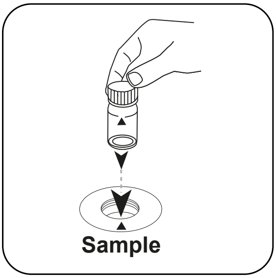
Filtrar cerca de 14 mL de amostra com um filtro pré-enxaguado (dimensão dos poros 0,45 µm).



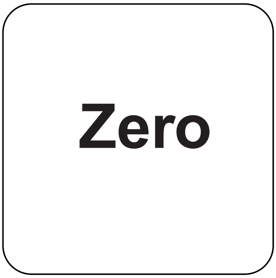
Encher a célula de 24 mm com **10 mL de amostra preparada**.



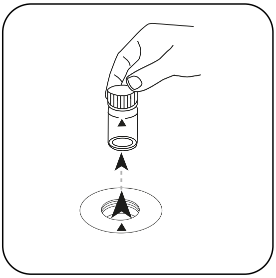
Fechar a(s) célula(s).



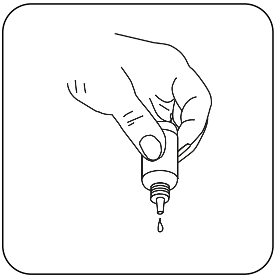
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



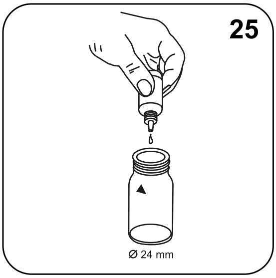
Premir a tecla **ZERO**.



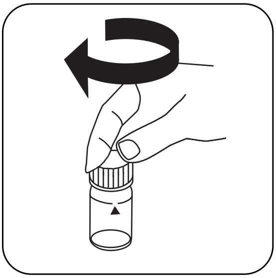
Retirar a célula do compartimento de medição.



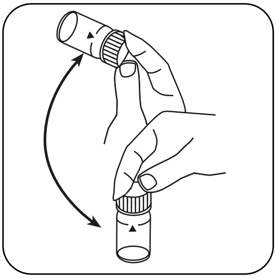
Manter os frascos conta gotas na vertical e pressionar lentamente para adicionar gotas de igual dimensão.



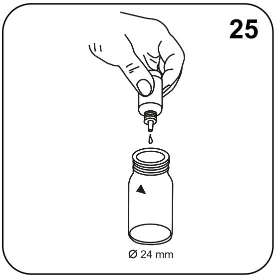
Adicionar **25 gotas KS228 (Ammonium Molybdate)**.



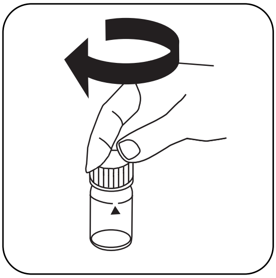
Fechar a(s) célula(s).



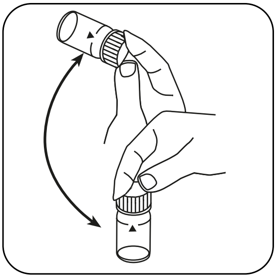
Misturar o conteúdo girando.



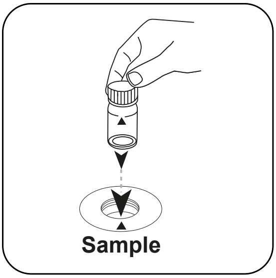
Adicionar **25 gotas KS229 (Ammonium Metavanadate)**.



Fechar a(s) célula(s).



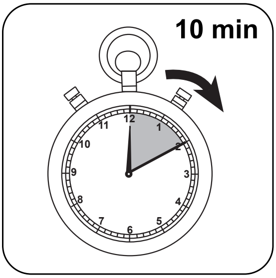
Misturar o conteúdo girando.



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 Fosfato.

Realização da determinação Polifosfato com reagentes líquidos

Escolher o método no equipamento.

Para a determinação de **HR Polifosfato com reagentes líquidos** deve realizar a **digestão** descrita.

Este teste deteta o teor de fosfato total inorgânico.O teor de polifosfatos resulta da diferença entre fosfato orgânico e orto-fosfato.

A determinação de LR Fosfato Total com reagentes líquidos é efetuada de igual modo à determinação sob Método 335, Fosfato HR com regentes líquidos.

No visor aparece o resultado em mg/L Fosfato total inorgânico (orto-fosfato e polifosfato).

Realização da determinação Fosfato total com reagentes líquidos

Escolher o método no equipamento.

Para a determinação de **HR Fosfato total com reagentes líquidos** deve realizar a **digestão** descrita.

Este teste determina todos os compostos existentes na amostra, inclusive orto-fosfato, polifosfato e compostos de fosfatos orgânicos.

A determinação de HR Fosfato total com reagentes líquidos é efetuada de igual modo à determinação sob Método 335, Fosfato HR com regentes líquidos.

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

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	P	1
mg/l	PO_4^{3-}	3.066177
mg/l	P_2O_5	2.29137

Método Químico

Vanadomolibdato

Apêndice

Texto de Interferências

Interferências Pesistentes

- Grandes quantidades de substâncias não dissolvidas podem causar resultados de medição não reproduzíveis.

Interferências	a partir de / [mg/L]
Al	200
AsO_4^{3-}	em todas as quantidades
Cr	100
Cu	10
Fe	100
Ni	300
SiO_2	50
$Si(OH)_4$	10
S^{2-}	em todas as quantidades
Zn	80

De acordo com

Standard Method 4500-P C

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

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.

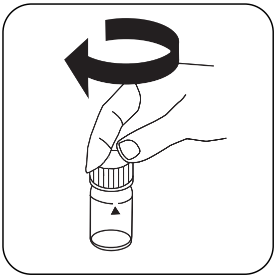
Notas

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.

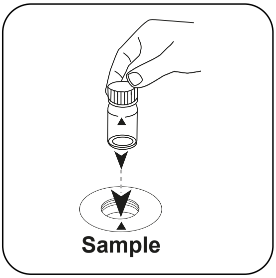
Realização da determinação Poliacrilatos com reagente líquido

Escolher o método no equipamento.

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

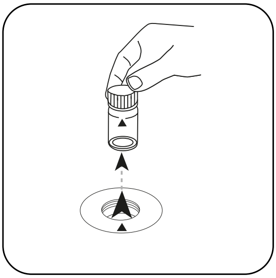


Fechar a(s) célula(s).

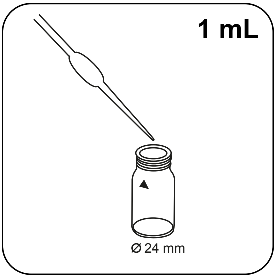


Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

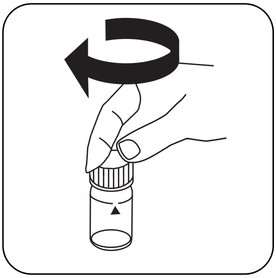
Premir a tecla **ZERO**.



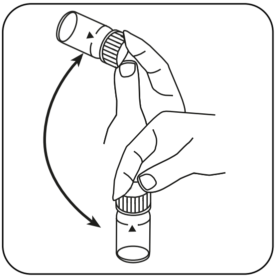
Retirar a célula do compartimento de medição.



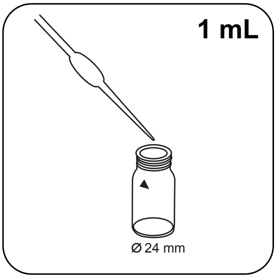
Adicionar **1 mL (25 drops) Polyacrylate Buffer A1 de solução** à célula de amostra.



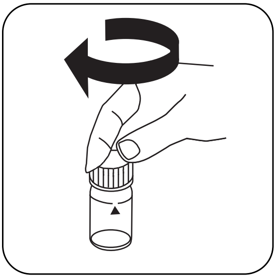
Fechar a(s) célula(s).



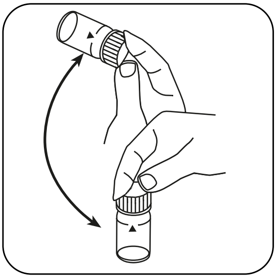
Misturar o conteúdo girando.



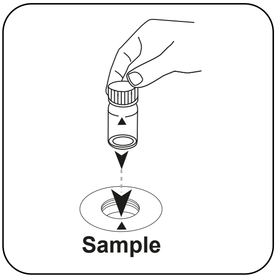
Adicionar **1 mL (25 drops) Polyacrylate Precipitant A2 de solução** à célula de amostra.



Fechar a(s) célula(s).



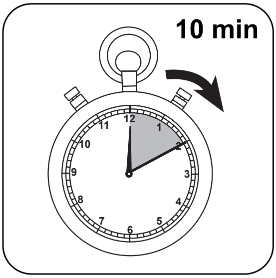
Misturar o conteúdo girando.



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

Silicato HR PP M352

1 - 90 mg/L SiO_2 SiHr

Silicomolybdate

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
VARIO Sílica HR Reagente, Conjunto F10	1 Conjunto	535700

Preparação

1. A temperatura da amostra deve situar-se entre 15 °C e 25 °C.

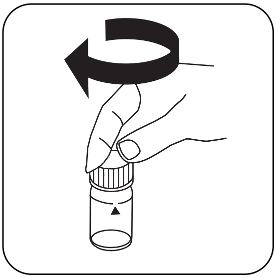
Notas

1. O método mede no flanco da curva de absorção da coloração resultante. Para fotómetros de filtro, a precisão do método pode, portanto, ser melhorada, se necessário, pelo ajuste do utilizador com um padrão de silicato (aprox. 70 mg/L SiO_2).

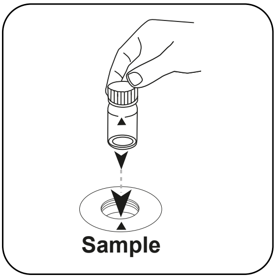
Realização da determinação Dióxido de silício HR com pacote de pó Vario

Escolher o método no equipamento.

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



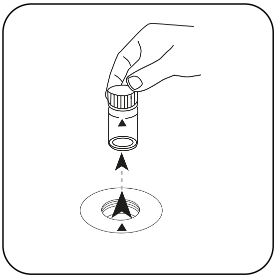
Fechar a(s) célula(s).



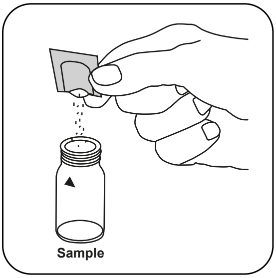
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

Zero

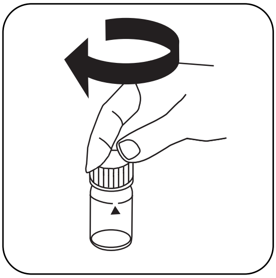
Premir a tecla **ZERO**.



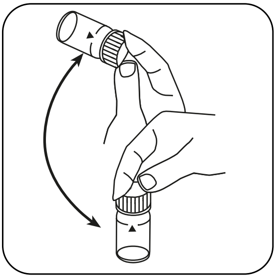
Retirar a célula do compartimento de medição.



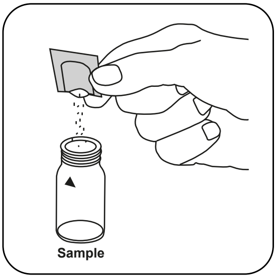
Adicionar um **pacote de pó Vario Silica HR Molybdate F10** .



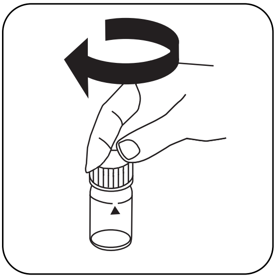
Fechar a(s) célula(s).



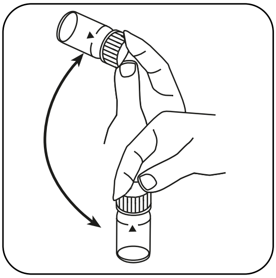
Dissolver o pó girando.



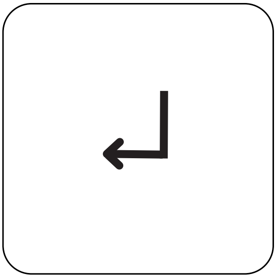
Adicionar um **pacote de pó Vario Silica HR Acid Rgt. F10** .



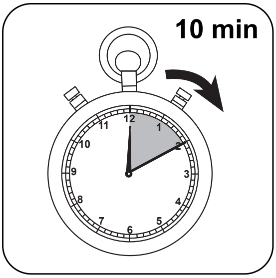
Fechar a(s) célula(s).



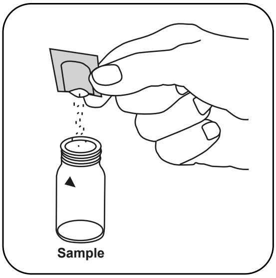
Misturar o conteúdo girando.



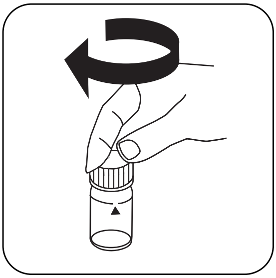
Premir a tecla **ENTER**.



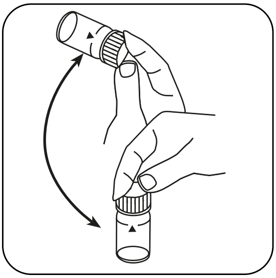
Aguardar **10 minuto(s) de tempo de reação**.



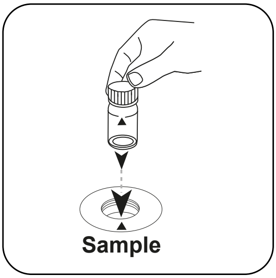
Adicionar um **pacote de pó Vario Silica Citric Acid F10** .



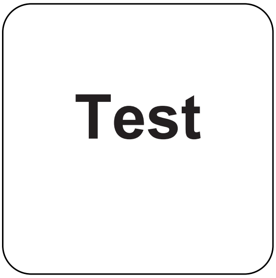
Fechar a(s) célula(s).



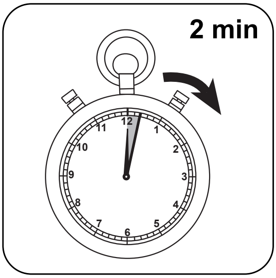
Dissolver o pó girando.



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 Silicato.

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	SiO_2	1
mg/l	Si	0.47

Método Químico

Silicomolybdate

Apêndice

Texto de Interferências

Interferências Removíveis

- As amostras de água podem conter formas de ácido silícico que reagem muito lentamente com molibdénio. O tipo exato destas formas não é conhecido hoje em dia. Através de um pré-tratamento com hidrogenocarbonato de sódio e depois com ácido sulfúrico, estas podem ser convertidas em formas com capacidade de resposta (descrição em "Standard Methods for the Examination of Water and Wastewater" em "Silica-Digenstion with Sodium Bicarbonate").
- Na presença de dióxido de silício ou de fosfato, forma-se uma cor amarela.
  A adição do pacote de pó Silica Citric Acid F10 permite eliminar a cor amarela que se formou com o fosfato.

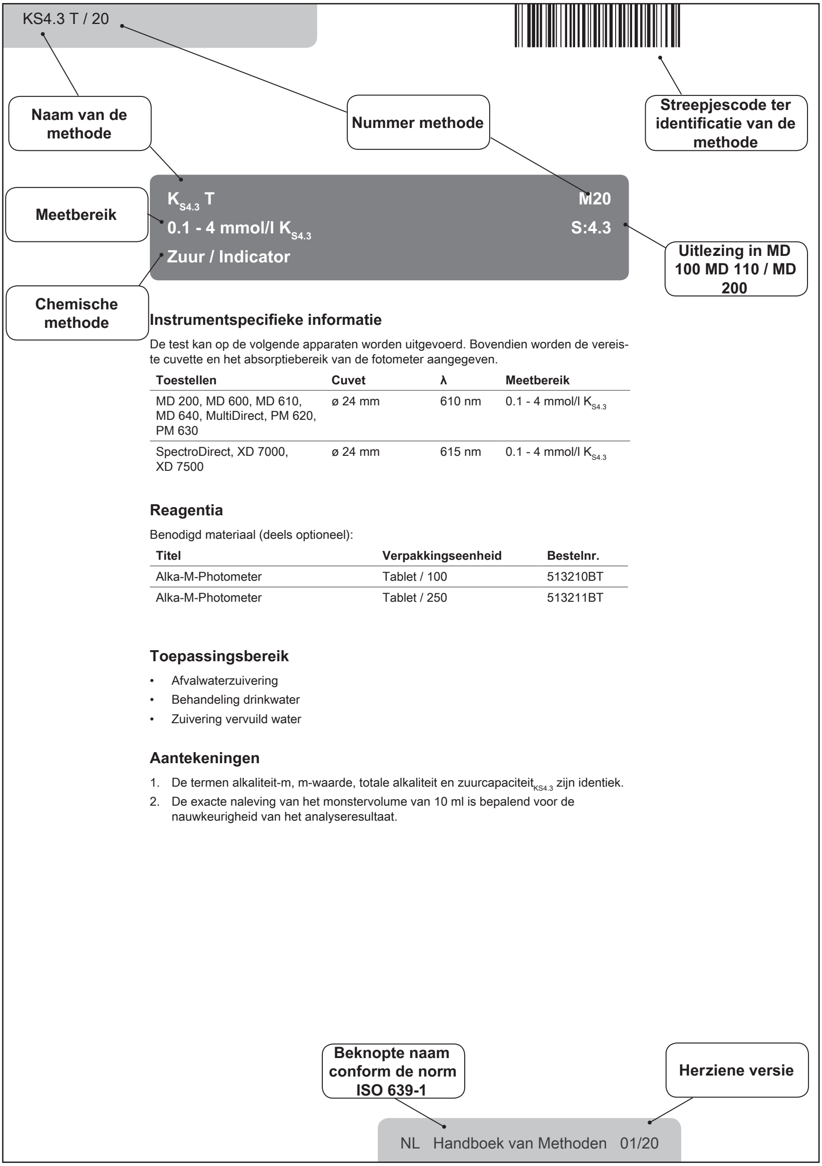
Interferências	a partir de / [mg/L]	Influência
Fe	grandes quantidades	
PO_4^{3-}	50	
PO_4^{3-}	60	A perturbação é de cerca de -2 %
PO_4^{3-}	75	A perturbação é de cerca de -11 %
S^{2-}	em todas as quantidades	

Validação de método

Limite de Detecção	0.38 mg/L
Limite de Determinação	1.14 mg/L
Fim da Faixa de Medição	100 mg/L
Sensibilidade	120 mg/L / Abs
Faixa de Confiança	1.69 mg/L
Desvio Padrão	0.70 mg/L
Coeficiente de Variação	1.38 %

Derivado de

Standard Method 4500-SiO2 C



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

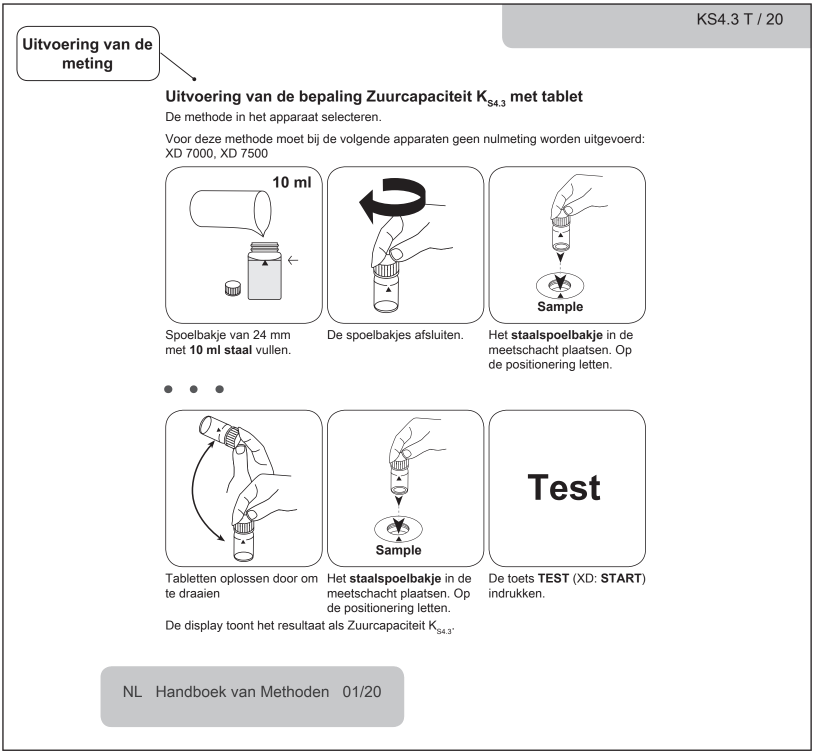
Toepassingsbereik

- 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



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 $K_{S4.3}$.

Aluminium PP M50

0.01 - 0.25 mg/L Al AL

Eriochromocyanine R

Reagentia

Benodigd materiaal (deels optioneel):

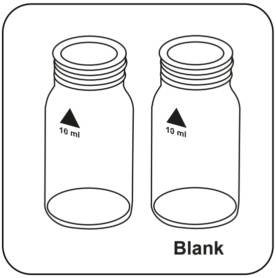
Reagentia	Verpakkingseenheid	Bestelnr.
VARIO aluminium set 20 ml	1 St.	535000

Voorbereiding

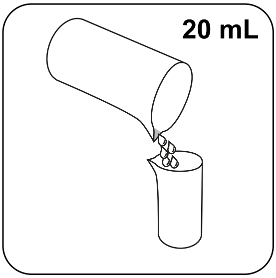
1. Om nauwkeurige analyseresultaten te bekomen, moet een monstertemperatuur van 20 tot 25 °C worden aangehouden.
2. Om fouten als gevolg van onzuiverheden te voorkomen, spoelt u het spoelbakje en toebehoren voor de analyse met zoutzuuroplossing (ca. 20 %) en vervolgens met gedeïoniseerd water.

Uitvoering van de bepaling Aluminium met Vario-poederpakje

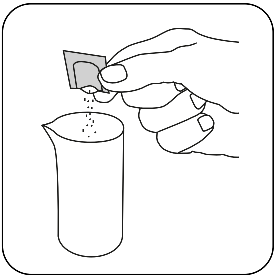
De methode in het apparaat selecteren.



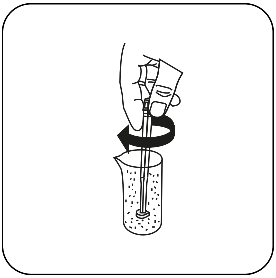
Twee propere spoelbakjes van 24 mm klaarzetten. Een als nulspoelbakje kenmerken.



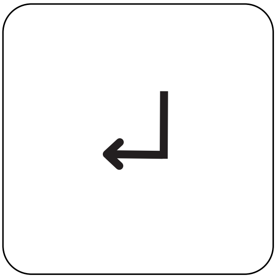
20 mL staal in een maatbeker van 100 mL doen.



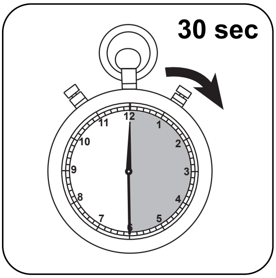
Een **Vario ALUMINIUM ECR F20 poederpakje** toevoegen.



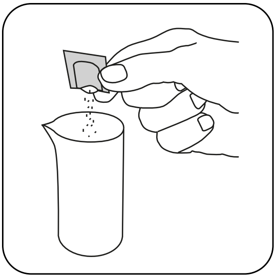
Poeder oplossen door te roeren.



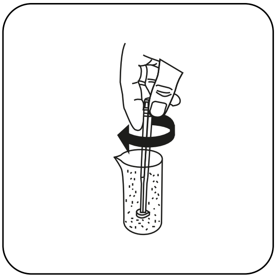
De toets **ENTER** indrukken.



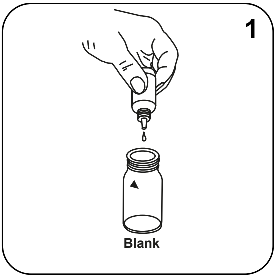
De reactietijd van 30 seconden afwachten.



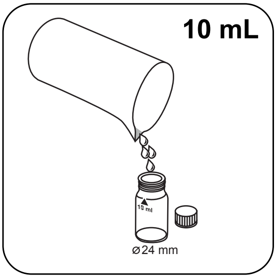
Een **Vario HEXAMINE F20 poederpakje** toevoegen.



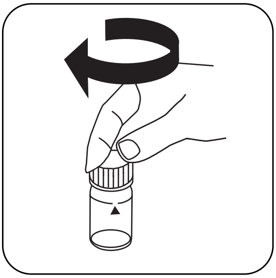
Poeder oplossen door te roeren.



1 druppels Vario ALUMINIUM ECR Masking Reagent in het nulspoelbakje doen.



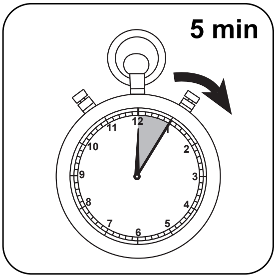
In elk spoelbakje **10 mL voorbehandeld staal** doen.



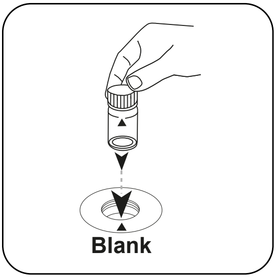
De spoelbakjes afsluiten.

↵

De toets **ENTER** indrukken.



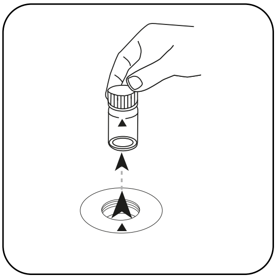
De reactietijd van 5 minuten afwachten.



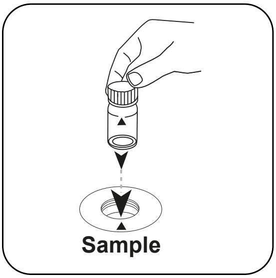
Het **nulspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

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

Chloride L (B) M92

0.5 - 20 mg/L Cl^- CL-

Kwikthiocyanaat / ijzernitraat

Reagentia

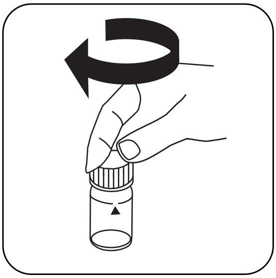
Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
Chloride Reagent Set	1 St.	56R018490

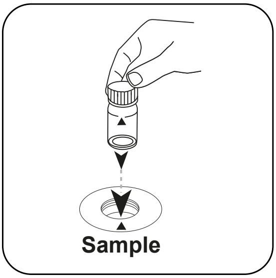
Uitvoering van de bepaling Chloride met vloeibaar reagens

De methode in het apparaat selecteren.

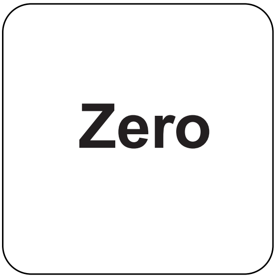
Spoelbakje van 24 mm met **10 mL staal** vullen.



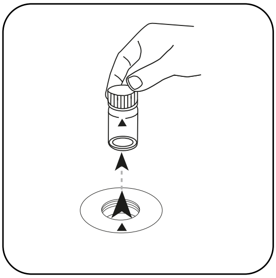
De spoelbakjes afsluiten.



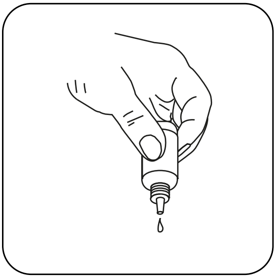
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



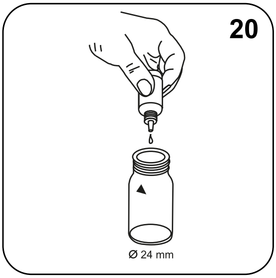
De toets **NUL** indrukken.



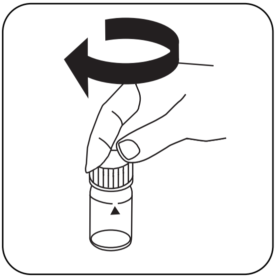
Het spoelbakje uit de meetschacht nemen.



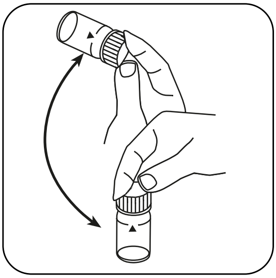
De druppelflessen verticaal houden en even grote druppels toevoegen door langzaam te drukken.



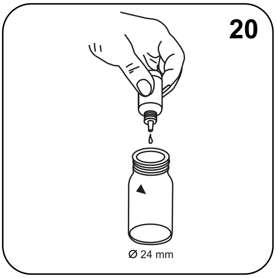
20 druppels KS251 (Chloride reagens A) toevoegen.



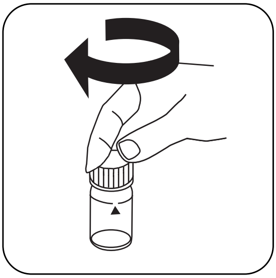
De spoelbakjes afsluiten.



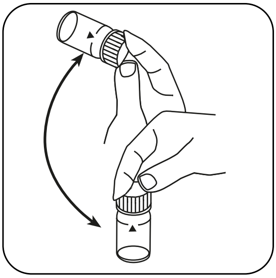
De inhoud mengen door om te draaien.



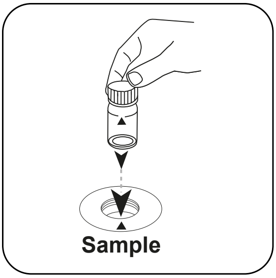
20 druppels KS253 (Chloride reagens B) toevoegen.



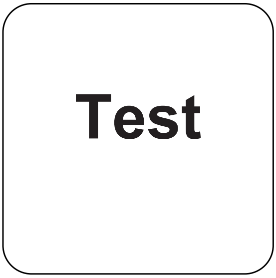
De spoelbakjes afsluiten.



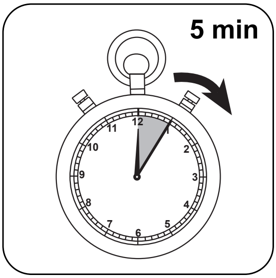
De inhoud mengen door om te draaien.



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 Chloride.

Evaluatie

De volgende tabel geeft aan dat de uitvoerwaarden kunnen worden geconverteerd naar andere citatievormen.

Eenheid	Dagvaardingsformulier	Omrekeningsfactor
mg/l	Cl^-	1
mg/l	NaCl	1.65

Chemische methode

Kwikthiocyanaat / ijzernitraat

Aanhangsel

Verstoringen

Permanente verstoringen

1. Verminderende stoffen zoals sulfiet en thiosulfaat die ijzer (III) tot ijzer (II) of kwikzilver (II) tot kwikzilver (I) kunnen verminderen, kunnen storen. Cyanide, jodium en broom hebben een positieve invloed.

Afgeleid van

DIN 15682-D31
DIN ISO 15923-1 D49.

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

Voorbereiding

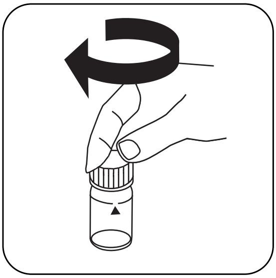
1. Sterk alkalisch of zuur water moet vóór de analyse op een pH-waarde van 4 tot 6 worden ingesteld.

Uitvoering van de bepaling Koper, vrij met tablet

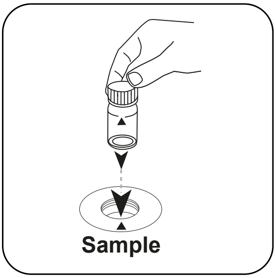
De methode in het apparaat selecteren.

Selecteer bovendien de bepaling: vrij

Spoelbakje van 24 mm met **10 mL staal** vullen.



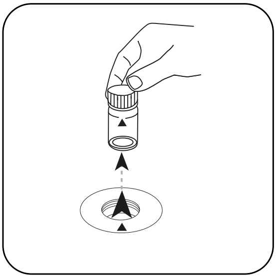
De spoelbakjes afsluiten.



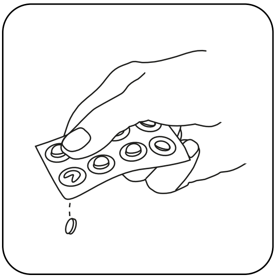
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Zero

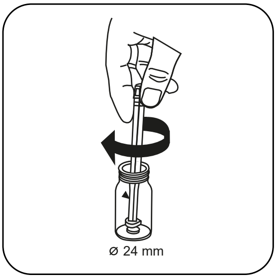
De toets **NUL** indrukken.



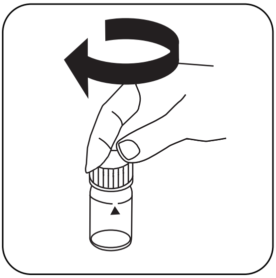
Het spoelbakje uit de meetschacht nemen.



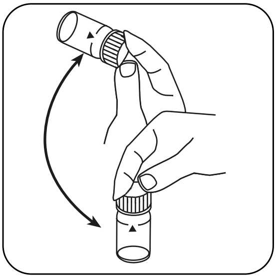
Een COPPER Nr. 1 tablet toevoegen.



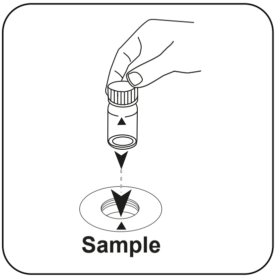
De tabletten onder lichte rotatie verpletteren.



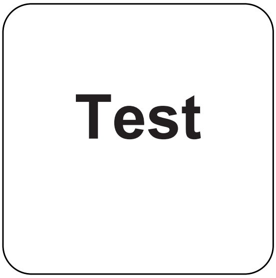
De spoelbakjes afsluiten.



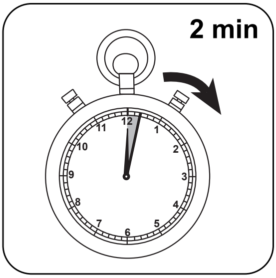
Tabletten oplossen door om te draaien



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.

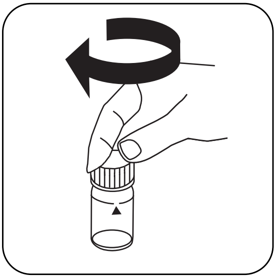
De display toont het resultaat in mg/L vrij koper.

Uitvoering van de bepaling Koper, totaal met tablet

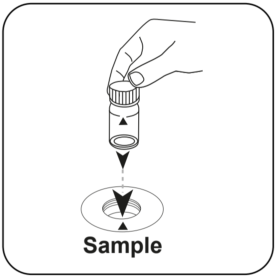
De methode in het apparaat selecteren.

Selecteer bovendien de bepaling: totaal

Spoelbakje van 24 mm met **10 mL staal** vullen.



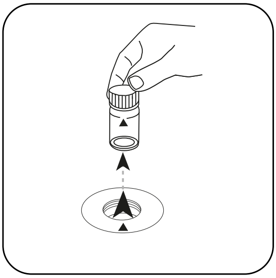
De spoelbakjes afsluiten.



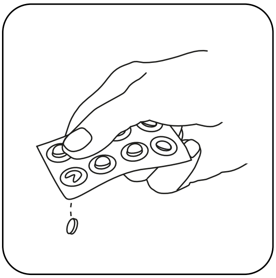
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Zero

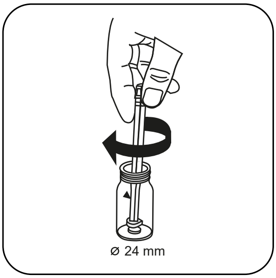
De toets **NUL** indrukken.



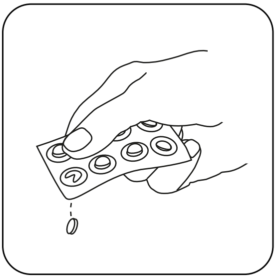
Het spoelbakje uit de meetschacht nemen.



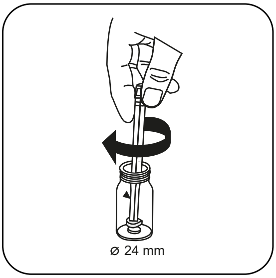
Een COPPER Nr. 1 tablet toevoegen.



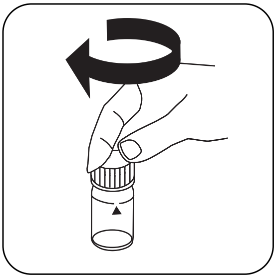
De tabletten onder lichte rotatie verpletteren en oplossen.



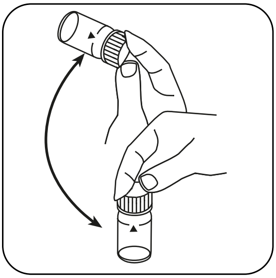
Een COPPER Nr. 2 tablet toevoegen.



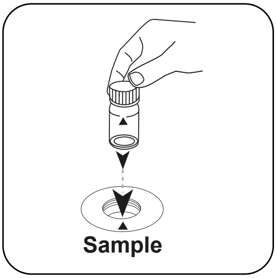
De tabletten onder lichte rotatie verpletteren.



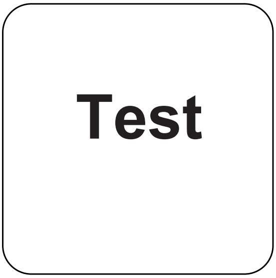
De spoelbakjes afsluiten.



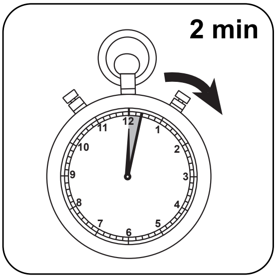
Tabletten oplossen door om te draaien



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



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

DEHA PP M167

0.02 - 0.5 mg/L DEHA DEHA

PPST

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
VARIO DEHA reagens set	1 St.	536000

Voorbereiding

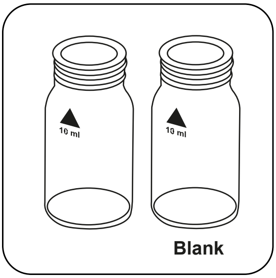
1. Om fouten als gevolg van ijzerafzettingen te voorkomen, spoelt u het glaswerk voor de analyse met zoutzuuroplossing (ca. 20 %) en vervolgens met gedeïoniseerd water.

Aantekeningen

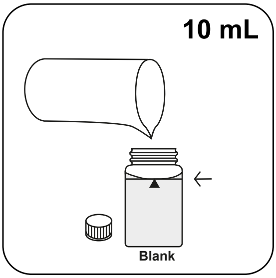
1. Aangezien de reactie temperatuurafhankelijk is, moet 20 °C ± 2 °C in acht worden genomen.
2. Plaats get monsterspoelbakje in de meetschacht of in het donker tijdens de kleurontwikkelingstijd. (Het blootstellen van de reagensoplossing aan uv-licht (zonlicht) zal resulteren in overmatige metingen.)

Uitvoering van de bepaling DEHA (N,N-diethylhydroxylamine) met Vario-poederpakjes en vloeibaar reagens

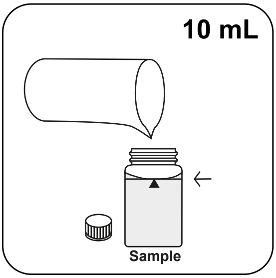
De methode in het apparaat selecteren.



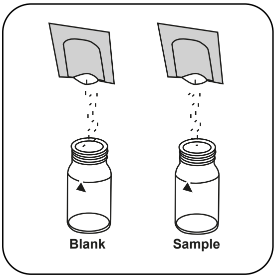
Twee propere spoelbakjes van 24 mm klaarzetten. Een als nulspoelbakje kenmerken.



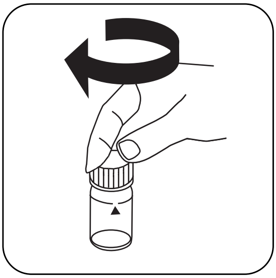
10 mL gedeïoniseerd water in het nulspoelbakje doen.



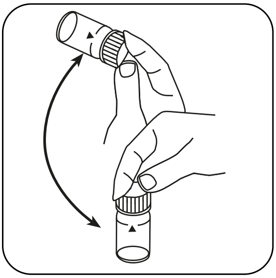
10 mL staal in het staalspoelbakje doen.



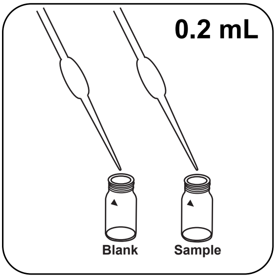
In elk spoelbakje **een Vario OXYSCAV 1 Rgt poederpakje** doen.



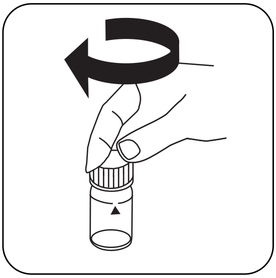
De spoelbakjes afsluiten.



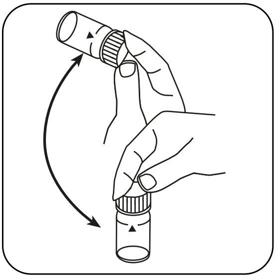
De inhoud mengen door om te draaien.



In elk spoelbakje **0.2 mL Vario DEHA 2 Rgt oplossing** doen.



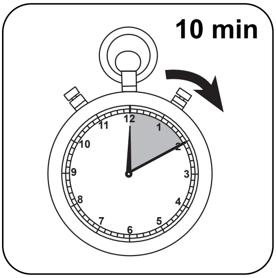
De spoelbakjes afsluiten.



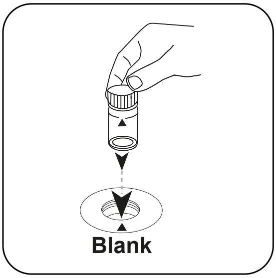
De inhoud mengen door om te draaien.

↵

De toets **ENTER** indrukken.



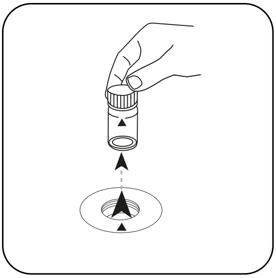
De reactietijd van 10 minuten afwachten.



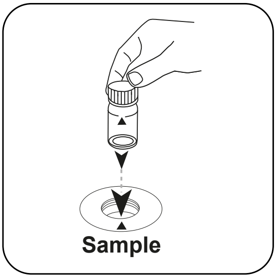
Het **nulspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

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 als DEHA.

Evaluatie

De volgende tabel geeft aan dat de uitvoerwaarden kunnen worden geconverteerd naar andere citatievormen.

Eenheid	Dagvaardingsformulier	Omrekeningsfactor
mg/l	DEHA	1
µg/l	DEHA	1000
mg/l	Hydrochinon	2.63
mg/l	MEKO	4.5
mg/l	Carbohydrazid	1.31
mg/l	ISA	3.9

Chemische methode

PPST

Aanhangsel

Verstoringen

Uit te sluiten verstoringen

1. Storingen:
   IJzer (II) stoort in alle hoeveelheden: Om de ijzerconcentratie (II) te bepalen, herhaalt u de test zonder de DEHA-oplossing toe te voegen. Als de concentratie hoger is dan 20 µg/L, wordt de weergegeven waarde afgetrokken van het resultaat van de DEHA-bepaling.
2. Stoffen die ijzer (III) reduceren, veroorzaken storing. Stoffen die sterk complex ijzer kunnen storen.

Verstoringen	verstoort vanaf
Zn	50
$Na_2B_4O_7$	500
Co	0,025
Cu	8
$CaCO_3$	1000
Lignosulfonate	0,05
Mn	0,8
Mo	80
Ni	0,8

Verstoringen	**verstoort vanaf**
PO_4^{3-}	10
$R\text{-}PO(OH)_2$	10
SO_4^{2-}	1000

Literatuurverwijzing

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989

Hydrazine P M205

0.05 - 0.5 mg/L N_2H_4 Hydr

Dimethylaminobenzaldehyde

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
Hydrazinetest poeder	Poeder / 30 g	462910

De volgende toebehoren zijn eveneens vereist.

Toebehoren	Verpakkingseenheid	Bestelnr.
Doseerlepel, 1 g	1 St.	384930

Voorbereiding

1. Als het watermonster troebel is, moet het worden gefilterd voordat de nulinstelling wordt uitgevoerd.
2. De bemonsteringstemperatuur mag niet hoger zijn dan 21 °C.

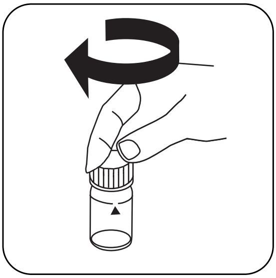
Aantekeningen

1. Bij gebruik van de hydrazinemeetlepel komt 1 g overeen met een niveau-meetlepel.
2. Voor de verwijdering van troebelheid veroorzaakt door reagentia, hebben kwalitatieve vouwfilters voor middelfijne neerslag hun waarde bewezen.
3. Om het reagens te controleren op mogelijke veroudering tijdens langdurige opslag, wordt de test uitgevoerd zoals beschreven met leidingwater. Als het resultaat hoger is dan de detectielimiet van 0,05 mg/L, mag het reagens alleen worden gebruikt met beperkingen (grotere meetafwijkingen).

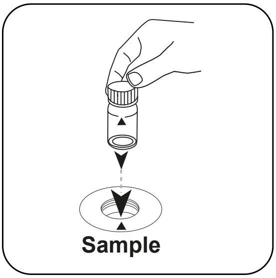
Uitvoering van de bepaling Hydrazine met poederreagens

De methode in het apparaat selecteren.

Spoelbakje van 24 mm met **10 mL staal** vullen.



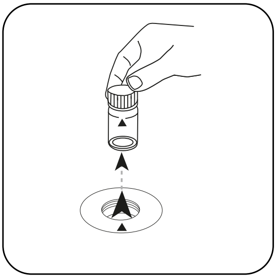
De spoelbakjes afsluiten.



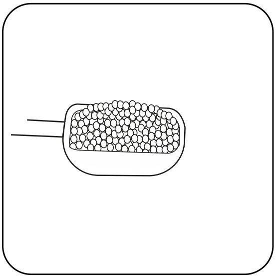
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Zero

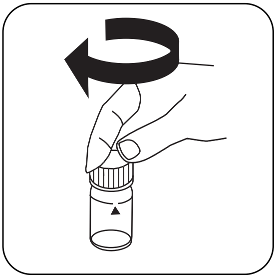
De toets **NUL** indrukken.



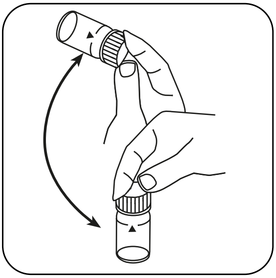
Het spoelbakje uit de meetschacht nemen.



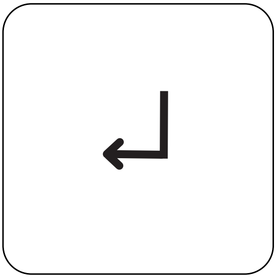
1 g HYDRAZINE-test poeder toevoegen.



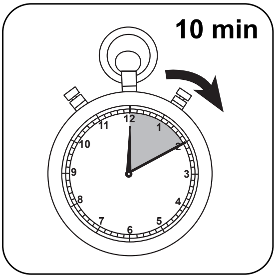
De spoelbakjes afsluiten.



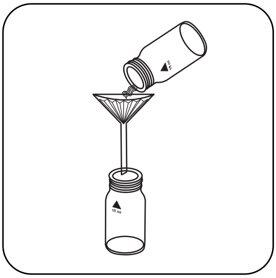
De inhoud mengen door om te draaien.



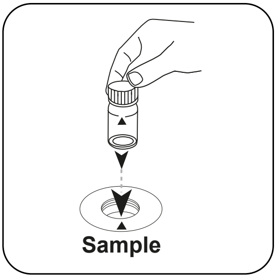
De toets **ENTER** indrukken.



De reactietijd van 10 minuten afwachten.



De ontstane lichte vertroebeling verwijderen door te filteren.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Test

De toets **TEST** (XD: **START**) indrukken.

De display toont het resultaat als Hydrazine.

Chemische methode

Dimethylaminobenzaldehyde

Aanhangsel

Verstoringen

Uit te sluiten verstoringen

1. Verwijder verstoringen veroorzaakt door sterk gekleurde of troebele monsters: 1 deel gedeïoniseerd water en 1 deel huishoudelijk bleekmiddel gemengd. Voeg 1 druppel van deze oplossing toe aan 25 ml monster en meng. Gebruik 10 ml van dit monster in plaats van gedeïoniseerd water voor het nulmonster. Opgelet: Het onbehandelde monster moet worden gebruikt om het watermonster te meten. Principe: het hydrazine wordt geoxideerd door het bleekmiddel en de kleurstoring wordt uitgeschakeld tijdens het nulpunt.

Verstoringen	verstoort vanaf
NH_4^+	10
C_4H_9NO	10
VO_4^{3-}	1

Afgeleid van

DIN 38413-P1

IJzer LR L (A) M225

0.03 - 2 mg/L Fe FE

Ferrozine / Thioglycolaat

Reagentia

Benodigd materiaal (deels optioneel):

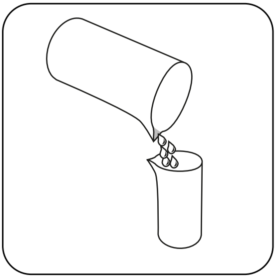
Reagentia	Verpakkingseenheid	Bestelnr.
Zuurgraad / Alkaliteit P-indicator PA1	65 mL	56L013565
Calciumhardheidsbuffer CH2	65 mL	56L014465
KP962-Ammonium persulfaat poeder	Poeder / 40 g	56P096240
KS63-FE6-Thioglycolaat/Molybdaat HR RGT	30 mL	56L006330
KS63-FE6-Thioglycolaat/Molybdaat HR RGT	65 mL	56L006365
KS61-FE5-Ferrozine/Thioglycolaat	65 mL	56L006165

Voorbereiding

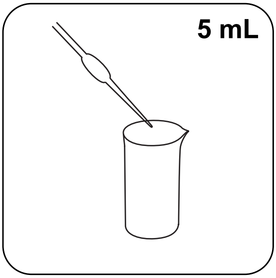
1. Als er sterke complexvormers in het monster aanwezig zijn, moet de reactietijd worden verlengd tot er geen verdere kleurontwikkeling zichtbaar is. Zeer sterke ijzercomplexen worden echter niet gedetecteerd tijdens de meting. In dit geval moeten de complexvormers door oxidatie met zuur/perssulfaat 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

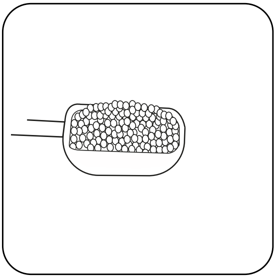
Totaal ijzer bestaat uit oplosbaar, complex en gesuspendeerd ijzer. Het staal mag voor de meting niet worden gefilterd. Om een homogenisering van het staal te garanderen, moeten neergeslagen deeltjes onmiddellijk voor de afname van het staal gelijkmatig worden verdeeld door krachtig te schudden. Voor 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.



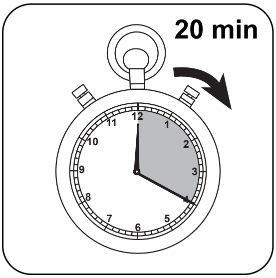
Een geschikte ontsluitingsbeker met **50 mL gehomogeniseerd staal** vullen.



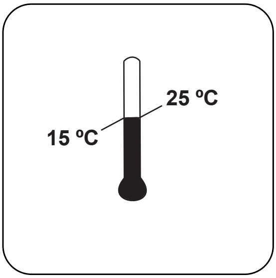
5 mL 1:1 zoutzuur toevoegen.



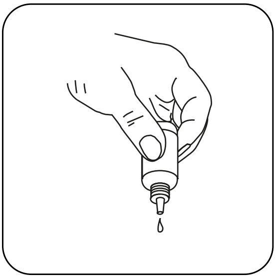
Een maatlepel KP 962 (Ammonium Persulfat Powder) toevoegen.



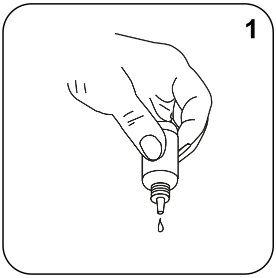
Het staal gedurende **20 minuten koken**. Er moet een staalvolume van 25 mL worden behouden, eventueel met gedeïoniseerd water vullen.



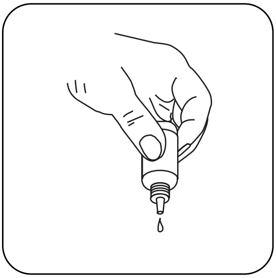
Het staal laten afkoelen tot **kamertemperatuur**.



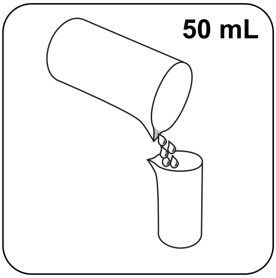
De druppelflessen verticaal houden en even grote druppels toevoegen door langzaam te drukken.



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!)**



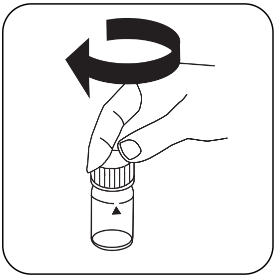
Het staal met **gedeïoniseerd water tot 50 mL** vullen.

Uitvoering van de bepaling IJzer, totaal LR (A) met vloeibaar reagens

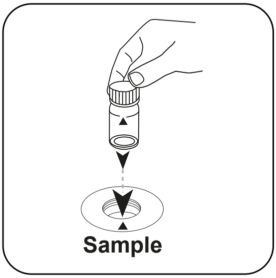
De methode in het apparaat selecteren.

Voor de bepaling van **IJzer, totaal LR** de beschreven **ontsluiting** uitvoeren.

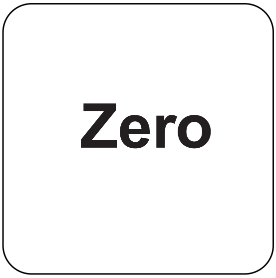
Spoelbakje van 24 mm met **10 mL gedeïoniseerd water** vullen.



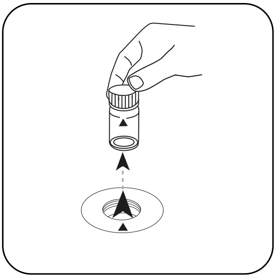
De spoelbakjes afsluiten.



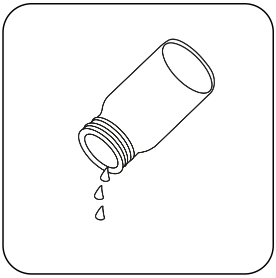
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



De toets **NUL** indrukken.

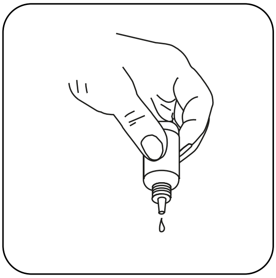


Het spoelbakje uit de meetschacht nemen.

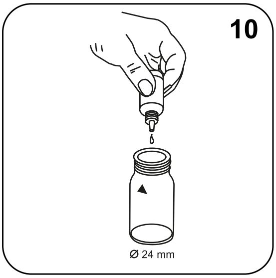


Het spoelbakje ledigen.

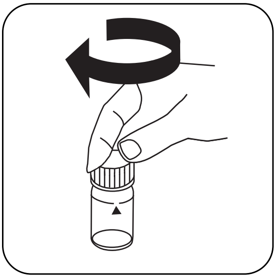
Spoelbakje van 24 mm met **10 mL voorbereid staal** vullen.



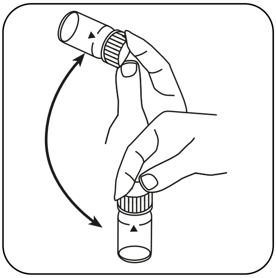
De druppelflessen verticaal houden en even grote druppels toevoegen door langzaam te drukken.



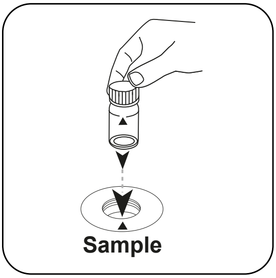
10 druppels KS61 (Ferrozine/ Thioglycolat) toevoegen.



De spoelbakjes afsluiten.



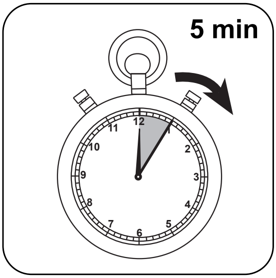
De inhoud mengen door om te draaien.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Test

De toets **TEST** (XD: **START**) indrukken.



De reactietijd van 5 minuten afwachten.

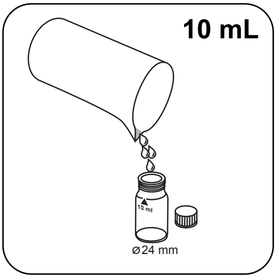
Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

De display toont het resultaat in mg/L Totaal ijzer of, bij gebruik van een gefilterd staal, in mg/l totaal oplosbaar ijzer.

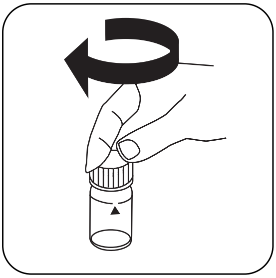
Uitvoering van de bepaling IJzer LR (A) met vloeibaar reagens

De methode in het apparaat selecteren.

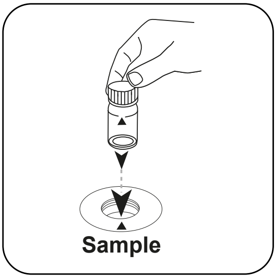
Voor een bepaling van het totaal opgeloste ijzer moet het staal voor de bepaling worden gefilterd (poriegrootte 0,45 µm). Anders worden ijzerdeeltjes en gesuspendeerd ijzer mee bepaald.



Spoelbakje van 24 mm met **10 mL voorbereid staal** vullen.



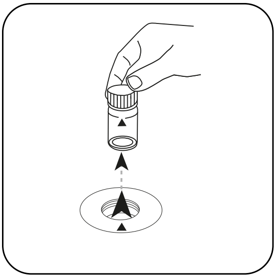
De spoelbakjes afsluiten.



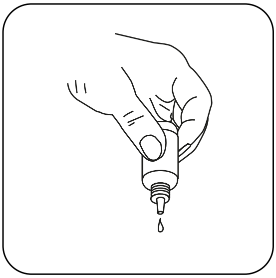
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Zero

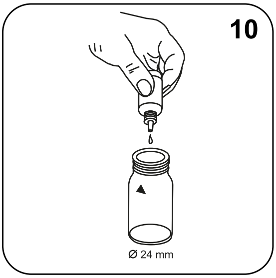
De toets **NUL** indrukken.



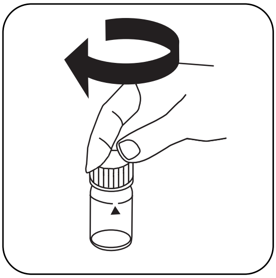
Het spoelbakje uit de meetschacht nemen.



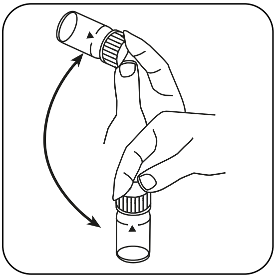
De druppelflessen verticaal houden en even grote druppels toevoegen door langzaam te drukken.



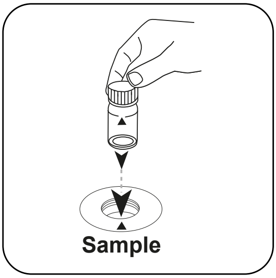
10 druppels KS61 (Ferrozine/ Thioglycolat) toevoegen.



De spoelbakjes afsluiten.



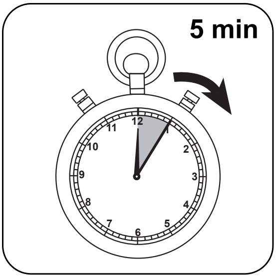
De inhoud mengen door om te draaien.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

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 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)

Opgeloste zuurstof C M292

10 - 800 µg/L O_2 c) O2

Rhodazine D TM

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
Vacu-vial zuurstof testkit	1 Zin	380450

De volgende toebehoren zijn eveneens vereist.

Toebehoren	Verpakkingseenheid	Bestelnr.
Adapter voor ronde cuvetten 13 mm	1 St.	19802192
Adapter voor Vacu-vial	1 St.	192075

Voorbereiding

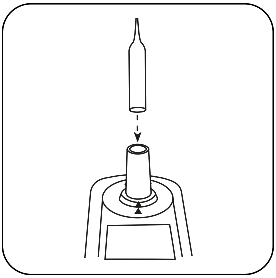
1. Lees voor het uitvoeren van de test eerst de originele gebruiksaanwijzing en de veiligheidsinstructies die bij de testkit zijn gevoegd (de MSDS-fiches zijn beschikbaar op de homepage www.chemetrics.com).

Aantekeningen

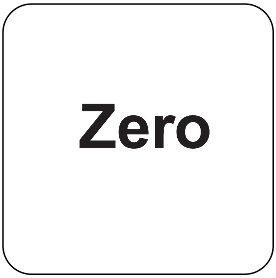
1. Deze methode is een product van CHEMetrics.. Het meetbereik en de golflengte die in deze fotometer worden gebruikt, kunnen echter afwijken van de CHEMetrics-specificaties.
2. Bewaar Vacu-Vials® in het donker bij kamertemperatuur.
3. Vacu-Vials® is een gedeponeerd handelsmerk van CHEMetrics, Inc. / Calverton, U.S.A.

Uitvoering van de bepaling Zuurstof, opgelost met Vacu Vials® K-7553

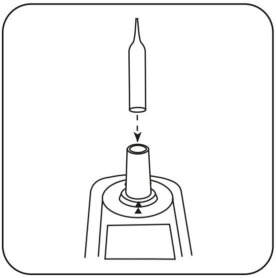
De methode in het apparaat selecteren.



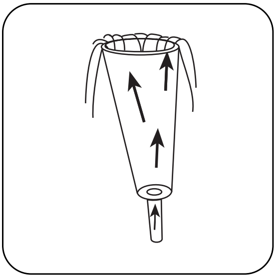
De **nulampul** in de meetschacht plaatsen.



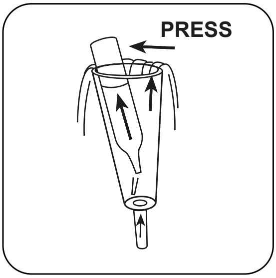
De toets **NUL** indrukken.



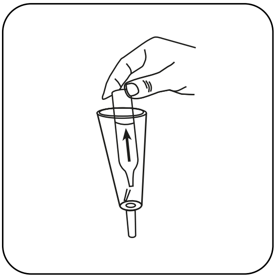
De nulampul uit de meetschacht nemen.



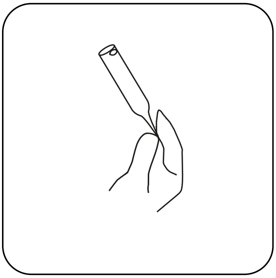
Gedurende enkele minuten testwater van onder naar boven door de staalafnamebeker laten stromen om luchtbellen te verwijderen.



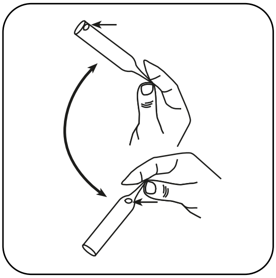
Een Vacu-vial®-ampul in de staalafnamebeker plaatsen. De punt van de ampul afbreken door die licht tegen de wand van de beker te drukken. De volledige vulling van de ampul afwachten.



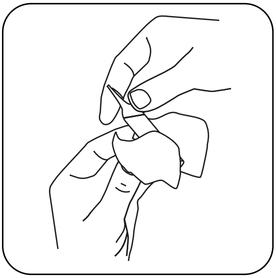
De volle ampul vervolgens vlot met de punt naar onderen uit de staalafnamebeker nemen.



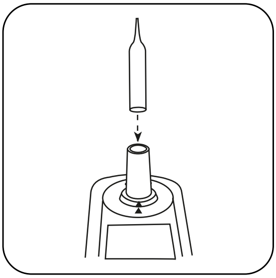
De opening met een vinger afsluiten om contact met de lucht te vermijden.



De ampul meerdere keren omdraaien.



De ampul van buitenaf drogen.



De ampul in de meetschacht plaatsen.

Test

De toets **TEST** (XD: **START**) indrukken.

De display toont het resultaat in mg/L Zuurstof.

Chemische methode

Rhodazine D TM

Aanhangsel

Afgeleid van

ASTM D 5543-15

[c] MultiDirect: Adapter voor Vacu-vials® vereist (bestelnr. 19 20 75)

Fosfaat HR L M335

5 - 80 mg/L PO_4 PO4

Vanadomolybdaat

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
KS278-Zwavelzuur 50 %	65 mL	56L027865
Zuurgraad / Alkaliteit P-indicator PA1	65 mL	56L013565
Calciumhardheidsbuffer CH2	65 mL	56L014465
KP962-Ammonium persulfaat poeder	Poeder / 40 g	56P096240
Phosphate HR, Ortho Reagent Set	1 St.	56R019090

De volgende toebehoren zijn eveneens vereist.

Toebehoren	Verpakkingseenheid	Bestelnr.
Roerstaaf en poederlepel	1 St.	56A006601

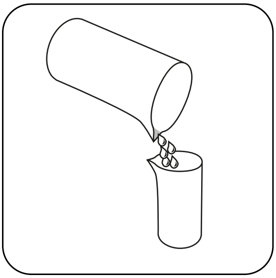
Voorbereiding

1. Sterk gebufferde monsters of monsters met extreme pH-waarden moeten vóór de analyse in een pH-bereik tussen 6 en 7 worden gebracht (met 1 mol/l-zoutzuur of 1 mol/l-zoutoplossing).
2. De analyse van polyfosfaten en totaal fosfaat vereist voorafgaande ontsluiting.

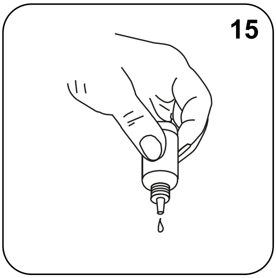
Aantekeningen

1. Reagentia en accessoires beschikbaar op aanvraag.

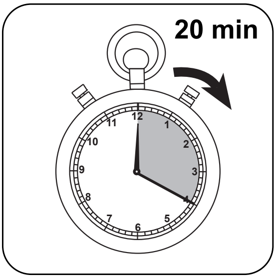
Ontsluiting Polyfosfaat HR met vloeibare reagentia



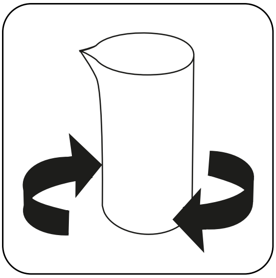
Een geschikte ontsluitingsbeker met **50 mL gehomogeniseerd staal** vullen.



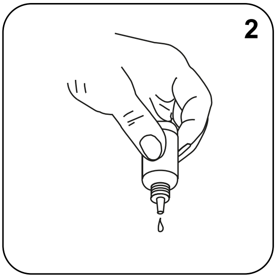
15 druppels KS278 (50 % zwavelzuur) toevoegen.



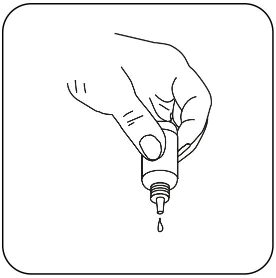
Het staal gedurende **20 minuten koken**. Er moet een staalvolume van 25 mL worden behouden, eventueel met gedeïoniseerd water vullen.



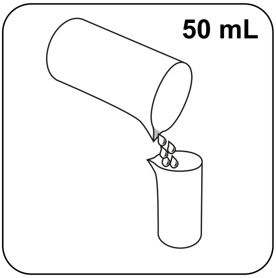
De ontsluitingsbeker omdraaien en laten afkoelen tot kamertemperatuur.



2 druppels KS135 (Phenolphthalein Substitute Indikator) toevoegen.

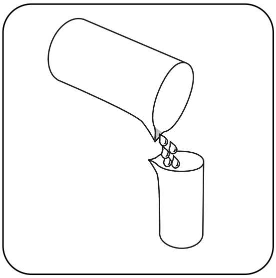


Hardness Calcium Buffer CH2 druppelgewijs aan hetzelfde staal toevoegen tot een licht roze tot rode kleur ontstaat. **(Opgelet: het staal na elke druppel draaien!)**

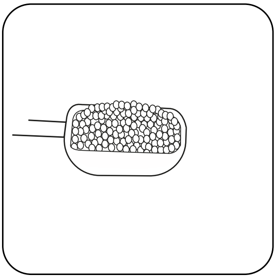


Het staal met **gedeïoniseerd water tot 50 mL** vullen.

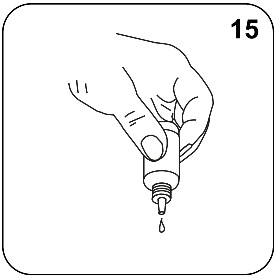
Ontsluiting Totaal fosfaat HR met vloeibare reagentia



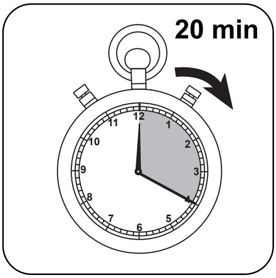
Een geschikte ontsluitingsbeker met **50 mL gehomogeniseerd staal** vullen.



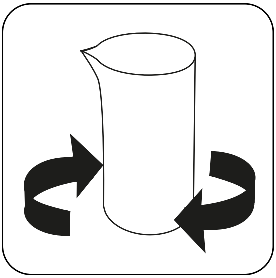
Een maatlepel KP962 (Ammonium Persulfate Powder) toevoegen.



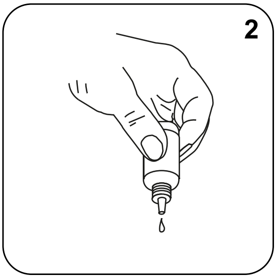
15 druppels KS278 (50 % zwavelzuur) toevoegen.



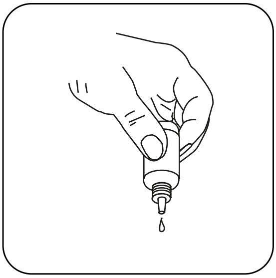
Het staal gedurende **20 minuten koken**. Er moet een staalvolume van 25 mL worden behouden, eventueel met gedeïoniseerd water vullen.



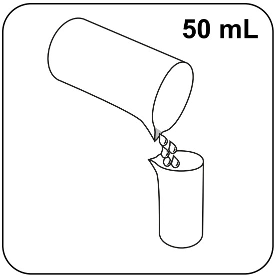
De ontsluitingsbeker omdraaien en laten afkoelen tot kamertemperatuur.



2 druppels KS135 (Phenolphthalein Substitute Indikator) toevoegen.



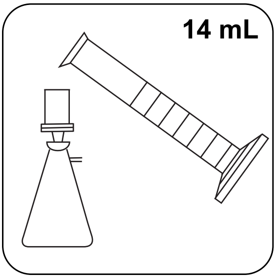
Hardness Calcium Buffer CH2 druppelgewijs aan hetzelfde staal toevoegen tot een licht roze tot rode kleur ontstaat. **(Opgelet: het staal na elke druppel draaien!)**



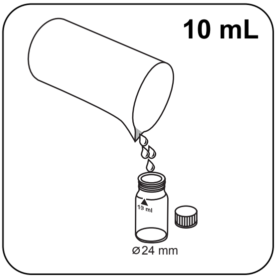
Het staal met **gedeïoniseerd water tot 50 mL** vullen.

Uitvoering van de bepaling Fosfaat HR met vloeibaar reagens

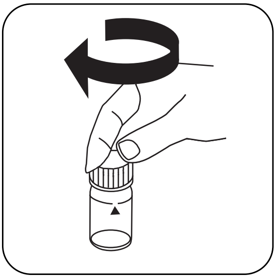
De methode in het apparaat selecteren.



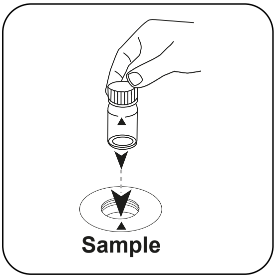
Ongeveer 14 mL staal met een voorgespoelde filter (poriegrootte 0,45 µm) filteren.



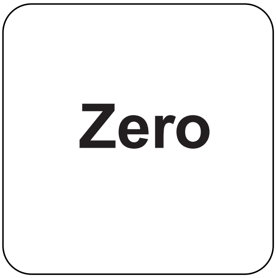
Spoelbakje van 24 mm met **10 mL voorbereid staal** vullen.



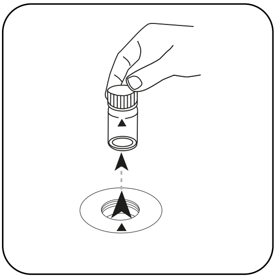
De spoelbakjes afsluiten.



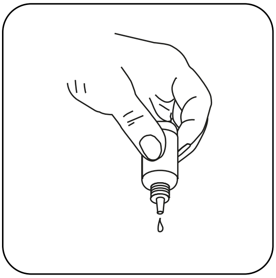
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



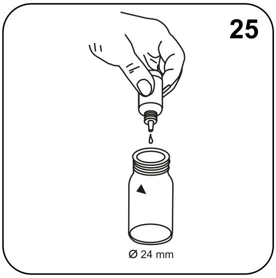
De toets **NUL** indrukken.



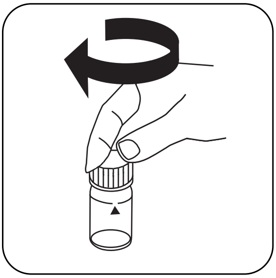
Het spoelbakje uit de meetschacht nemen.



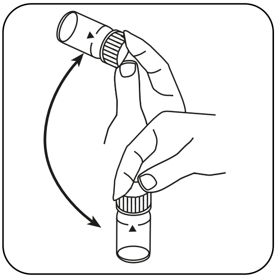
De druppelflessen verticaal houden en even grote druppels toevoegen door langzaam te drukken.



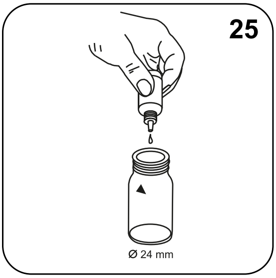
25 druppels KS228 (Ammonium Molybdate) toevoegen.



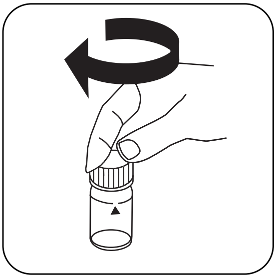
De spoelbakjes afsluiten.



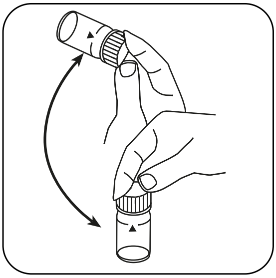
De inhoud mengen door om te draaien.



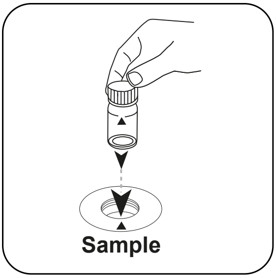
25 druppels KS229 (Ammonium Metavanadate) toevoegen.



De spoelbakjes afsluiten.



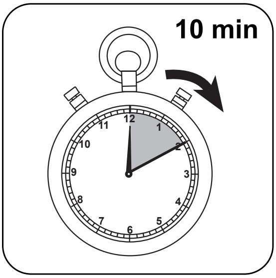
De inhoud mengen door om te draaien.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Test

De toets **TEST** (XD: **START**) indrukken.



De reactietijd van
10 minuten afwachten.

Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

De display toont het resultaat in mg/L Fosfaat.

Uitvoering van de bepaling Polyfosfaat met vloeibare reagentia

De methode in het apparaat selecteren.

Voor de bepaling van **Polyfosfaat HR met vloeibare reagentia** de beschreven **ontsluiting** uitvoeren.

Deze test bepaalt het gehalte anorganisch totaal fosfaat.Het polyfosfaatgehalte is het resultaat van het verschil tussen anorganisch en orthofosfaat.

De bepaling van Totaal fosfaat LR met vloeibare reagentia verloopt op dezelfde manier als de bepaling onder Methode 335, fosfaat HR met vloeibare reagentia.

De display toont het resultaat in mg/L anorganisch totaal fosfaat (orthofosfaat en polyfosfaat).

Uitvoering van de bepaling Totaal fosfaat met vloeibare reagentia

De methode in het apparaat selecteren.

Voor de bepaling van **Totaal fosfaat HR met vloeibare reagentia** de beschreven **ontsluiting** uitvoeren.

Deze test bepaalt alle in het staal aanwezige fosforverbindingen, inclusief orthofosfaat, polyfosfaat en organische fosforverbindingen.

De bepaling van Totaal fosfaat HR met vloeibaar reagens verloopt op dezelfde manier als de bepaling onder Methode 335, fosfaat HR met vloeibaar reagens.

De display toont het resultaat in mg/L Totaal fosfaat.

Evaluatie

De volgende tabel geeft aan dat de uitvoerwaarden kunnen worden geconverteerd naar andere citatievormen.

Eenheid	Dagvaardingsformulier	Omrekeningsfactor
mg/l	P	1
mg/l	PO_4^{3-}	3.066177
mg/l	P_2O_5	2.29137

Chemische methode

Vanadomolybdaat

Aanhangsel

Verstoringen

Permanente verstoringen

- Grote hoeveelheden onopgeloste stoffen kunnen niet-reproduceerbare meetresultaten veroorzaken.

Verstoringen	verstoort vanaf
Al	200
AsO_4^{3-}	in alle hoeveelheden
Cr	100
Cu	10
Fe	100
Ni	300
SiO_2	50
$Si(OH)_4$	10
S^{2-}	in alle hoeveelheden
Zn	80

Overeenkomstig

Standaardmethode 4500-P C

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

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.

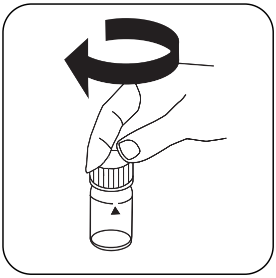
Aantekeningen

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.

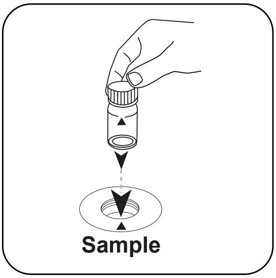
Uitvoering van de bepaling Polyacrylaat met vloeibaar reagens

De methode in het apparaat selecteren.

Spoelbakje van 24 mm met **10 mL staal** vullen.



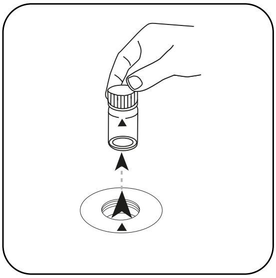
De spoelbakjes afsluiten.



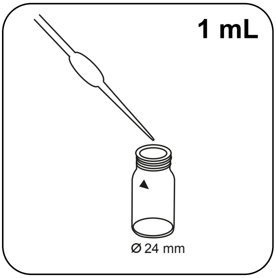
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

Zero

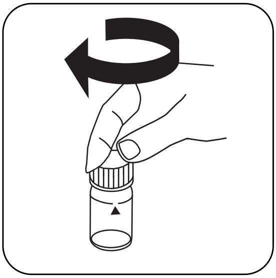
De toets **NUL** indrukken.



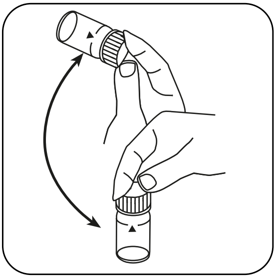
Het spoelbakje uit de meetschacht nemen.



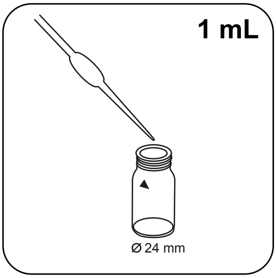
1 mL (25 druppels) KS255 (polyacrylaat reagens 1) oplossing in het staalspoelbakje doen.



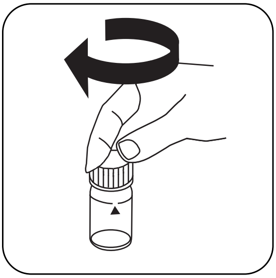
De spoelbakjes afsluiten.



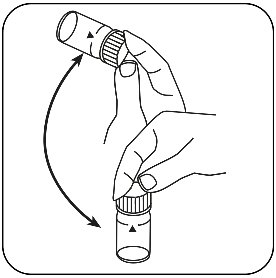
De inhoud mengen door om te draaien.



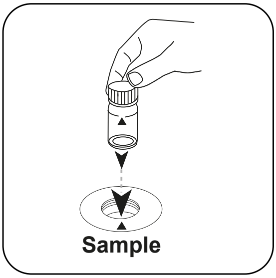
1 mL (25 druppels) Polyacrylate Precipitant A2 oplossing in het staalspoelbakje doen.



De spoelbakjes afsluiten.



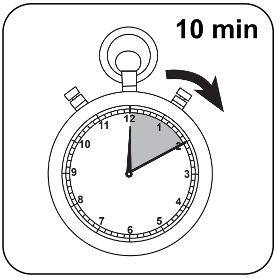
De inhoud mengen door om te draaien.



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

Silicaat HR PP M352

1 - 90 mg/L SiO_2 SiHr

Silicomolybdaat

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
VARIO Silica HR Reagens, set F10	1 Zin	535700

Voorbereiding

1. De bemonsteringstemperatuur moet tussen 15 en 25 °C liggen.

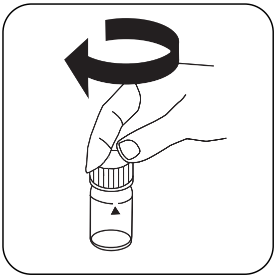
Aantekeningen

1. De methode meet de resulterende kleuring in de flank van de absorptiecurve. Voor filterfotometers kan de nauwkeurigheid van de methode daarom met behulp van een silicaatstandaard (ca. 70 mg/L SiO_2), indien nodig, worden verbeterd door de gebruikersaanpassing.

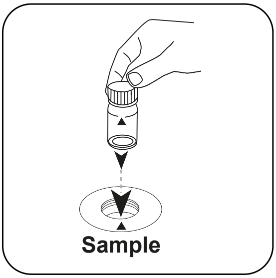
Uitvoering van de bepaling Siliciumdioxide HR met Vario-poederpakje

De methode in het apparaat selecteren.

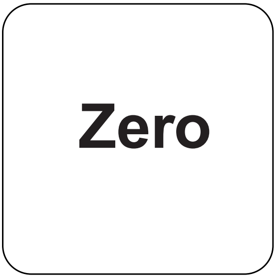
Spoelbakje van 24 mm met **10 mL staal** vullen.



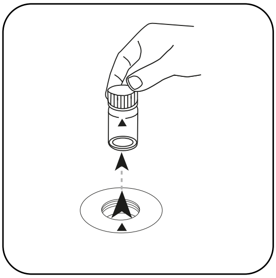
De spoelbakjes afsluiten.



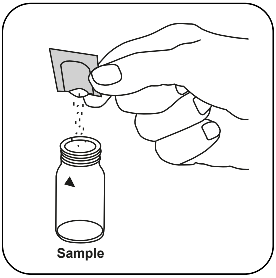
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



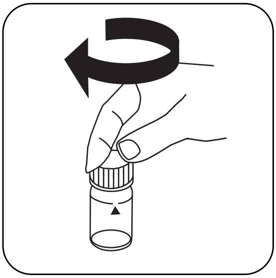
De toets **NUL** indrukken.



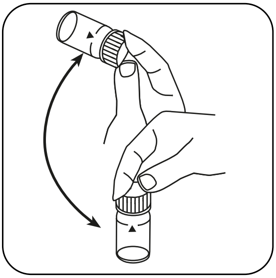
Het spoelbakje uit de meetschacht nemen.



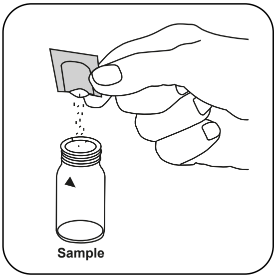
Een **Vario Silica HR molybdaat F10 poederpakje** toevoegen.



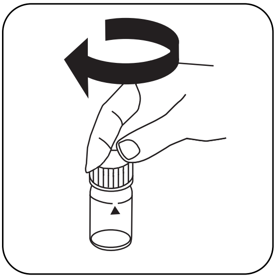
De spoelbakjes afsluiten.



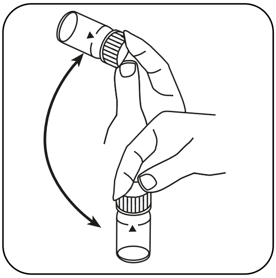
Het poeder oplossen door om te draaien.



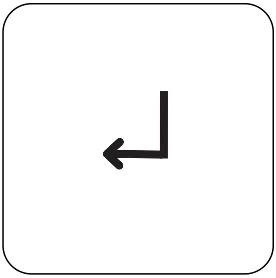
Een **Vario Silica HR zuur Rgt. F10 poederpakje** toevoegen.



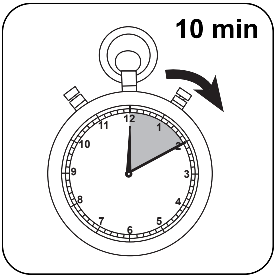
De spoelbakjes afsluiten.



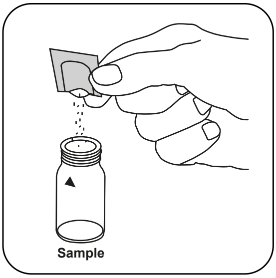
De inhoud mengen door om te draaien.



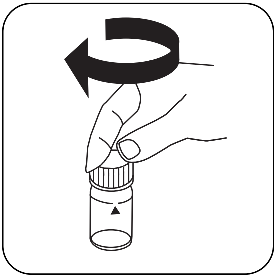
De toets **ENTER** indrukken.



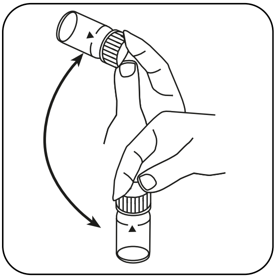
De reactietijd van 10 minuten afwachten.



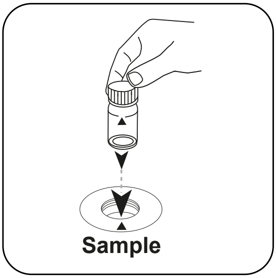
Een **Vario Silica citroenzuur F10 poederpakje** toevoegen.



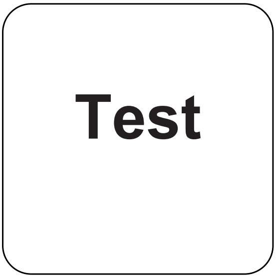
De spoelbakjes afsluiten.



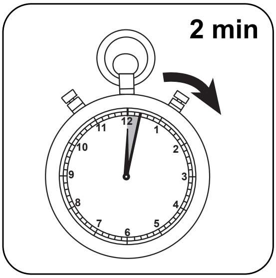
Het poeder oplossen door om te draaien.



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 Siliciumdioxide.

Evaluatie

De volgende tabel geeft aan dat de uitvoerwaarden kunnen worden geconverteerd naar andere citatievormen.

Eenheid	Dagvaardingsformulier	Omrekeningsfactor
mg/l	SiO_2	1
mg/l	Si	0.47

Chemische methode

Silicomolybdaat

Aanhangsel

Verstoringen

Uit te sluiten verstoringen

- Af en toe bevatten watermonsters vormen van siliciumdioxide die zeer langzaam reageren met molybdaat. De precieze aard van deze vormen is momenteel onbekend. Door voorbehandeling met natriumwaterstofcarbonaat en vervolgens met zwavelzuur kunnen deze worden omgezet in vormen met een hoge reactiviteit (beschrijving in "Standard Methods for the Examination of Water and Wastewater" onder "Silica-Digenstion with Sodium Bicarbonate").
- Als er siliciumdioxide of fosfaat aanwezig is, ontstaat er een gele kleur.
  Door de toevoeging van de Silica Citroenzuur F10 poederverpakking wordt de gele kleur veroorzaakt door fosfaat geëlimineerd.

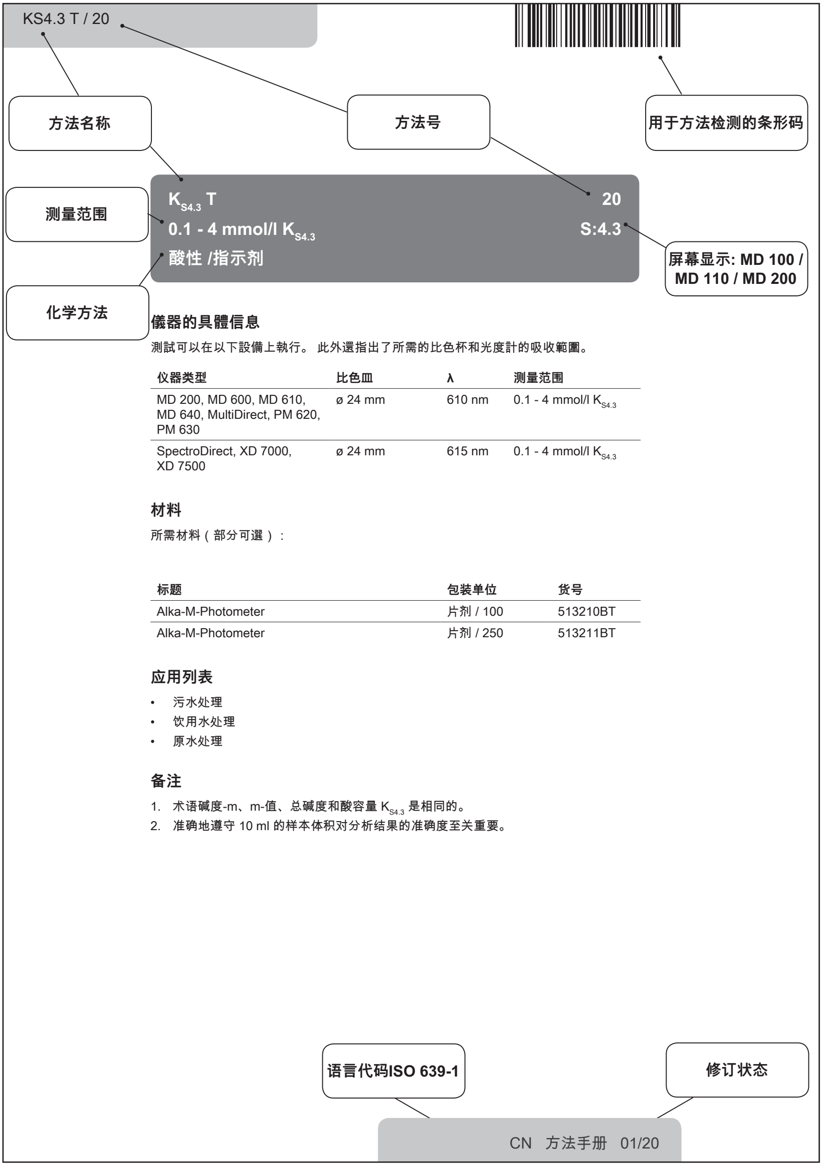
Verstoringen	verstoort vanaf	Invloed
Fe	grote aantallen	
PO_4^{3-}	50	
PO_4^{3-}	60	De verstoring is ongeveer -2%
PO_4^{3-}	75	De verstoring is ongeveer -11 %
S^{2-}	in alle hoeveelheden	

Validatie van de methodes

Aantoonbaarheidsgrens	0.38 mg/L
Bepaalbaarheidsgrens	1.14 mg/L
Einde meetbereik	100 mg/L
Gevoeligheid	120 mg/L / Abs
Betrouwbaarheidsgrenzen	1.69 mg/L
Standaardafwijking procedure	0.70 mg/L
Variatiecoefficient procedure	1.38 %

Afgeleid van

Standaardmethode 4500-SiO2 C



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

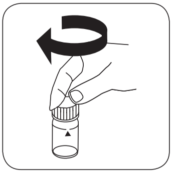
开始测量

进行测定 $K_{S4.3}$ 片剂酸容量

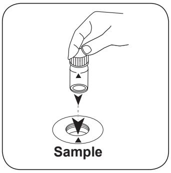
选择设备中的方法。

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。

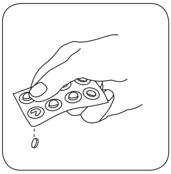


密封比色杯。

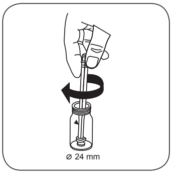


将样本比色杯放入测量轴中。注意定位。

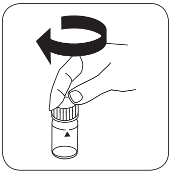
● ● ●



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）：

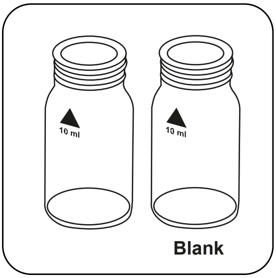
试剂	包装单位	货号
VARIO 铝套件 20 ml	1 片	535000

准备

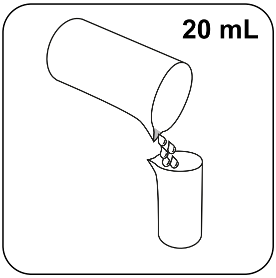
1. 为了获得准确的分析结果，必须保持 20 ℃ 到 25 ℃ 的样本温度。
2. 为避免污染错误，请在分析前用盐酸溶液（约 20%）冲洗比色杯和附件，然后用去离子水冲洗。

进行测定 Vario 铝粉包

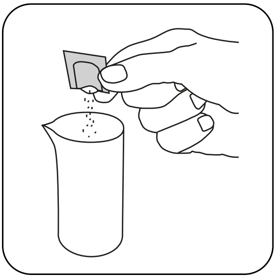
选择设备中的方法。



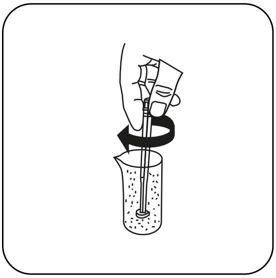
准备两个干净的 24 mm 比色杯。将一个比色杯标记为空白比色杯。



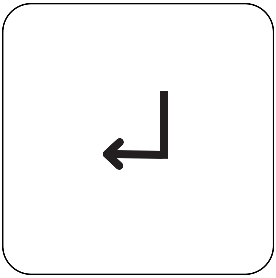
加入 **20 mL 样本**到 100 mL 量杯中。



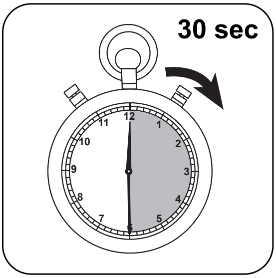
加入 **Vario ALUMINIUM ECR F20 粉包** 。



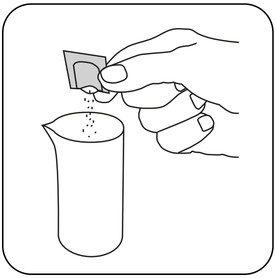
搅拌溶解粉末。



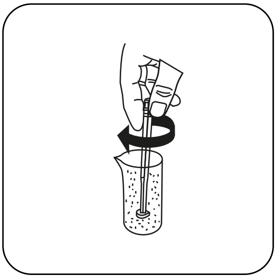
按下 **ENTER** 按钮。



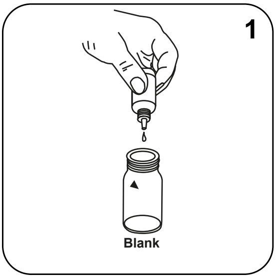
等待 **30 秒反应时间** 。



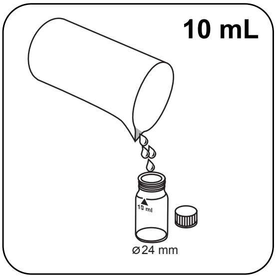
加入 **Vario HEXAMINE F20 粉包** 。



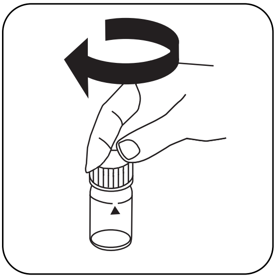
搅拌溶解粉末。



将 **1 滴 Vario ALUMINIUM ECR Masking Reagent** 加入到空白比色杯中。



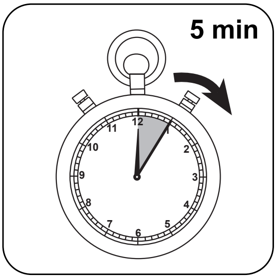
在每个比色杯中加入
10 mL 预处理的样本。



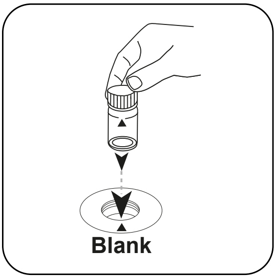
密封比色杯。

↵

按下 **ENTER** 按钮。



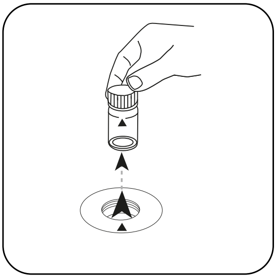
等待 **5 分钟反应时间** 。



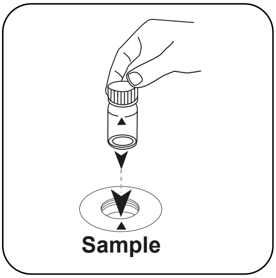
将**空白比色杯**放入测量轴中。注意定位。

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

L (B) 氯化物 M92

0.5 - 20 mg/L Cl^- CL-

硫氰酸汞/硝酸铁

材料

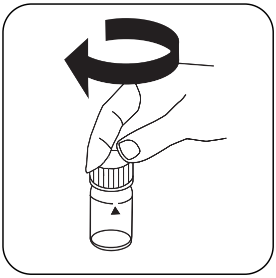
所需材料（部分可選）：

试剂	包装单位	货号
Chloride Reagent Set	1 片	56R018490

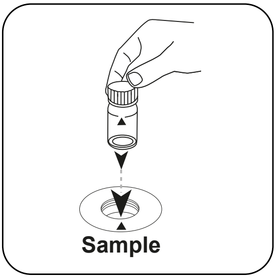
进行测定 氯化物液剂

选择设备中的方法。

用 **10 mL 样本**填充 24 mm 比色杯。



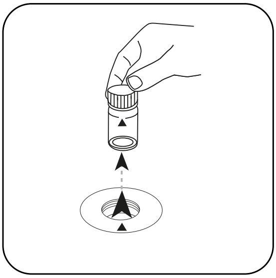
密封比色杯。



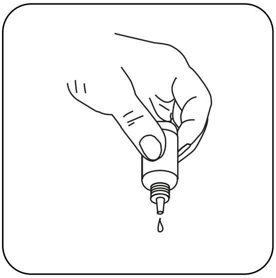
将**样本比色杯**放入测量轴中。注意定位。

Zero

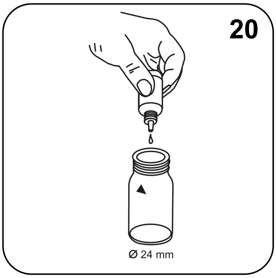
按下 **ZERO** 按钮。



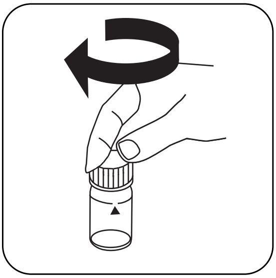
从测量轴上取下比色杯。



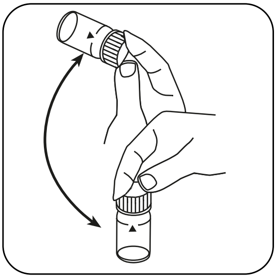
垂直握住滴瓶，慢慢加入相同大小的滴剂。



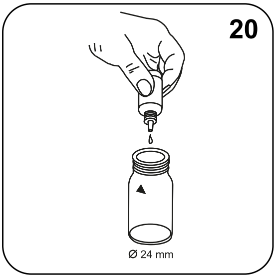
加入 **20 滴 KS251 (Chloride Reagenz A)**。



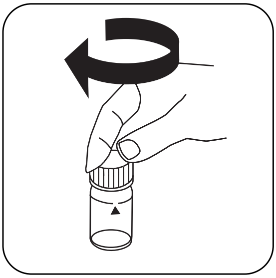
密封比色杯。



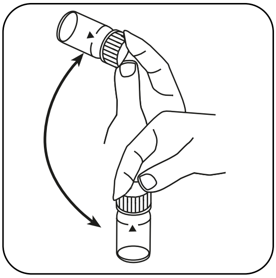
通过旋转混合内容物。



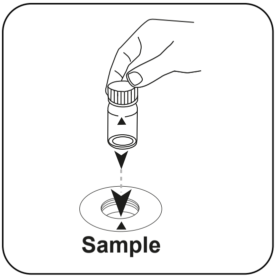
加入 **20 滴 KS253 (Chloride Reagenz B)**。



密封比色杯。



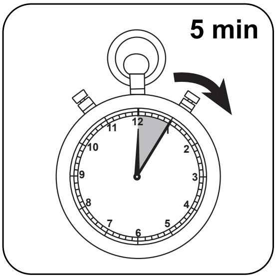
通过旋转混合内容物。



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 氯化物。

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	Cl^-	1
mg/l	NaCl	1.65

化学方法

硫氰酸汞/硝酸铁

附錄

干扰说明

持续干扰

1. 亚硫酸盐和硫代硫酸盐等还原性物质可将三价铁还原为二价铁或将二价汞还原为一价汞，可能有干扰作用。氰化物、碘和溴化物会产生正干扰。

源于

DIN 15682-D31
DIN ISO 15923-1 D49

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

准备

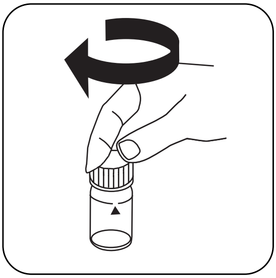
1. 在分析前应将强碱性或酸性水的 pH 从4到6 左右。

进行测定 余铜 片剂法

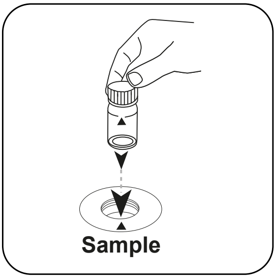
选择设备中的方法。

另外选择测定：余铜

用 **10 mL 样本**填充 24 mm 比色杯。



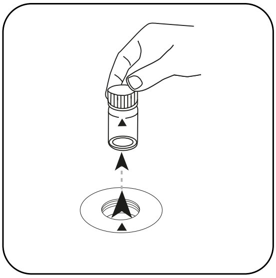
密封比色杯。



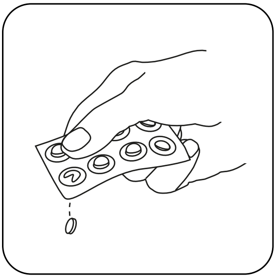
将**样本比色杯**放入测量轴中。注意定位。

Zero

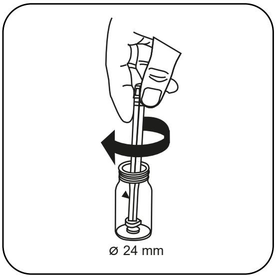
按下 **ZERO** 按钮。



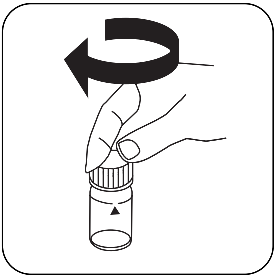
从测量轴上取下比色杯。



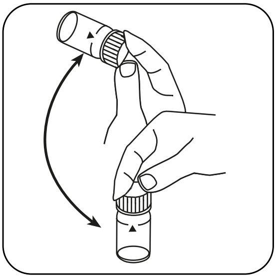
加入 **COPPER No. 1 片剂**。



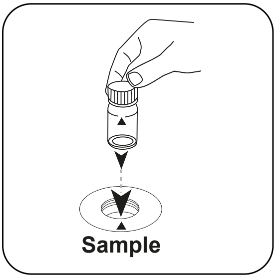
用轻微的扭转压碎片剂。



密封比色杯。



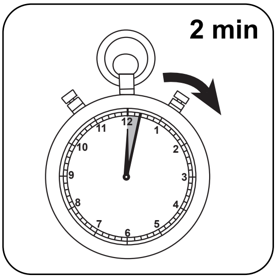
通过旋转溶解片剂。



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。

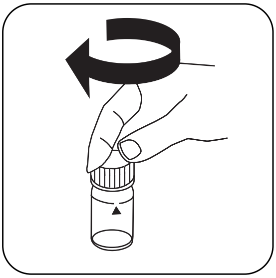
结果在显示屏上显示为 mg / l 余铜。

进行测定 总铜 片剂法

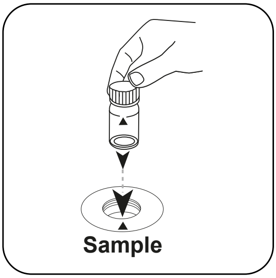
选择设备中的方法。

另外选择测定：总铜

用 **10 mL 样本**填充 24 mm 比色杯。



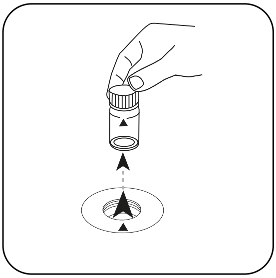
密封比色杯。



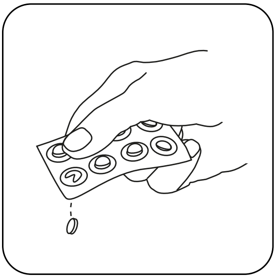
将**样本比色杯**放入测量轴中。注意定位。

Zero

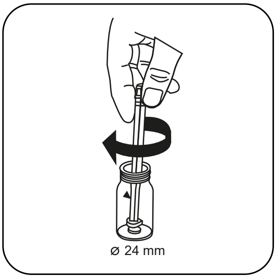
按下 **ZERO** 按钮。



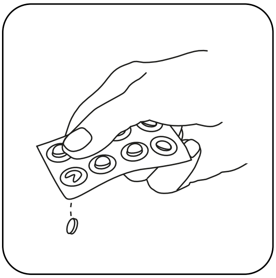
从测量轴上取下比色杯。



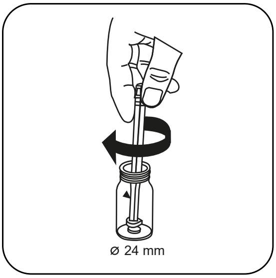
加入 **COPPER No. 1 片剂** 。



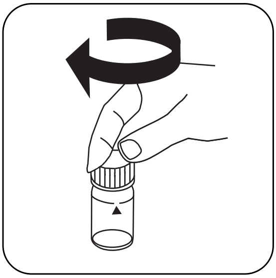
用轻微的扭转压碎片剂并溶解。



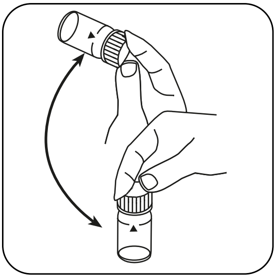
加入 **COPPER No. 2 片剂** 。



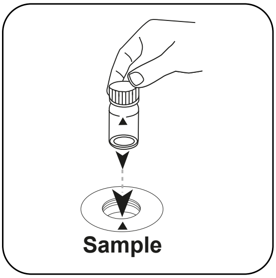
用轻微的扭转压碎片剂。



密封比色杯。



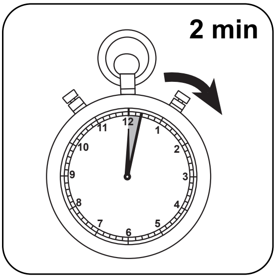
通过旋转溶解片剂。



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

附錄

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

DEHA PP M167

0.02 - 0.5 mg/L DEHA DEHA

PPST

材料

所需材料（部分可選）：

试剂	包装单位	货号
VARIO DEHA 试剂套件	1 片	536000

准备

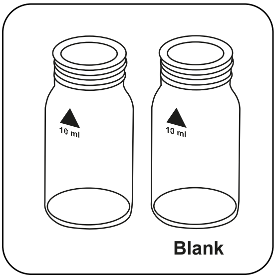
1. 为避免铁沉积造成的错误，请在分析前用盐酸溶液（约 20%）冲洗玻璃器皿，然后用去离子水冲洗。

备注

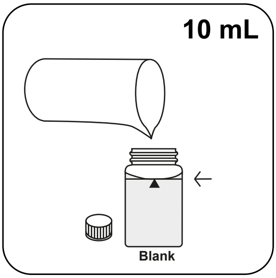
1. 由于反应依赖温度，因此必须保持 20 °C ± 2 °C。
2. 在显色时间内，将样本比色杯放入测量轴或黑暗中。（将试剂溶液暴露在紫外线（太阳光下）会导致测量值过高。）

进行测定 DEHA（N，N-二乙基羟胺）Vario 粉包和液剂

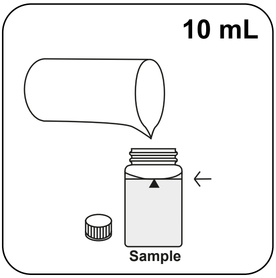
选择设备中的方法。



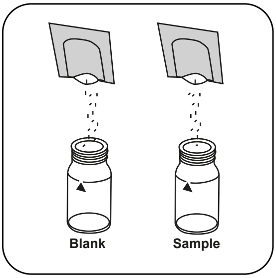
准备两个干净的 24 mm 比色杯。将一个比色杯标记为空白比色杯。



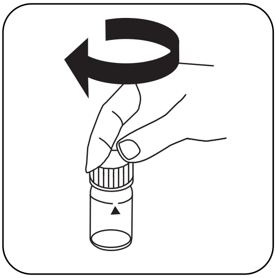
加入 **10 mL 去离子水**到比色杯中。



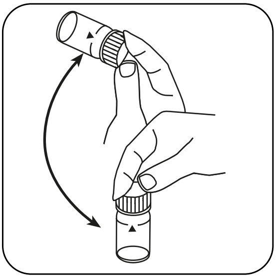
加入 **10 mL 样本**到样本比色杯中。



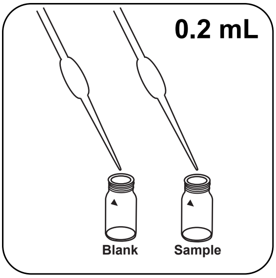
在每个比色杯中加入**一个 Vario OXYSCAV 1 Rgt 粉包**。



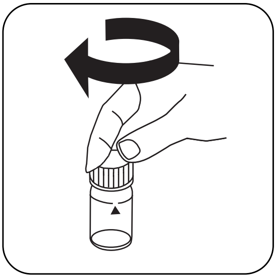
密封比色杯。



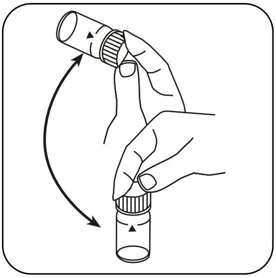
通过旋转混合内容物。



在每个比色杯中加入 **0.2 mL Vario DEHA 2 Rgt 溶液**。



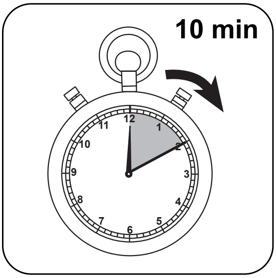
密封比色杯。



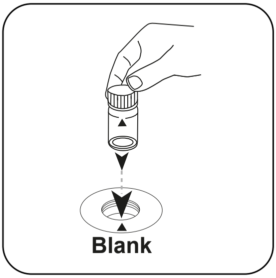
通过旋转混合内容物。

↵

按下 **ENTER** 按钮。



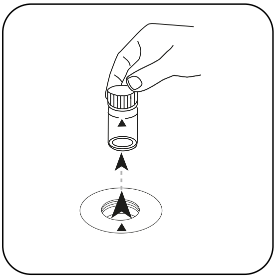
等待 **10 分钟反应时间** 。



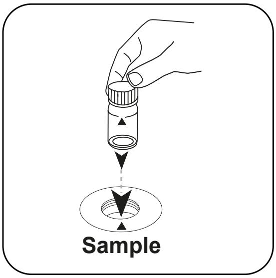
将**空白比色杯**放入测量轴中。注意定位。

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 DEHA。

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	DEHA	1
µg/l	DEHA	1000
mg/l	Hydrochinon	2.63
mg/l	MEKO	4.5
mg/l	Carbohydrazid	1.31
mg/l	ISA	3.9

化学方法

PPST

附錄

干扰说明

可消除干扰

1. 干扰：
   铁(II)干扰：为了测定铁（II）浓度，重复测试不添加 DEHA 的溶液。如果浓度高于 20 µg/L，从 DEHA 测定结果中减去显示值。
2. 还原铁（III）的物质会造成干扰。强烈复合铁（III）的物质会造成干扰。

干擾	從/ [mg/l]
Zn	50
$Na_2B_4O_7$	500
Co	0,025
Cu	8
$CaCO_3$	1000
Lignosulfonate	0,05
Mn	0,8
Mo	80
Ni	0,8
PO_4^{3-}	10
$R\text{-}PO(OH)_2$	10
SO_4^{2-}	1000

参考文献

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989

P 肼 M205

0.05 - 0.5 mg/L N_2H_4 Hydr

二甲氨基苯甲醛

材料
所需材料（部分可選）：

试剂	包装单位	货号
肼测试粉	粉剂 / 30 g	462910

它還需要以下配件。

附件	包装单位	货号
量勺，1 g	1 片	384930

准备

1. 如果水样浑浊，调零前必须进行过滤。
2. 样本温度不应超过 21 °C。

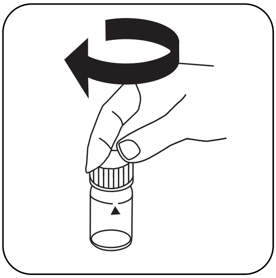
备注

1. 使用肼量勺时，1 g 相当于一量勺。
2. 为了去除由试剂引起的浑浊，定性波纹过滤器已证明可去除中等粗细沉淀物。
3. 为了检查试剂在长期储存过程中可能的老化情况，如所述用自来水进行测试。如果结果高于 0.05 mg/L 的检出限值，试剂只能在有限的条件下使用（较大的测量值偏差）。

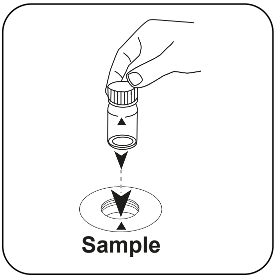
进行测定 肼试剂粉

选择设备中的方法。

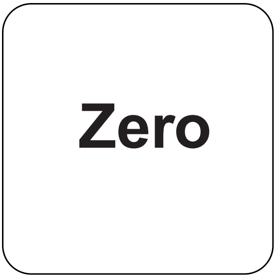
用 **10 mL 样本**填充 24 mm 比色杯。



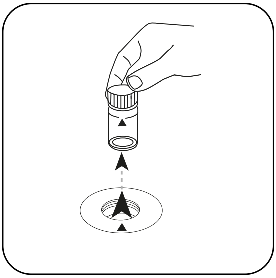
密封比色杯。



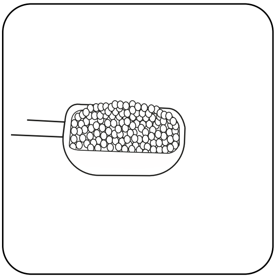
将**样本比色杯**放入测量轴中。注意定位。



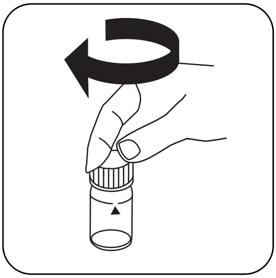
按下 **ZERO** 按钮。



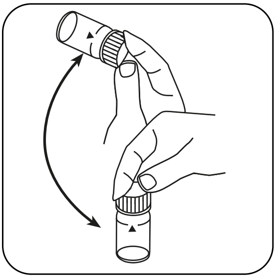
从测量轴上取下比色杯。



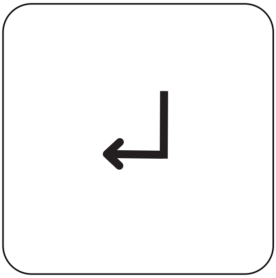
加入 **1 g HYDRAZIN Test 粉末**。



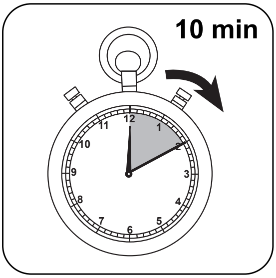
密封比色杯。



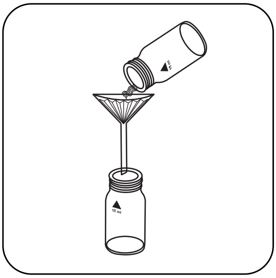
通过旋转混合内容物。



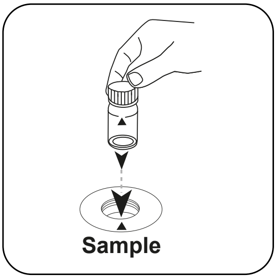
按下 **ENTER** 按钮。



等待 **10 分钟反应时间** 。



过滤去除所产生的轻微浑浊。



将**样本比色杯**放入测量轴中。注意定位。

结果在显示屏上显示为 肼。

Test

按下 **TEST** (XD: **START**) 按钮。

化学方法

二甲氨基苯甲醛

附錄

干扰说明

可消除干扰

1. 消除强烈色彩或浑浊样本的干扰：将 1 份去离子水和 1 份家用漂白剂混合。加入 1 滴该溶液到 25 ml 的样本中并混合。使用 10 ml 该样本替代去离子水用于空白样本。注意：为了测量水样，必须使用未处理的样本。
原理：肼在漂白剂的作用下被氧化，在零平衡状态下关闭色彩干扰。

干擾	從/ [mg/l]
NH_4^+	10
C_4H_9NO	10
VO_4^{3-}	1

源于

DIN 38413-P1

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）：

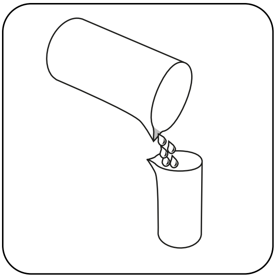
试剂	包装单位	货号
酸度/碱度 P 指标 PA1	65 mL	56L013565
钙硬度缓冲剂 CH2	65 mL	56L014465
KP962 过硫酸铵粉末	粉剂 / 40 g	56P096240
KS63-FE6 硫基乙酸盐/钼酸盐 HR RGT	30 mL	56L006330
KS63-FE6 硫基乙酸盐/钼酸盐 HR RGT	65 mL	56L006365
KS61-FE5 菲洛嗪/硫基乙酸盐	65 mL	56L006165

准备

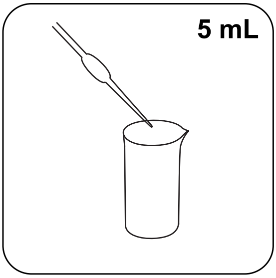
1. 如果样本中存在强结合剂，则反应时间必须延长，直到看不到进一步的颜色变化。然而，在测量过程中未检测到非常强的铁复合物。在这种情况下，结合剂必须用酸/过硫酸盐氧化破坏，然后通过中和使样本达到 pH 6 – 9。
2. 为了测定总溶解的和悬浮的铁，样本必须用酸/过硫酸盐煮沸。随后，中和至 pH 6 – 9，并用去离子水补充至原始体积。

消解

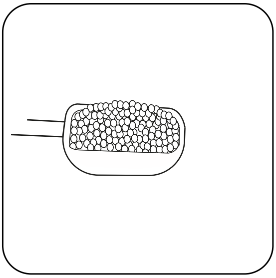
总铁由可溶性复合铁和悬浮铁组成。测量前不应过滤样本。为了确保样本的均匀性，在取样之前，沉积的颗粒必须在剧烈摇动下均匀分布。为了测定全部可溶性铁（包括复合铁化合物），需要过滤样本。确定总铁所需的设备和试剂不包括在标准供货中。



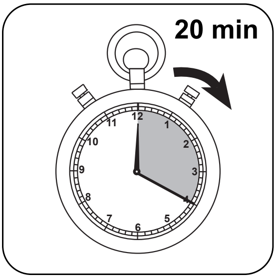
用 **50 mL 均质化的样本**填充合适的消解容器。



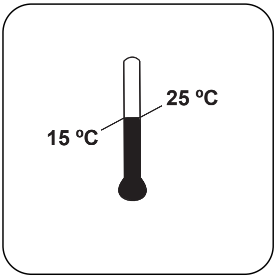
加入 **5 mL 1:1 盐酸** 。



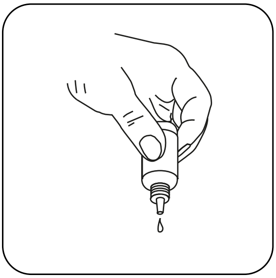
加入一勺 **KP 962 (Ammonium Persulfat Powder)**。



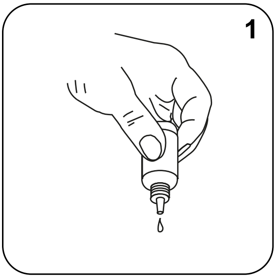
样本**煮沸 20 分钟** 。应保持 25 mL 的样本量；如有必要，加满去离子水。



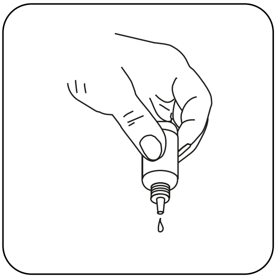
将样本冷却到**室温**。



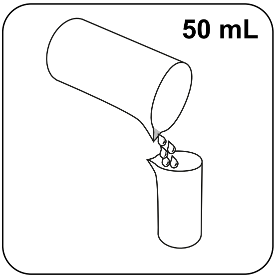
垂直握住滴瓶，慢慢加入相同大小的滴剂。



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！）**



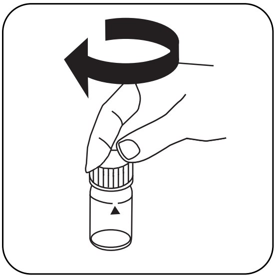
将样本用**去离子水填充至 50 mL** 。

进行测定 总铁 LR (A) 水剂法

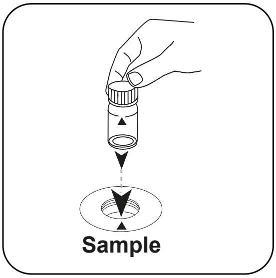
选择设备中的方法。

为了测定 **总铁 LR，进行** 中所述的**消解**。

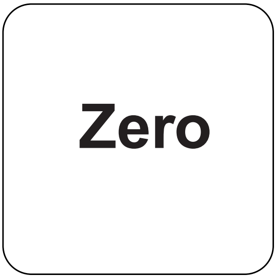
用 **10 mL 去离子水**填充 24 mm 比色杯。



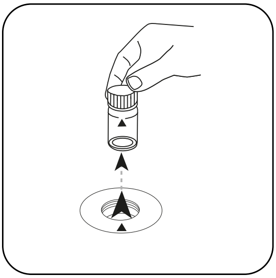
密封比色杯。



将**样本比色杯**放入测量轴中。注意定位。



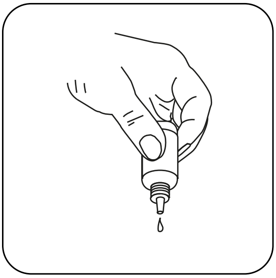
按下 **ZERO** 按钮。



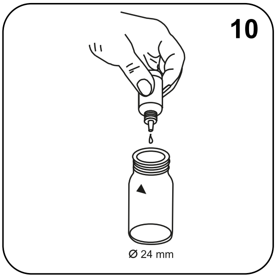
从测量轴上取下比色杯。

倒空比色杯。

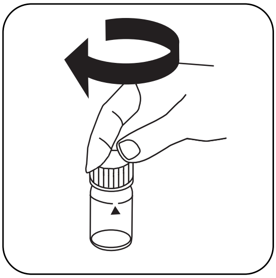
用 **10 mL 准备好的样本**填充 24 mm 比色杯。



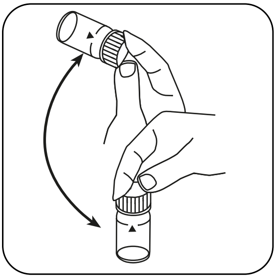
垂直握住滴瓶，慢慢加入相同大小的滴剂。



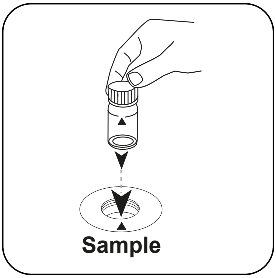
加入 **10 滴 Iron Reagent FE5**。



密封比色杯。



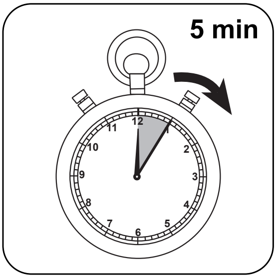
通过旋转混合内容物。



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。

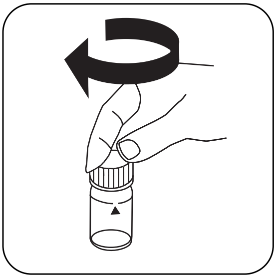
结果在显示屏上显示为 mg / l 总铁或对于过滤样品测试为总溶解铁 mg/l 。

进行测定 铁 LR (A) 水剂法

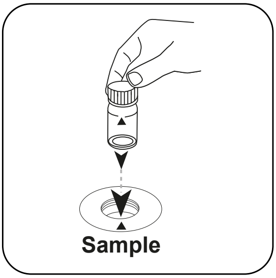
选择设备中的方法。

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。



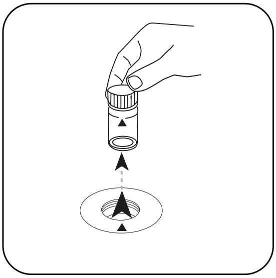
密封比色杯。



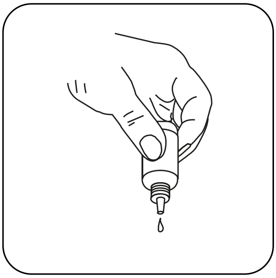
将**样本比色杯**放入测量轴中。注意定位。

Zero

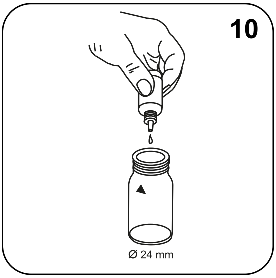
按下 **ZERO** 按钮。



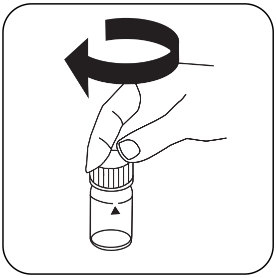
从测量轴上取下比色杯。



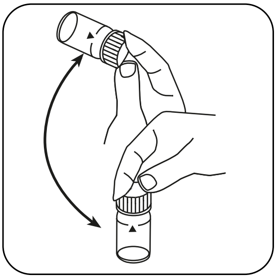
垂直握住滴瓶，慢慢加入相同大小的滴剂。



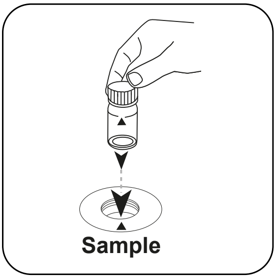
加入 **10 滴 Iron Reagent FE5**。



密封比色杯。



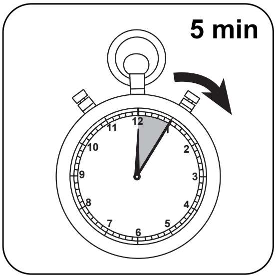
通过旋转混合内容物。



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)

C 溶解氧 M292

10 - 800 µg/L O_2 c) O2

Rhodazine D TM

材料
所需材料（部分可選）：

试剂	**包装单位**	**货号**
Vacu-vial 试剂管氧气检测包	1 组	380450

它還需要以下配件。

附件	**包装单位**	**货号**
圆形比色杯 13 mm 适配器	1 片	19802192
Vacu-vial 适配器 (13 mm) MultiDirect	1 片	192075

准备

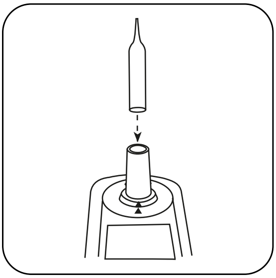
1. 在进行测试前，请务必阅读原始使用说明书和随测试装置附带的安全说明（MSDS 可在主页 www.chemetrics.com上获得）。

备注

1.这种方法是 CHEMetrics 的产品。但此光度计中使用的测量范围和波长可能偏离 CHEMetrics 数据。 2.Vacu-Vials® 在室温下黑暗中存放。 4.Vacu-Vials® 是美国 CHEMetrics, inc. / Calverton 的注册商标。

进行测定 溶解氧，Vacu Vials® K-7553

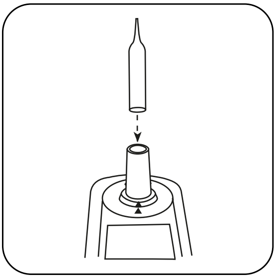
选择设备中的方法。



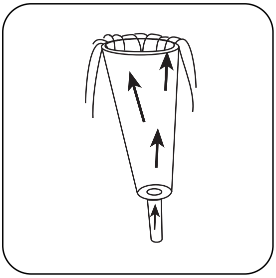
将 **Zero 安瓿**放入测量轴中。

Zero

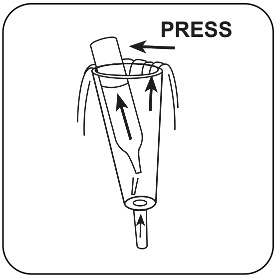
按下 **ZERO** 按钮。



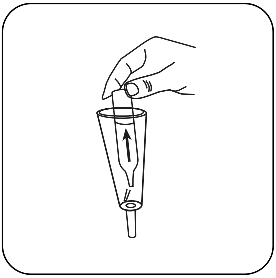
从测量轴上取下 Zero 安瓿。



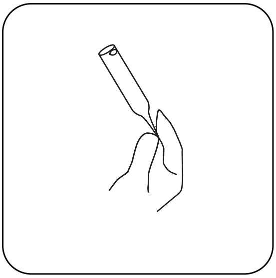
将含测试水的取样容器从底部向上倒置几分钟以去除气泡。



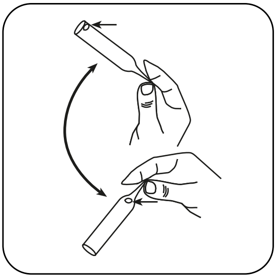
将 Vacu-vial® 安瓿放入取样容器中。轻轻按压容器壁，折断安瓿尖端。等待安瓿完全充满。



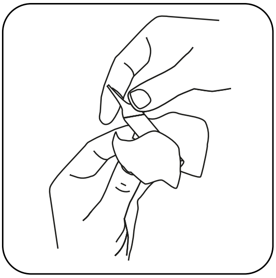
然后将整个安瓿从取样容器中迅速取下。



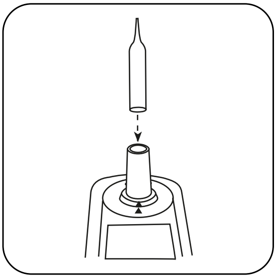
用手指关闭开口，以避免与空气接触。



旋转安瓿数次



安瓿从外部干燥。



将安瓿放入测量轴中。

Test

按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 mg / l 氧。

化学方法

Rhodazine D TM

附錄

源于

ASTM D 5543-15

[c] MultiDirect：对于Vacu-vials®管试剂，需比色皿适配器（订货编号19 20 75 ）

HR L 磷酸盐 M335

5 - 80 mg/L PO_4 PO4

Vanadomolybdate

材料

所需材料（部分可選）：

试剂	包装单位	货号
KS278 硫酸 50%	65 mL	56L027865
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
Phosphate HR, Ortho Reagent Set	1 片	56R019090

它還需要以下配件。

附件	包装单位	货号
搅拌棒和粉勺	1 片	56A006601

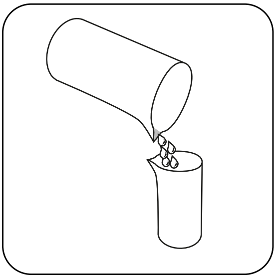
准备

1. 在分析前（用 1 mol/l 盐酸或 1 mol/l 氢氧化钠溶液）应将高度缓冲样本或极端 pH 值样本的 pH 范围调节到 6 和 7 之间。
2. 为了分析聚磷酸盐和总磷酸盐需要事先进行消解。

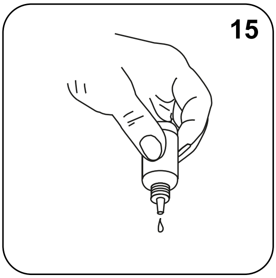
备注

1. 可根据要求获得试剂和配件。

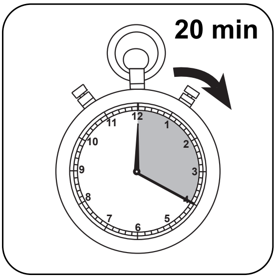
消解 聚磷酸 HR，水剂



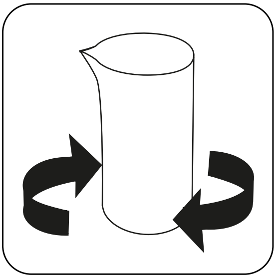
用 **50 mL 均质化的样本**填充合适的消解容器。



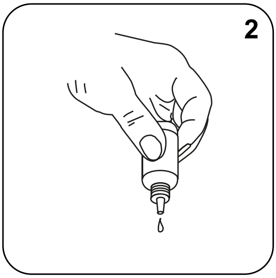
加入 **15 滴 KS278 (50% 硫酸)**。



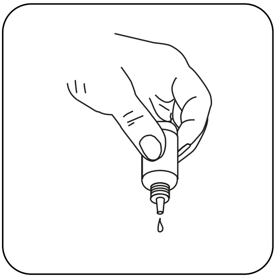
样本**煮沸 20 分钟** 。应保持 25 mL 的样本量；如有必要，加满去离子水。



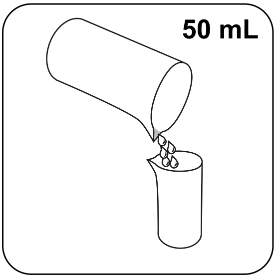
旋转消解容器并将其冷却到室温。



加入 **2 滴 Acidity / Alkalinity P Indicator PA1**。

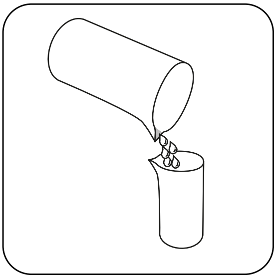


将 **Hardness Calcium Buffer CH2**滴加到相同的样本中，直到出现淡粉色向红色转变。 **(注意：滴加后摇动样本！)**

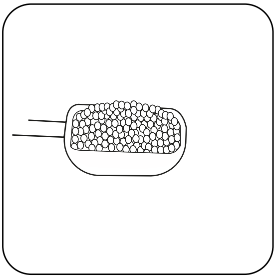


将样本用**去离子水填充至 50 mL** 。

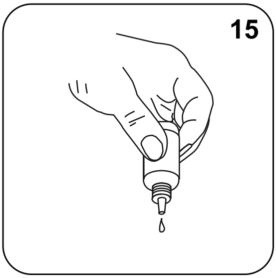
消解 总磷 HR，水剂



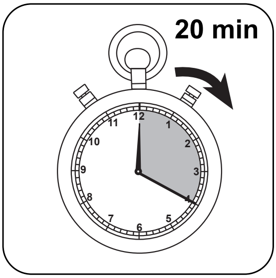
用 **50 mL 均质化的样本填**充合适的消解容器。



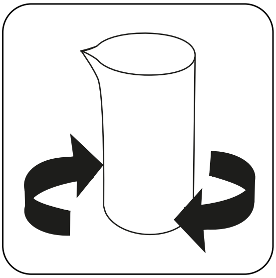
加入**一勺 KP962 (Ammonium Persulfate Powder)**。



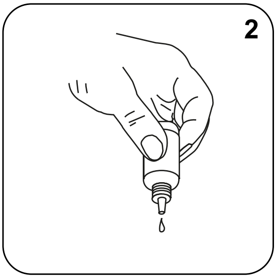
加入 **15 滴 KS278 (50% 硫酸)**。



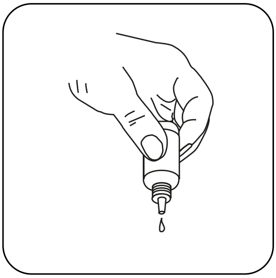
样本**煮沸 20 分钟** 。应保持 25 mL 的样本量；如有必要，加满去离子水。



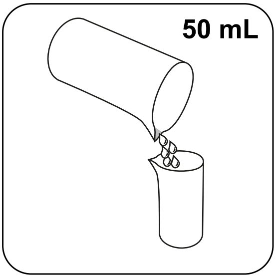
旋转消解容器并将其冷却到室温。



加入 **2 滴 Acidity / Alkalinity P Indicator PA1**。



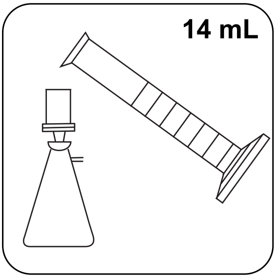
将 **Hardness Calcium Buffer CH2**滴加到相同的样本中，直到出现淡粉色向红色转变。**（注意：滴加后摇动样本！）**



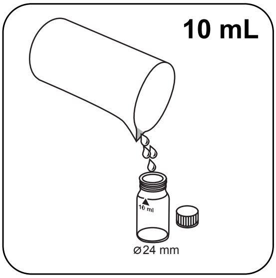
将样本用**去离子水填充至 50 mL** 。

进行测定 HR 磷酸盐液剂

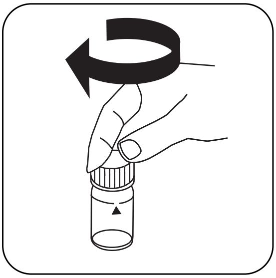
选择设备中的方法。



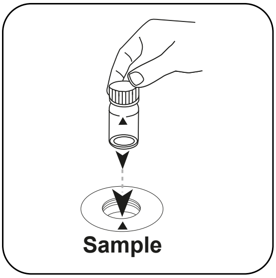
用预清洗的过滤器（孔径 0.45μm）过滤大约 14 mL 的样本。



用 **10 mL 准备好的样本**填充 24 mm 比色杯。



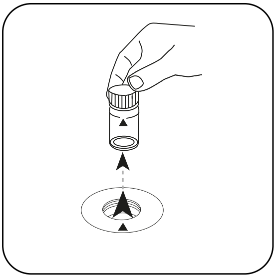
密封比色杯。



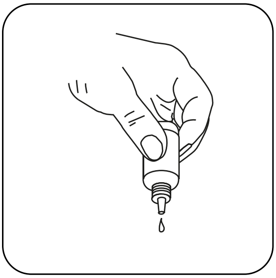
将**样本比色杯**放入测量轴中。注意定位。

Zero

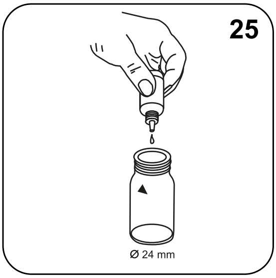
按下 **ZERO** 按钮。



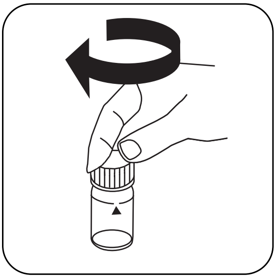
从测量轴上取下比色杯。



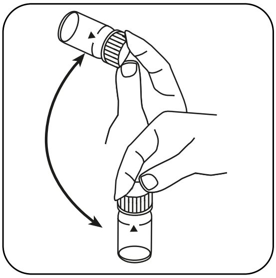
垂直握住滴瓶，慢慢加入相同大小的滴剂。



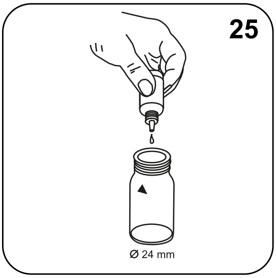
加入 **25 滴 KS228 (Ammonium Molybdate)**。



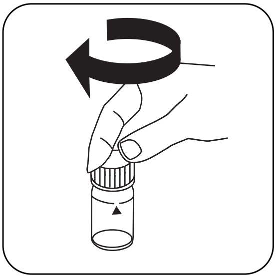
密封比色杯。



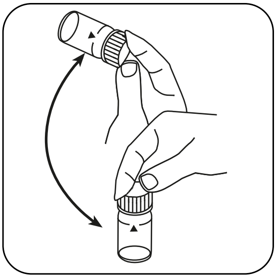
通过旋转混合内容物。



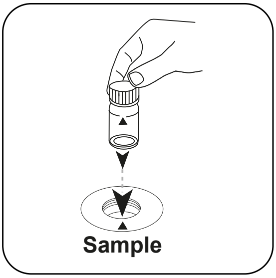
加入 **25 滴**
KS229 (Ammonium Metavanadate)。



密封比色杯。



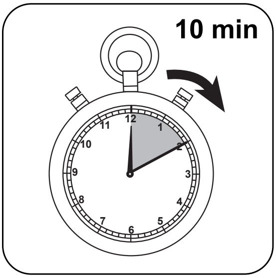
通过旋转混合内容物。



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 磷酸盐。

进行测定 聚磷酸盐，水剂

选择设备中的方法。

为了测定 **聚磷酸盐 HR，水剂，进行** 中所述的**消解**。

该测试测定无机磷酸盐的总含量。多磷酸盐的含量来自无机磷酸盐和正磷酸盐的差异。

总磷 LR，水剂 的测定与 335 方法, 磷酸盐 HR ，水剂 的测定相同。

结果在显示屏上显示为 mg / l 总无机磷（正磷酸盐和聚磷酸盐）。

进行测定 总磷 ，水剂

选择设备中的方法。

为了测定 **总磷 HR，水剂，进行** 中所述的**消解**。

该测试测定样本中存在的所有磷化合物，包括正磷酸盐、多磷酸盐和有机磷化合物。

总磷 HR，水剂 的测定与 335 方法, 磷酸盐 HR ，水剂 的测定相同。

结果在显示屏上显示为 mg / l 总磷。

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	P	1
mg/l	PO_4^{3-}	3.066177
mg/l	P_2O_5	2.29137

化学方法

Vanadomolybdate

附錄

干扰说明

持续干扰

- 大量的不溶解物质可能产生不可重现的测量结果。

干擾	從/ [mg/l]
Al	200
AsO_4^{3-}	所有的量
Cr	100
Cu	10
Fe	100
Ni	300
SiO_2	50
$Si(OH)_4$	10
S^{2-}	所有的量
Zn	80

参照

标准方法 4500-P C

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

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。

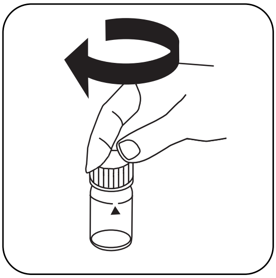
备注

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。

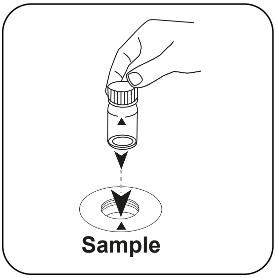
进行测定 聚丙烯酸酯液剂

选择设备中的方法。

用 **10 mL 样本**填充 24 mm 比色杯。



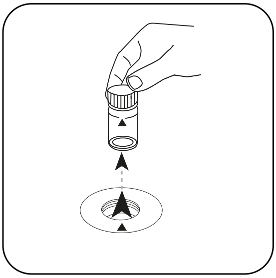
密封比色杯。



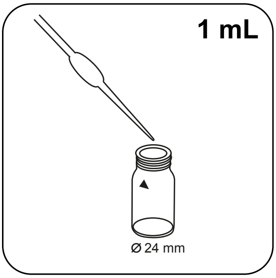
将**样本比色杯**放入测量轴中。注意定位。

Zero

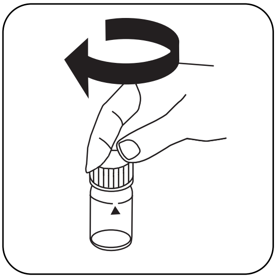
按下 **ZERO** 按钮。



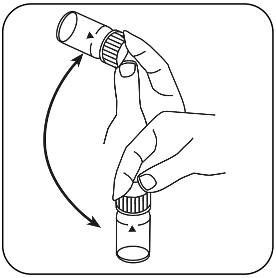
从测量轴上取下比色杯。



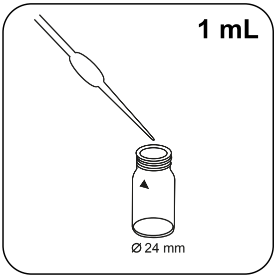
将 **1 mL (25 滴) KS255 (Polyacrylate Reagenz 1) 溶液**加入到样本比色杯中。



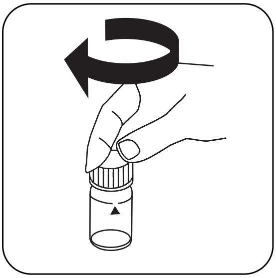
密封比色杯。



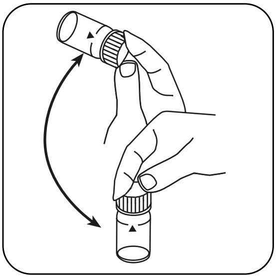
通过旋转混合内容物。



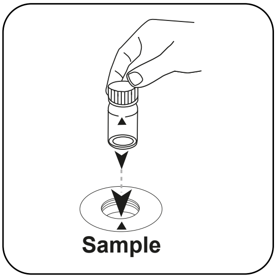
将 **1 mL (25 滴) Polyacrylate Precipitant A2 溶液**加入到样本比色杯中。



密封比色杯。



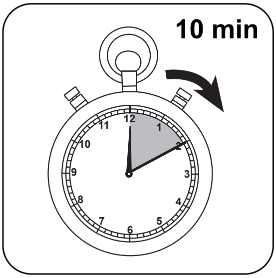
通过旋转混合内容物。



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

HR PP 硅酸盐 M352

1 - 90 mg/L SiO_2 SiHr

硅钼

材料

所需材料（部分可選）：

试剂	包装单位	货号
VARIO 二氧化硅 HR 试剂，套件 F10	1 组	535700

准备

1. 样本温度必须在 15 °C 至 25 °C 之间。

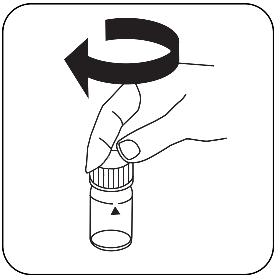
备注

1. 该方法根据所得着色液的吸收曲线的吸收边进行测量。对于滤色光度计，如果需要，可以使用硅酸盐标准液（约 70 mg/L SiO_2）通过用户调节来改善该方法的精度。

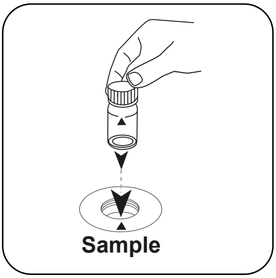
进行测定 HR 二氧化硅 Vario 粉包

选择设备中的方法。

用 **10 mL 样本**填充 24 mm 比色杯。



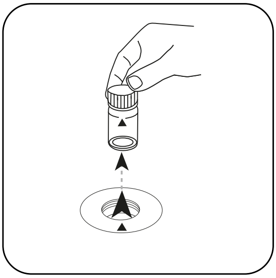
密封比色杯。



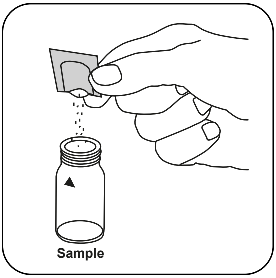
将**样本比色杯**放入测量轴中。注意定位。

Zero

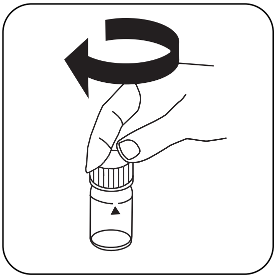
按下 **ZERO** 按钮。



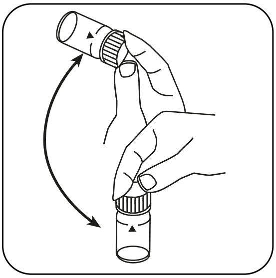
从测量轴上取下比色杯。



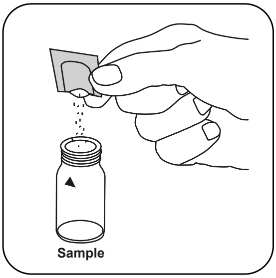
加入 **Vario Silica HR Molybdate F10 粉包** 。



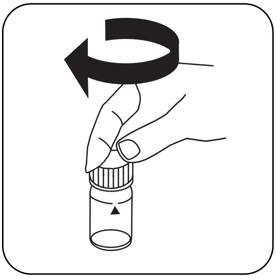
密封比色杯。



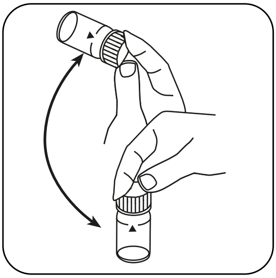
通过旋转溶解粉末。



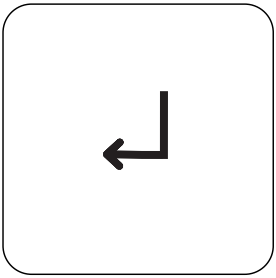
加入 **Vario Silica HR Acid Rgt. F10 粉包** 。



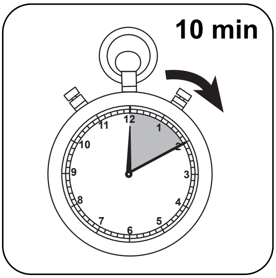
密封比色杯。



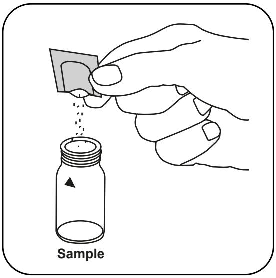
通过旋转混合内容物。



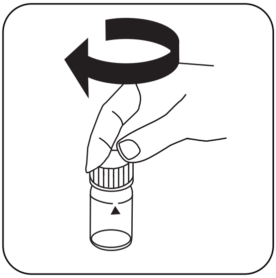
按下 **ENTER** 按钮。



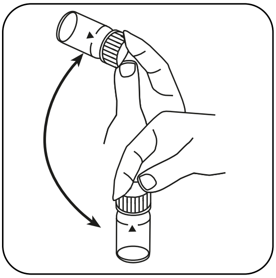
等待 **10 分钟反应时间** 。



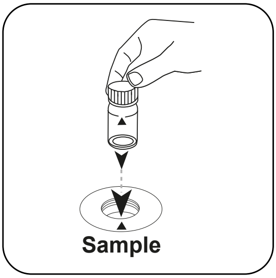
加入 **Vario Silica Citric Acid F10 粉包** 。



密封比色杯。



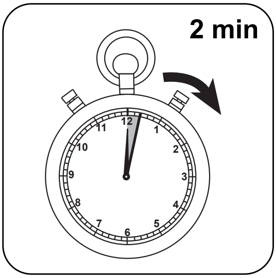
通过旋转溶解粉末。



将**样本比色杯**放入测量轴中。注意定位。

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 硅酸盐。

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	SiO_2	1
mg/l	Si	0.47

化学方法

硅钼

附錄

干扰说明

可消除干扰

- 偶尔水样含有与钼酸盐反应非常缓慢的硅酸形式。这些形式的确切性质目前是未知的。通过用碳酸氢钠，然后用硫酸预处理，可以将它们转化成反应性形式（参见“水和废水检测的标准方法”中“用碳酸氢钠进行二氧化硅分离”的描述）。
- 如果存在二氧化硅或磷酸盐，则会出现黄色。
  添加二氧化硅柠檬酸 F10 粉包可去除磷酸盐引起的黄色。

干擾	從/ [mg/l]	影響
Fe	大量	
PO_4^{3-}	50	
PO_4^{3-}	60	干扰约为 -2 %
PO_4^{3-}	75	干扰约为 -11 %
S^{2-}	所有的量	

方法验证

检出限	0.38 mg/L
测定下限	1.14 mg/L
测量上限	100 mg/L
灵敏度	120 mg/L / Abs
置信范围	1.69 mg/L
标准偏差	0.70 mg/L
变异系数	1.38 %

源于

标准方法 4500-SiO2 C

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