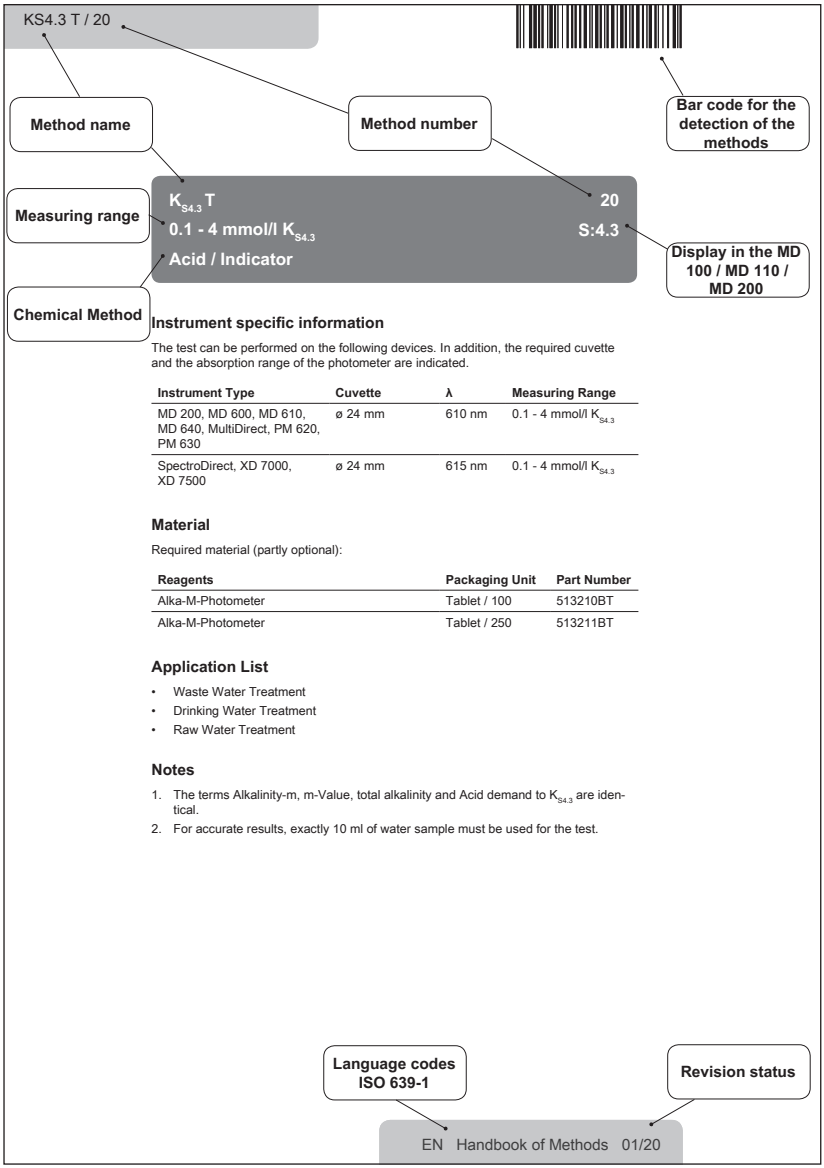
Lovibond® Water Testing

Tintometer® Group

Manual of Methods

MD50

Copper



Instrument specific information

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

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

Material

Required material (partly optional):

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

Application List

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

Notes

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

Performing test procedure

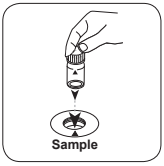
Implementation of the provision Acid capacity $K_{S4.3}$ with Tablet

Select the method on the device

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

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

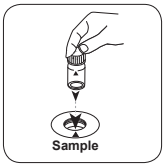
Close vial(s).



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

• • •

Dissolve tablet(s) by inverting.



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

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

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

Copper T **M150**

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

Biquinoline

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Copper No. 1	Tablet / 100	513550BT
Copper No. 1	Tablet / 250	513551BT
Copper No. 2	Tablet / 100	513560BT
Copper No. 2	Tablet / 250	513561BT
Set Copper No. 1/No. 2 100 Pc.[#]	100 each	517691BT
Set Copper No. 1/No. 2 250 Pc.[#]	250 each	517692BT
ValidCheck Copper 2 mg/l	1 pc.	48141525

Preparation

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

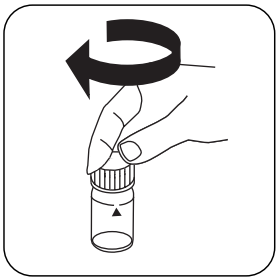
Determination of Copper, free with tablet

Select the method on the device.

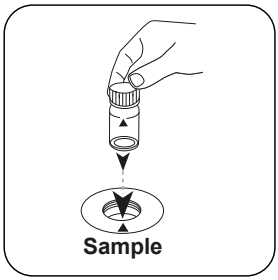
In addition, choose the test: free

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

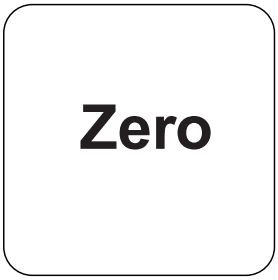
Fill 24 mm vial with **10 mL sample**.



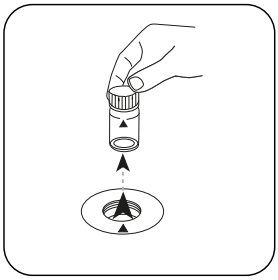
Close vial(s).



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

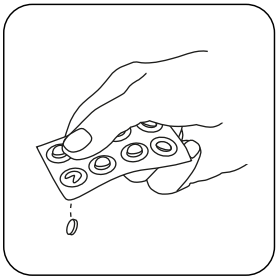


Press the **ZERO** button.

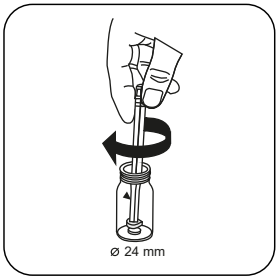


Remove the vial from the sample chamber.

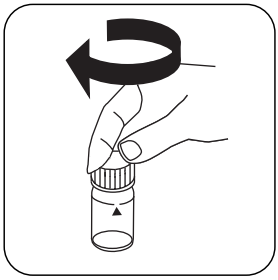
For devices that require **no ZERO measurement** , **start here**.



Add **COPPER No. 1 tablet** .

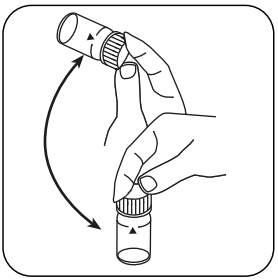


Crush tablet(s) by rotating slightly.

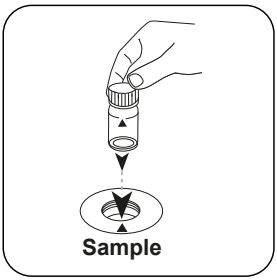


Close vial(s).

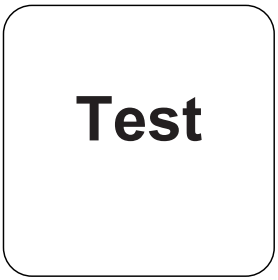
EN



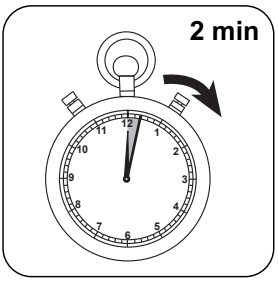
Dissolve tablet(s) by inverting.



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



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



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

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

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

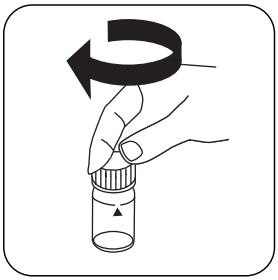
Determination of Copper, total with tablet

Select the method on the device.

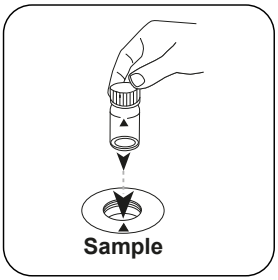
In addition, choose the test: total

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

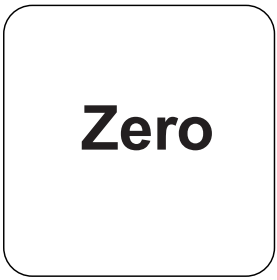
Fill 24 mm vial with **10 mL sample**.



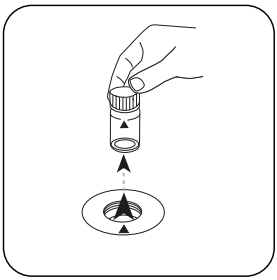
Close vial(s).



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

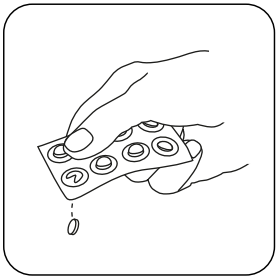


Press the **ZERO** button.

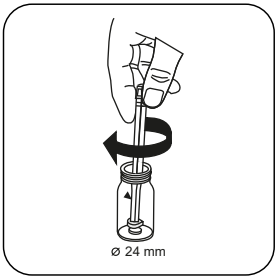


Remove the vial from the sample chamber.

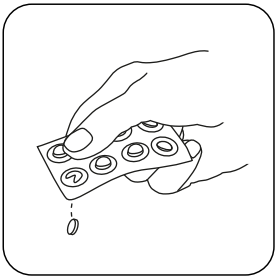
For devices that require **no ZERO measurement** , **start here**.



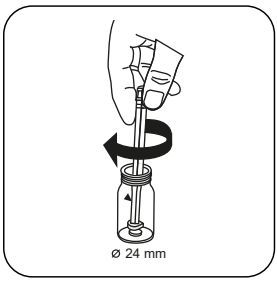
Add **COPPER No. 1 tablet** .



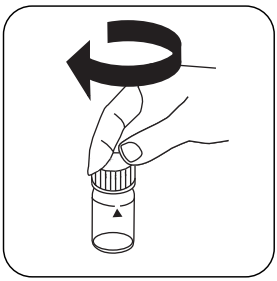
Crush tablet(s) by rotating slightly and dissolve.



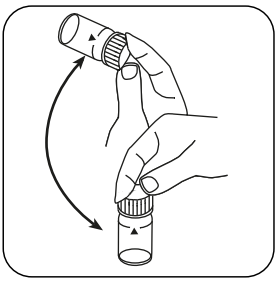
Add **COPPER No. 2 tablet** .



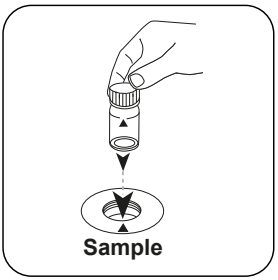
Crush tablet(s) by rotating slightly.



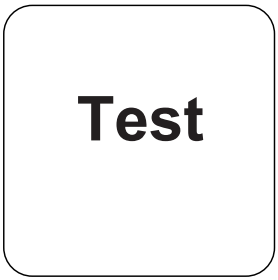
Close vial(s).



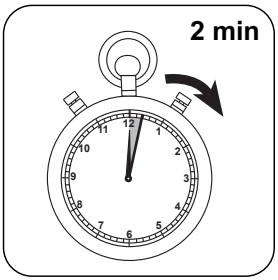
Dissolve tablet(s) by inverting.



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



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



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

EN

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

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

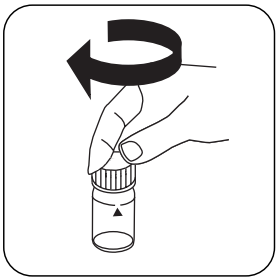
Determination of Copper, differentiated determination with Tablet

Select the method on the device.

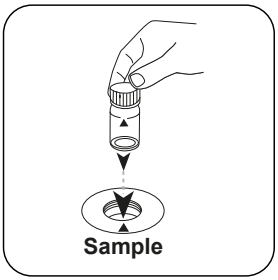
In addition, choose the test: differentiated

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

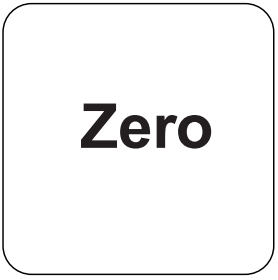
Fill 24 mm vial with **10 mL sample**.



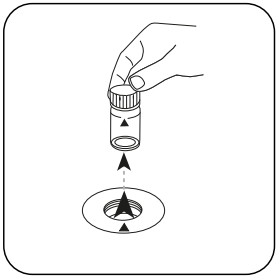
Close vial(s).



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

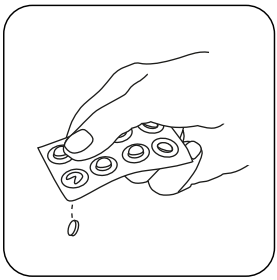


Press the **ZERO** button.

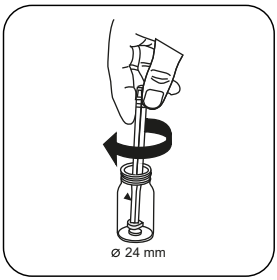


Remove the vial from the sample chamber.

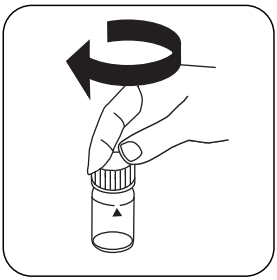
For devices that require **no ZERO measurement** , **start here**.



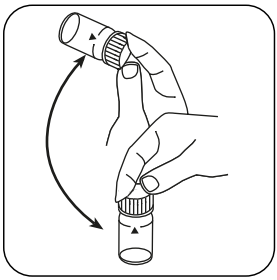
Add **COPPER No. 1 tablet** .



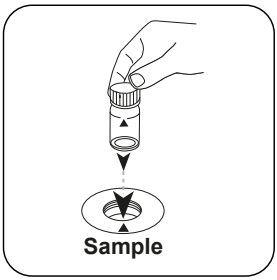
Crush tablet(s) by rotating slightly.



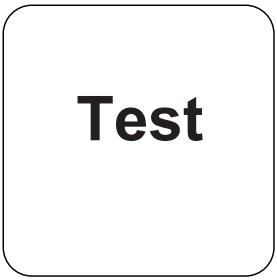
Close vial(s).



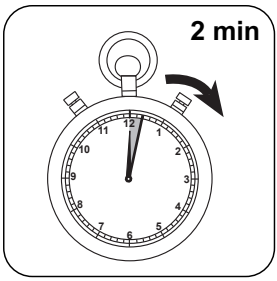
Dissolve tablet(s) by inverting.



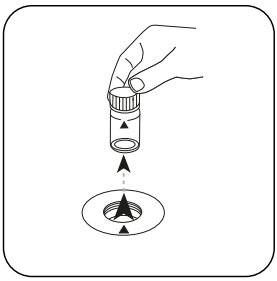
Place **sample vial** in the sample chamber. Pay attention to the positioning.



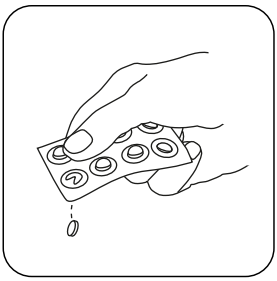
Press the **TEST** (XD: **START**)button.



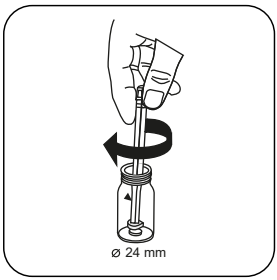
Wait for **2 minute(s) reaction time**.



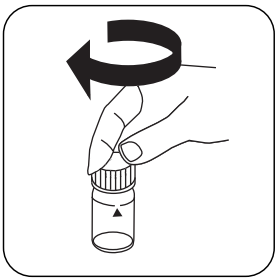
Remove the vial from the sample chamber.



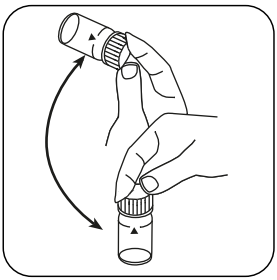
Add **COPPER No. 2 tablet** .



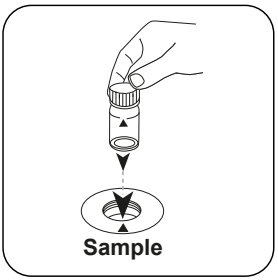
Crush tablet(s) by rotating slightly.



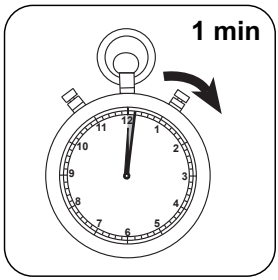
Close vial(s).



Dissolve tablet(s) by inverting.



Test



EN

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

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

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

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

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

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

Copper VLR PP M152

2 - 210 µg/L Cu

Porphyrine Indicator

EN

Material

Required material (partly optional):

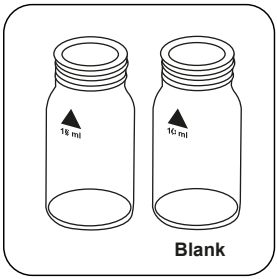
Reagents	Packaging Unit	Part Number
VARIO Copper, Set F10	1 Set	535140

Notes

1. For most accurate results, a reagent blank measurement should be performed.
2. The pH of the sample has to be adapted by addition of sodium hydroxide solution or salpetric acid to a range 2-6 before starting the measurement.

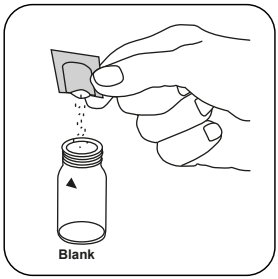
Determination of Copper VLR with powder packs

Select the method on the device.

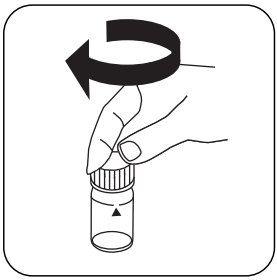


Prepare two clean 24 mm vials. Mark one as a blank.

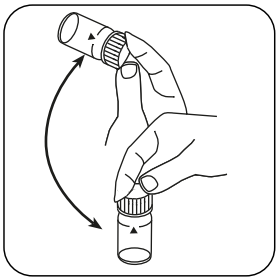
Place **10 mL sample** in each vial.



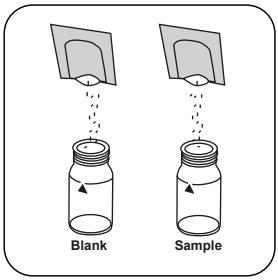
Add a **CU3 Masking F10 powder pack** to the blank.



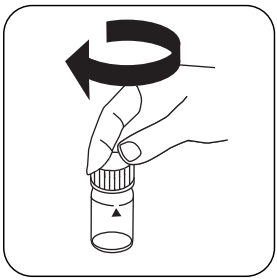
Close vial(s).



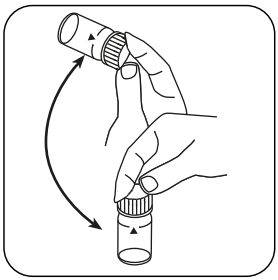
Swirl around to dissolve the powder.



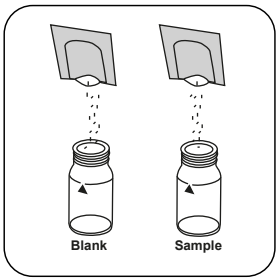
Add **a CU1 Porphyrin F10 powder pack** in each vial.



Close vial(s).

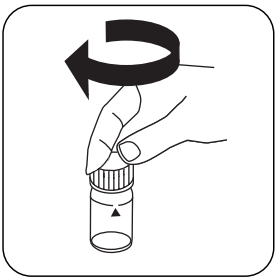


Swirl around to dissolve the powder.

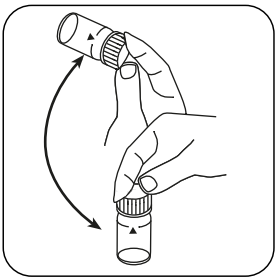


Add **a CU2 Porphyrin F10 powder pack** in each vial.

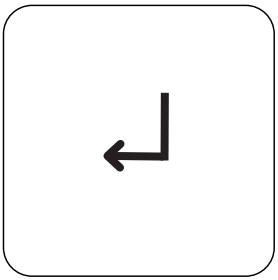
EN



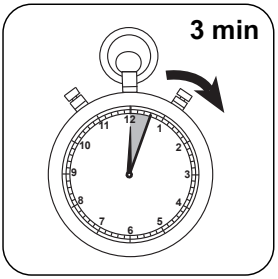
Close vial(s).



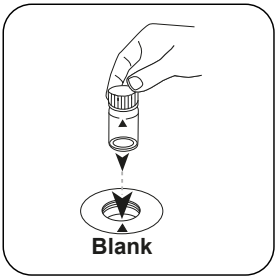
Swirl around to dissolve the powder.



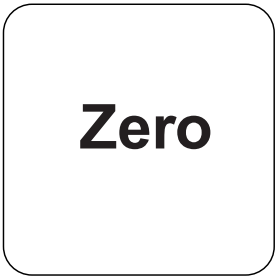
Press the **ENTER** button.



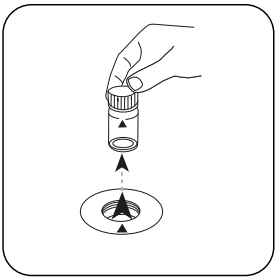
Wait for **3 minute(s) reaction time**.



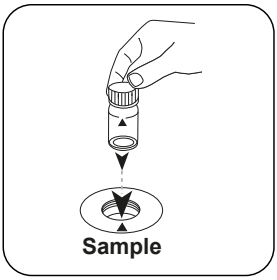
Place **blank** in the sample chamber. Pay attention to the positioning.



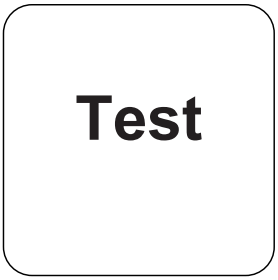
Press the **ZERO** button.



Remove the vial from the sample chamber.



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



Press the **TEST** button.

The result in **µg/L** Copper appears on the display.

Chemical Method

Porphyrine Indicator

Interferences

Persistant Interferences

1. Complexing substances can interfere in any concentration.

Interference	from / [mg/L]
Al^{3+}	60
Cd^{2+}	10
Ca^{2+}	15000
Cl^{-}	90000
Cr^{6+}	110
Co^{2+}	100
F^{-}	30000
Pb^{2+}	3
Mg^{2+}	10000
Mn	140
Mo	11
Ni^{2+}	60
K^{+}	60000
Na^{+}	90000
Zn^{2+}	9
Fe	6
Hg	3

Method Validation

Limit of Detection	2.6 µg/L
Limit of Quantification	7.9 µg/L
End of Measuring Range	210 µg/L
Sensitivity	156 µg/L/Abs
Confidence Intervall	5.5 µg/L
Standard Deviation	2.3 µg/L
Variation Coefficient	2.2 %

Copper PP M153

0.05 - 5 mg/L Cu Cu

Bicinchoninate

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
VARIO CU1 F10	Powder / 100 pc.	530300
VARIO CU1 F10	Powder / 1000 pc.	530303
ValidCheck Copper 2 mg/l	1 pc.	48141525

Preparation

1. Digestion is required for the determination of total copper.
2. The pH value of the sample must be adjusted between 4 and 6 before analysis (with potassium hydroxide solution or nitric acid). Any resulting dilution must be taken into account in the result.
   Note: pH values above 6 can lead to Copper precipitation.

Notes

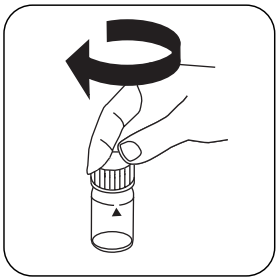
1. Accuracy is not affected by undissolved powder.

Determination of Copper, free with Vario Powder Pack

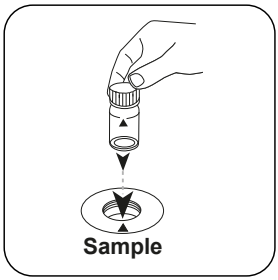
Select the method on the device.

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

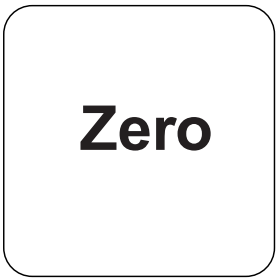
Fill 24 mm vial with **10 mL sample**.



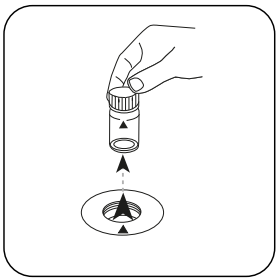
Close vial(s).



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

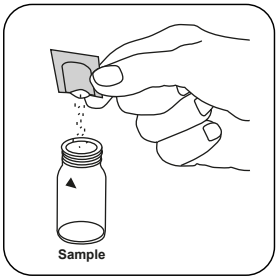


Press the **ZERO** button.

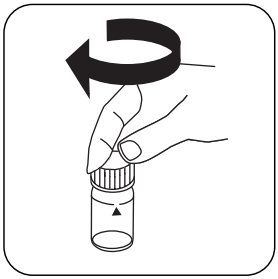


Remove the vial from the sample chamber.

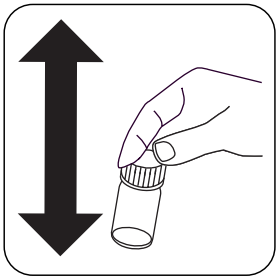
For devices that require **no ZERO measurement** , **start here**.



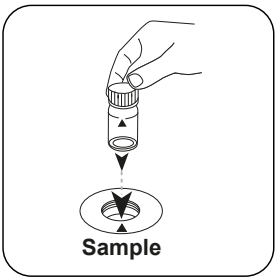
Add **Vario Cu 1 F10 powder pack**.

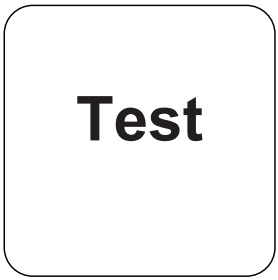


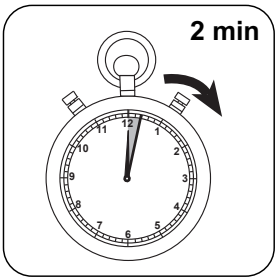
Close vial(s).



Mix the contents by shaking.







EN

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 Copper appears on the display.

Chemical Method

Bicinchoninate

Appendix

Interferences

Persistant Interferences

Hardness, Al and Fe produce lower test results.

Removeable Interferences

1. Cyanide, CN^-: Cyanide prevents full colour development.
   Cyanide interference is eliminated as follows: Add 0.2 ml Formaldehyde to 10 ml water sample and wait for a
   reaction time of 4 minutes. (Cyanide is masked). After this perform the test as described. Multiply the result by 1.02 to correct the sample dilution by Formaldehyde.
2. Silver, Ag^+: If a turbidity remains and turns black, silver interference is likely. Add 10 drops of saturated Potassium chloride solution to 75 ml of
   water sample and filter it through a fine filter. Use 10 ml of the filtered water sample to perform test.

Method Validation

Limit of Detection	0.05 mg/L
Limit of Quantification	0.15 mg/L
End of Measuring Range	5 mg/L
Sensitivity	3.77 mg/L / Abs
Confidence Intervall	0.064 mg/L
Standard Deviation	0.027 mg/L
Variation Coefficient	1.07 %

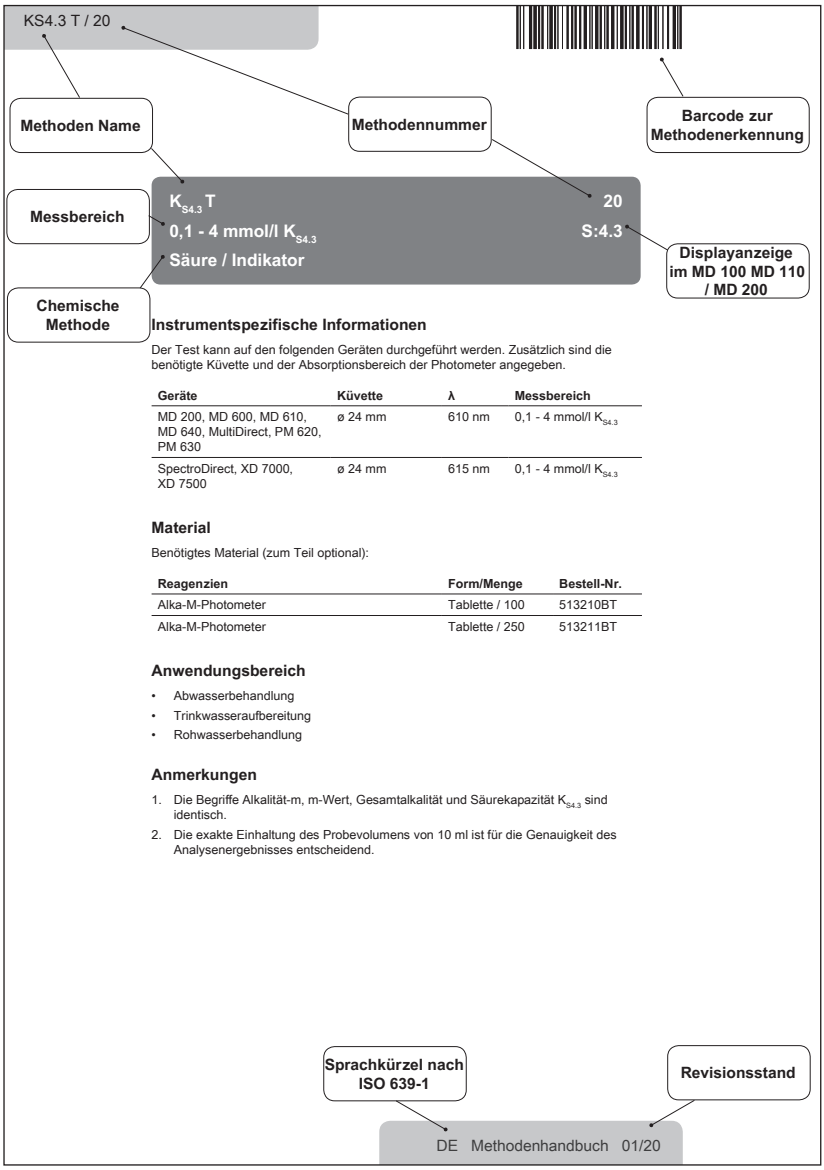
Bibliography

S. Nakano, Y. Zasshi, 82 486 - 491 (1962) [Chemical Abstracts, 58 3390e (1963)]

Derived from

APHA Method 3500Cu

DE


KS4.3 T / 20
Methoden Name
Methodennummer
Barcode zur Methodenerkennung
Messbereich
$K_{S4.3}$ T
20
0,1 - 4 mmol/l $K_{S4.3}$
S:4.3
Säure / Indikator
Displayanzeige im MD 100 MD 110 / MD 200
Chemische Methode
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.
Sprachkürzel nach ISO 639-1
Revisionsstand
DE Methodenhandbuch 01/20

Durchführung der Messung

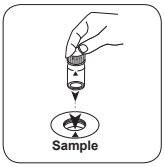
Durchführung der Bestimmung Säurekapazität $K_{S4.3}$ mit Tablette

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.

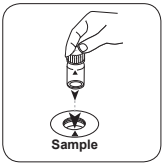
Küvette(n) verschließen.



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 $K_{S4.3}$.

Kupfer T **M150**

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

Biquinolin

DE

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
Copper No. 1	Tablette / 100	513550BT
Copper No. 1	Tablette / 250	513551BT
Copper No. 2	Tablette / 100	513560BT
Copper No. 2	Tablette / 250	513561BT
Set Copper No. 1/No. 2#	je 100	517691BT
Set Copper No. 1/No. 2#	je 250	517692BT
ValidCheck Kupfer 2 mg/L	1 St.	48141525

Vorbereitung

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

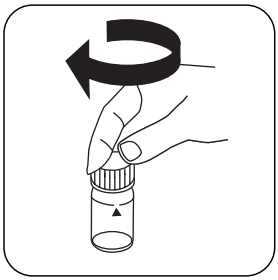
Durchführung der Bestimmung Kupfer, frei mit Tablette

Die Methode im Gerät auswählen.

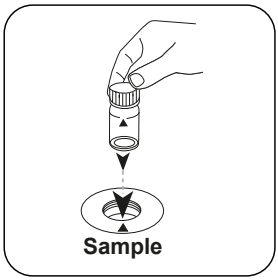
Wählen Sie zudem die Bestimmung: frei

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

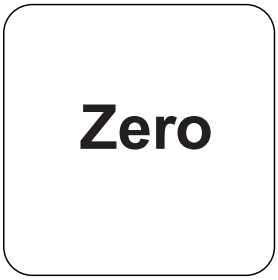
24-mm-Küvette mit **10 mL Probe** füllen.



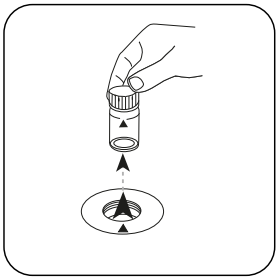
Küvette(n) verschließen.



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

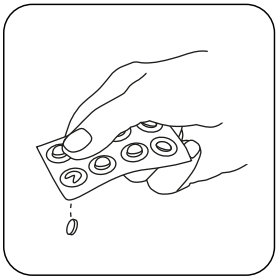


Taste **ZERO** drücken.

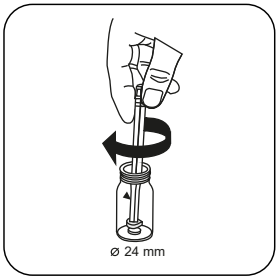


Küvette aus dem Messschacht nehmen.

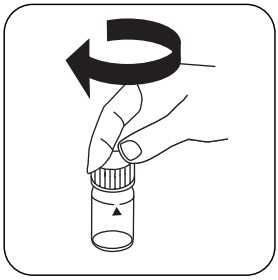
Bei Geräten, die **keine ZERO-Messung** erfordern, **hier beginnen**.



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

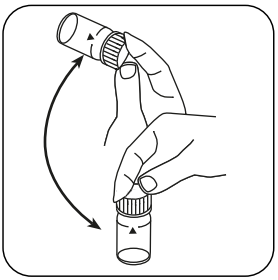


Tablette(n) unter leichter Drehung zerdrücken.

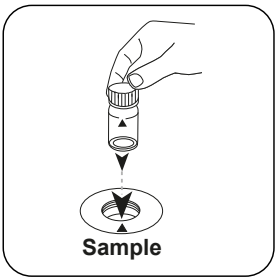


Küvette(n) verschließen.

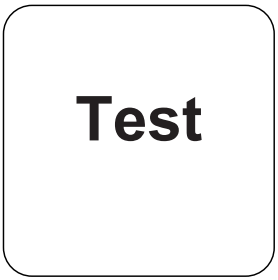
DE



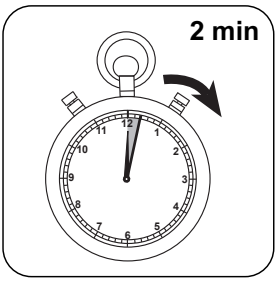
Tablette(n) durch Umschwenken lösen.



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



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



2 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

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

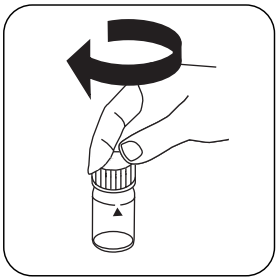
Durchführung der Bestimmung Kupfer, gesamt mit Tablette

Die Methode im Gerät auswählen.

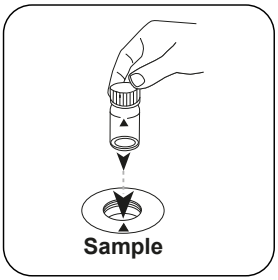
Wählen Sie zudem die Bestimmung: gesamt

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

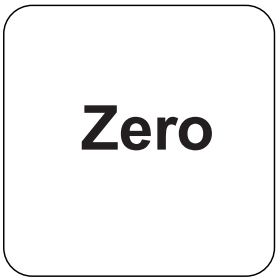
24-mm-Küvette mit **10 mL Probe** füllen.



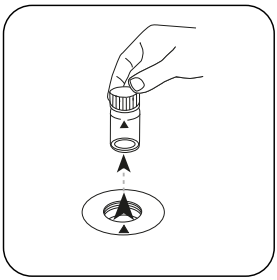
Küvette(n) verschließen.



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

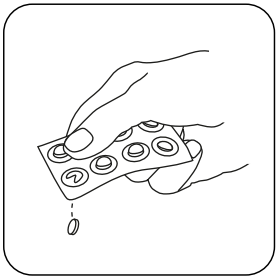


Taste **ZERO** drücken.

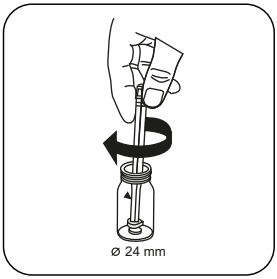


Küvette aus dem Messschacht nehmen.

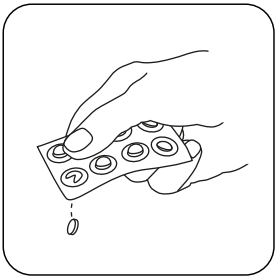
Bei Geräten, die **keine ZERO-Messung** erfordern, **hier beginnen**.



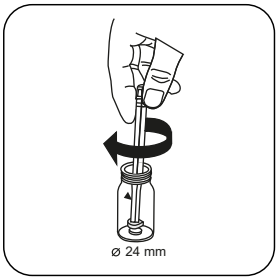
Eine **COPPER No. 1 Tablette** zugeben.



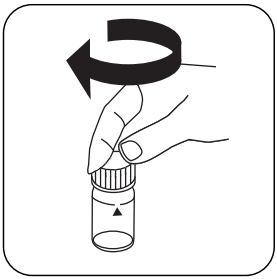
Die Tablette(n) unter leichter Drehung zerdrücken und lösen.



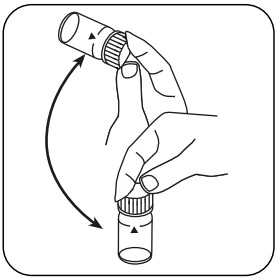
Eine **COPPER No. 2 Tablette** zugeben.



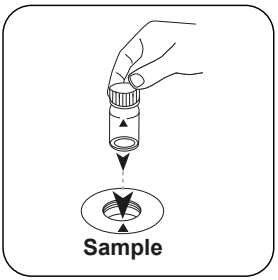
Tablette(n) unter leichter Drehung zerdrücken.



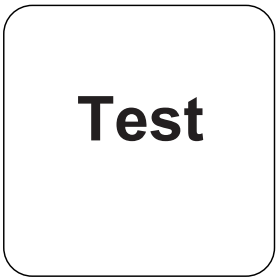
Küvette(n) verschließen.



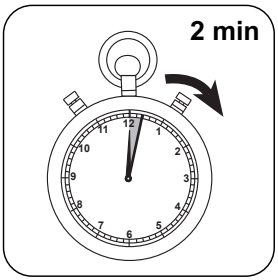
Tablette(n) durch Umschwenken lösen.



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



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



2 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

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

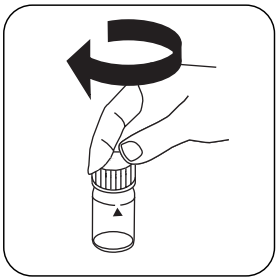
Durchführung der Bestimmung Kupfer , differenzierte Bestimmung mit Tablette

Die Methode im Gerät auswählen.

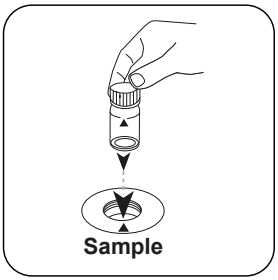
Wählen Sie zudem die Bestimmung: differenziert

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

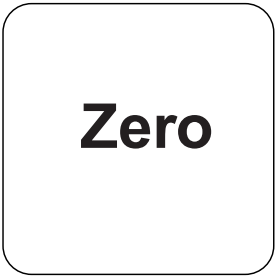
24-mm-Küvette mit **10 mL Probe** füllen.



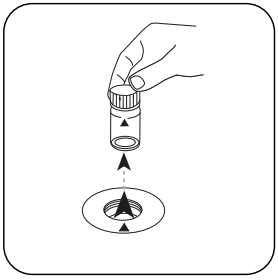
Küvette(n) verschließen.



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

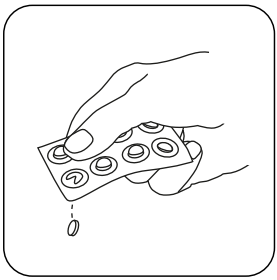


Taste **ZERO** drücken.

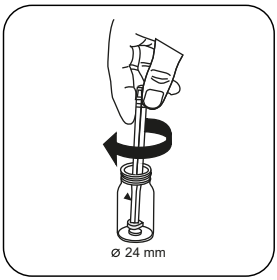


Küvette aus dem Messschacht nehmen.

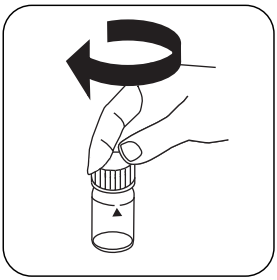
Bei Geräten, die **keine ZERO-Messung** erfordern, **hier beginnen**.



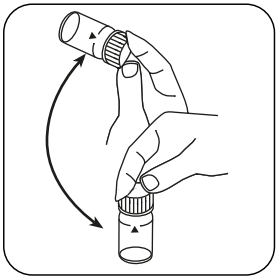
Eine **COPPER No. 1 Tablette** zugeben.



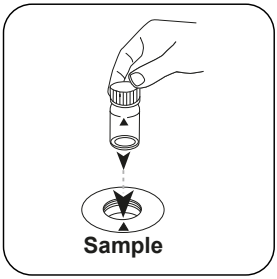
Tablette(n) unter leichter Drehung zerdrücken.



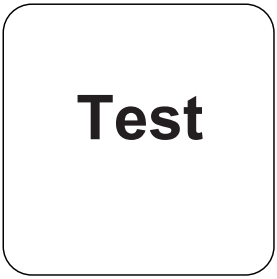
Küvette(n) verschließen.



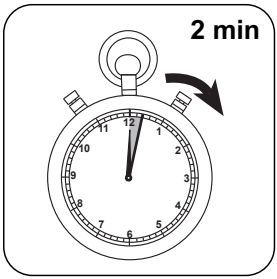
Tablette(n) durch Umschwenken lösen.



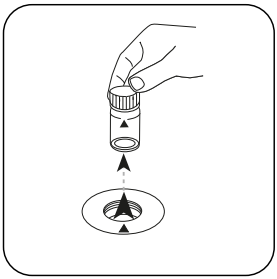
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



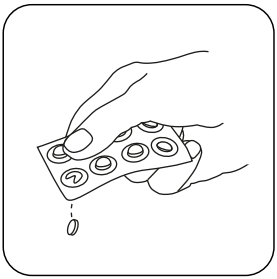
Taste **TEST** (XD: **START**) drücken.



2 Minute(n) Reaktionszeit abwarten.

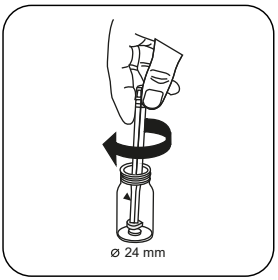


Küvette aus dem Messschacht nehmen.

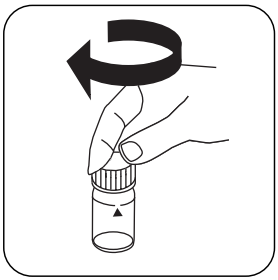


Eine **COPPER No. 2 Tablette** zugeben.

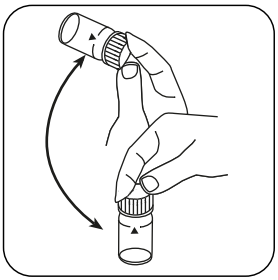
DE



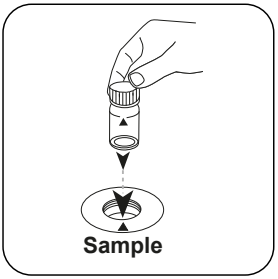
Tablette(n) unter leichter Drehung zerdrücken.



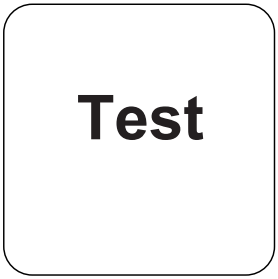
Küvette(n) verschließen.



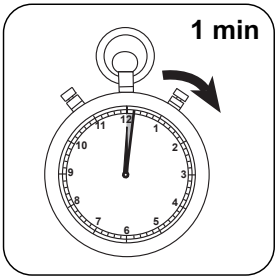
Tablette(n) durch Umschwenken lösen.



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



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



1 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

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

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

Kupfer VLR PP M152

2 - 210 µg/L Cu

Porphyrine Indicator

DE

Material

Benötigtes Material (zum Teil optional):

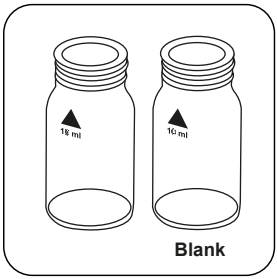
Reagenzien	Form/Menge	Bestell-Nr.
VARIO Copper, Set F10	1 Satz	535140

Anmerkungen

1. Um möglichst genaue Ergebnisse zu erzielen, sollte eine Reagenzienblindmessung durchgeführt werden.
2. Der pH-Wert der Probe muss vor Beginn der Messung durch Zugabe von Natronlauge oder Salpetersäure auf einen Bereich von 2-6 eingestellt werden..

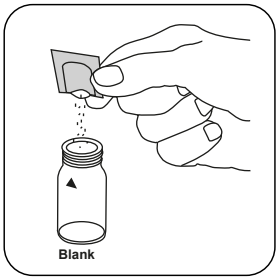
Durchführung der Bestimmung Kupfer VLR mit Pulverpäckchen

Die Methode im Gerät auswählen.

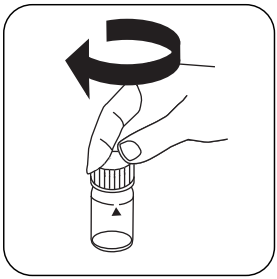


Zwei saubere 24-mm-Küvetten bereitstellen. Eine als Nullküvette kennzeichnen.

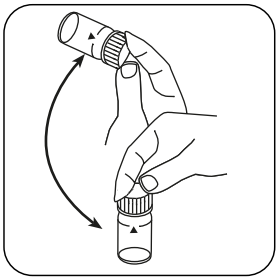
In jede Küvette **10 mL Probe** geben.



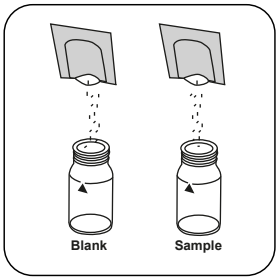
Der Nüllküvette ein **CU3 Masking F10 Pulverpäckchen** zugeben.



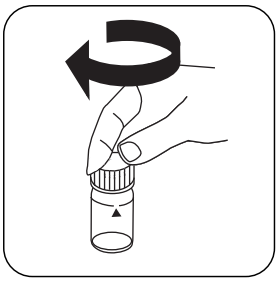
Küvette(n) verschließen.



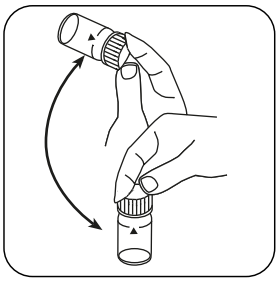
Das Pulver durch Umschwenken lösen.



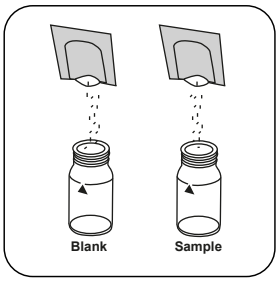
In jede Küvette **ein CU1 Porphyrin F10 Pulverpäckchen** geben.



Küvette(n) verschließen.

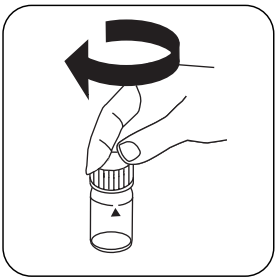


Das Pulver durch Umschwenken lösen.

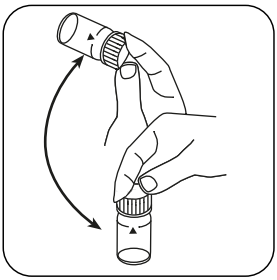


In jede Küvette **ein CU2 Porphyrin F10 Pulverpäckchen** geben.

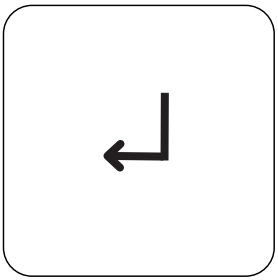
DE



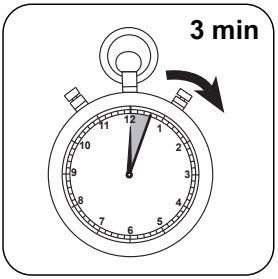
Küvette(n) verschließen.



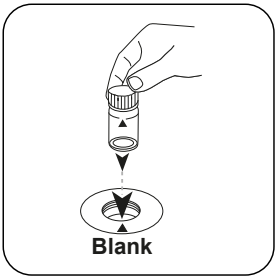
Das Pulver durch Umschwenken lösen.



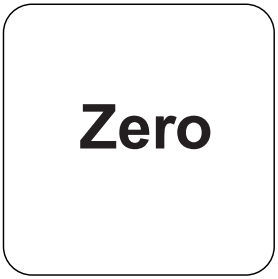
Taste **ENTER** drücken.



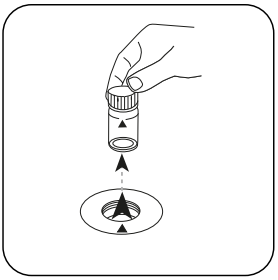
3 Minute(n) Reaktionszeit abwarten.



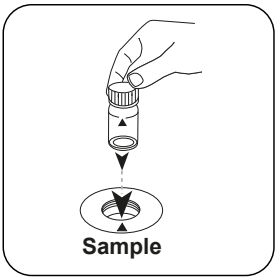
Die **Nullküvette** in den Messschacht stellen. Positionierung beachten.



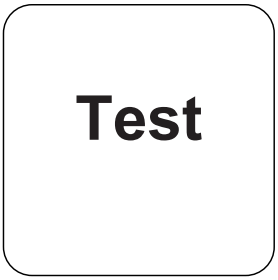
Taste **ZERO** drücken.



Küvette aus dem Messschacht nehmen.



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



Taste **TEST** drücken.

In der Anzeige erscheint das Ergebnis in **µg/L** Kupfer.

Chemische Methode

Porphyrine Indicator

Störungen

Permanente Störungen

1. Komplexbildende Substanzen können in jeder Konzentration stören.

Störung	Stört ab / [mg/L]
Al^{3+}	60
Cd^{2+}	10
Ca^{2+}	15000
Cl^{-}	90000
Cr^{6+}	110
Co^{2+}	100
F^{-}	30000
Pb^{2+}	3
Mg^{2+}	10000
Mn	140
Mo	11
Ni^{2+}	60
K^{+}	60000
Na^{+}	90000
Zn^{2+}	9
Fe	6
Hg	3

Methodenvalidierung

Nachweisgrenze	2.6 µg/L
Bestimmungsgrenze	7.9 µg/L
Messbereichsende	210 µg/L
Empfindlichkeit	156 µg/L/Abs
Vertrauensbereich	5.5 µg/L
Verfahrensstandardabweichung	2.3 µg/L
Verfahrensvariationskoeffizient	2.2 %

Kupfer PP M153

0,05 - 5 mg/L Cu Cu

Bicinchoninat

DE

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
VARIO Cu1 F10	Pulver / 100 St.	530300
VARIO Cu1 F10	Pulver / 1000 St.	530303
ValidCheck Kupfer 2 mg/L	1 St.	48141525

Vorbereitung

1. Für die Bestimmung von Gesamtkupfer ist ein Aufschluss erforderlich.
2. Der pH-Wert der Probe muss vor der Analyse zwischen 4 und 6 eingestellt werden (mit Kaliumhydroxidlösung oder Salpetersäure). Eine dadurch erfolgte Verdünnung ist beim Ergebnis zu berücksichtigen.
   Achtung: Bei pH-Werten über 6 kann Kupfer ausfallen.

Anmerkungen

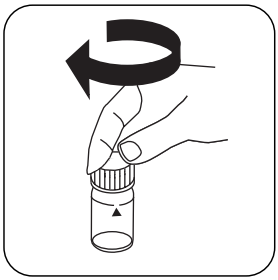
1. Die Genauigkeit wird durch ungelöstes Pulver nicht beeinflusst.

Durchführung der Bestimmung Kupfer, frei mit Vario Pulverpäckchen

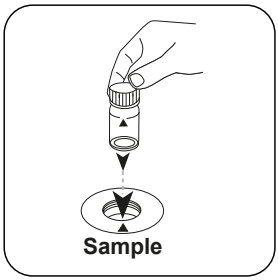
Die Methode im Gerät auswählen.

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

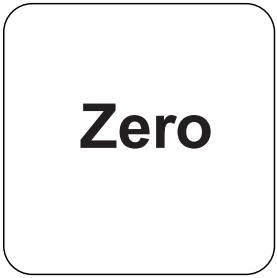
24-mm-Küvette mit **10 mL Probe** füllen.



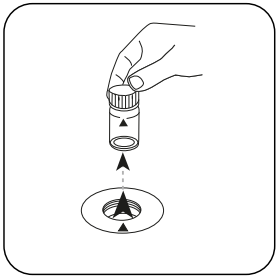
Küvette(n) verschließen.



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

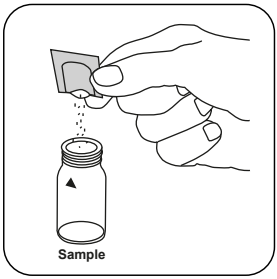


Taste **ZERO** drücken.

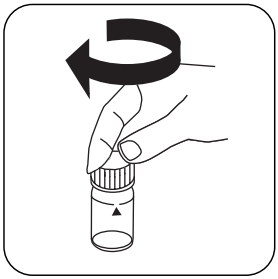


Küvette aus dem Messschacht nehmen.

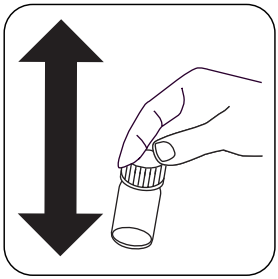
Bei Geräten, die **keine ZERO-Messung** erfordern, **hier beginnen**.



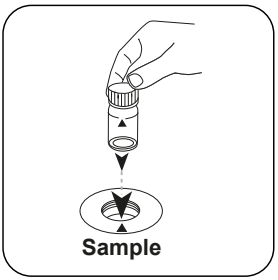
Ein **Vario Cu 1 F10 Pulverpäckchen** zugeben.

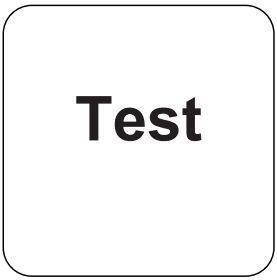


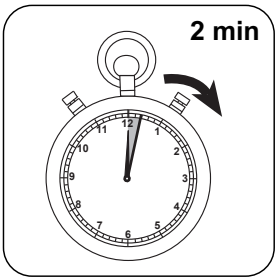
Küvette(n) verschließen.



Inhalt durch Schütteln mischen.







DE

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 Kupfer.

Chemische Methode

Bicinchoninat

Appendix

Störungen

Permanente Störungen

Härte, Al und Fe erzeugen niedrigere Testergebnisse.

Ausschließbare Störungen

1. Cyanid, CN^-: Cyanid verhindert eine vollständige Farbentwicklung. Eine Störung durch Cyanid ist wie folgt zu beseitigen: 10 ml Probe mit 0,2 ml Formaldehyd versetzen und 4 Minuten Reaktionszeit abwarten. (Cyanid wird maskiert). Anschließend den Test wie beschrieben durchführen. Das Ergebnis mit 1,02 multiplizieren, um die Verdünnung der Probe mit Formaldehyd zu berücksichtigen.
2. Silber, Ag^+: Eine bestehende Trübung, die sich schwarz färbt, kann durch Silber verursacht sein. 75 ml Probe mit 10 Tropfen einer gesättigten Kaliumchloridlösung versetzen und anschließend durch einen feinen Filter filtrieren. 10 ml der filtrierten Probe für die Durchführung verwenden.

Methodenvalidierung

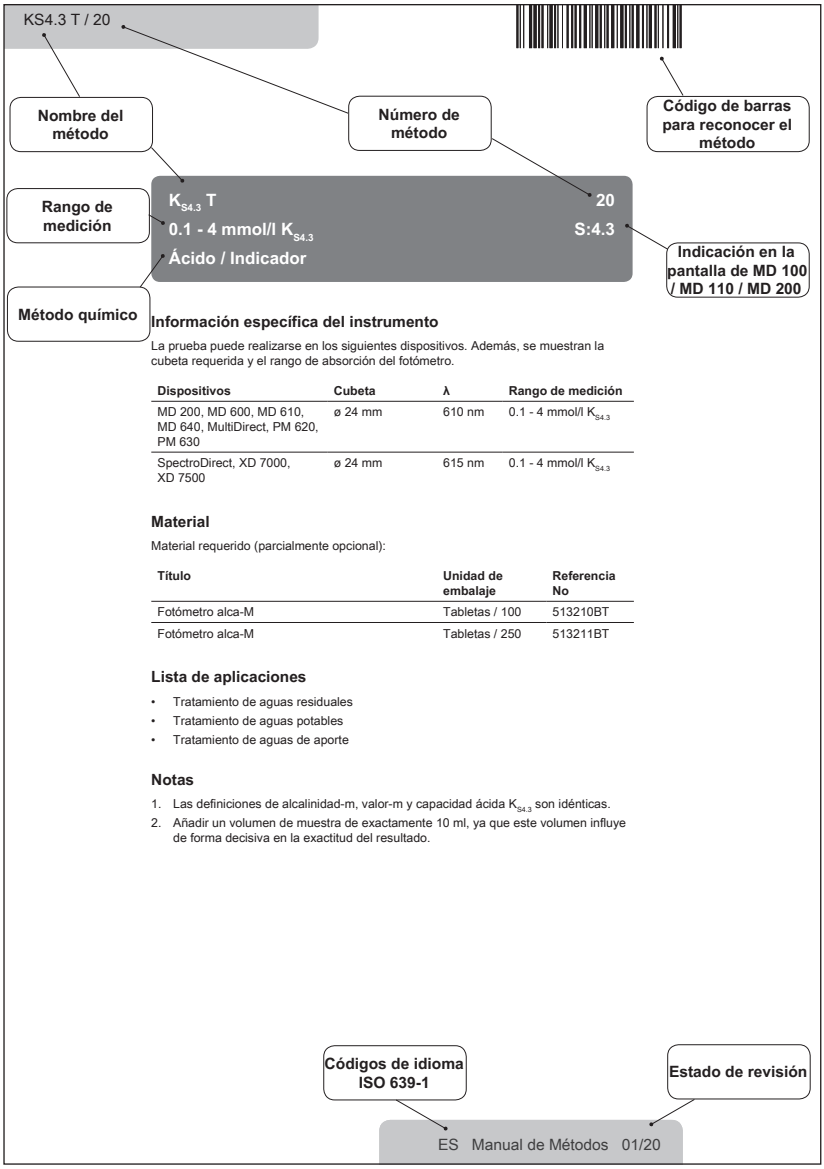
Nachweisgrenze	0.05 mg/L
Bestimmungsgrenze	0.15 mg/L
Messbereichsende	5 mg/L
Empfindlichkeit	3.77 mg/L / Abs
Vertrauensbereich	0.064 mg/L
Verfahrensstandardabweichung	0.027 mg/L
Verfahrensvariationskoeffizient	1.07 %

Literaturverweise

S. Nakano, Y. Zasshi, 82 486 - 491 (1962) [Chemical Abstracts, 58 3390e (1963)]

Abgeleitet von

APHA Method 3500Cu


KS4.3 T / 20
Nombre del método
Número de método
Código de barras para reconocer el método
Rango de medición
$K_{S4.3}$ T
20
0.1 - 4 mmol/l $K_{S4.3}$
S:4.3
Ácido / Indicador
Indicación en la pantalla de MD 100 / MD 110 / MD 200
Método químico
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.
Códigos de idioma ISO 639-1
Estado de revisión
ES Manual de Métodos 01/20

Realización de la determinación

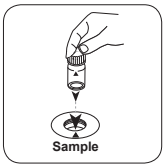
Ejecución de la determinación Capacidad ácida $K_{S4.3}$ con tableta

Seleccionar el método en el aparato.

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

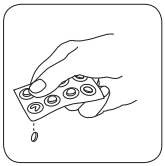
Llenar la cubeta de 24 mm con **10 ml de muestra** .

Cerrar la(s) cubeta(s).

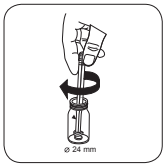


Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

• • •



Añadir **tableta ALKA-M-PHOTOMETER**.



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

Cerrar la(s) cubeta(s).

Cobre T **M150**

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

Biquinolina

ES

Material

Material requerido (parcialmente opcional):

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

Preparación

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

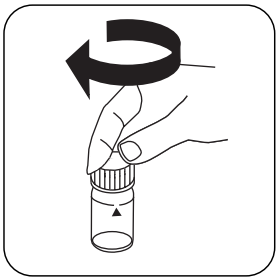
Ejecución de la determinación Cobre libre con tableta

Seleccionar el método en el aparato.

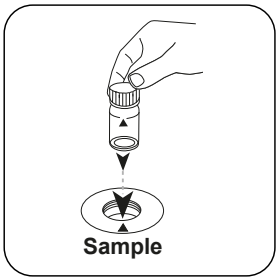
Seleccione además la determinación: libre

Para este método, no es necesario realizar una medición CERO cada vez en los siguientes dispositivos: XD 7000, XD 7500

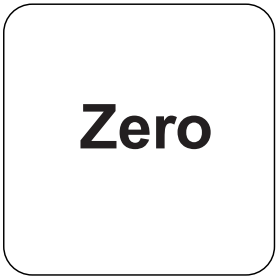
Llenar la cubeta de 24 mm con **10 mL de muestra** .



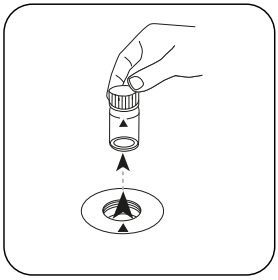
Cerrar la(s) cubeta(s).



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

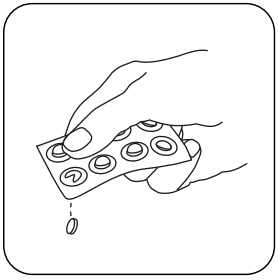


Pulsar la tecla **ZERO**.

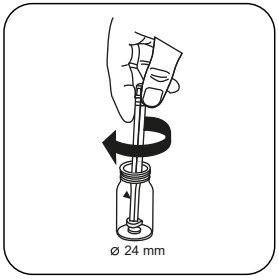


Extraer la cubeta del compartimiento de medición.

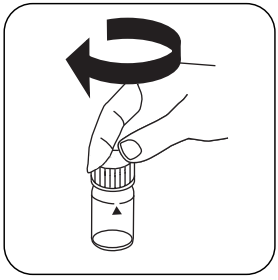
Para los aparatos que **no requieran medición CERO** , **empezar aquí**.



Añadir **tableta COPPER No. 1**.

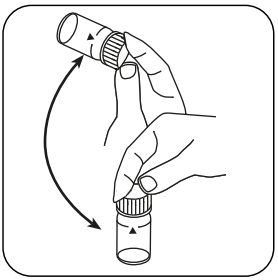


Triturar la(s) tableta(s) girando ligeramente.

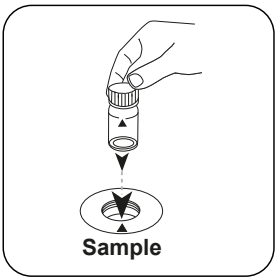


Cerrar la(s) cubeta(s).

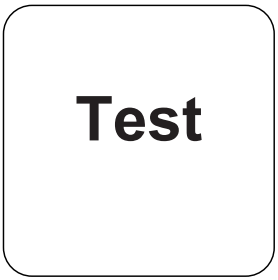
ES



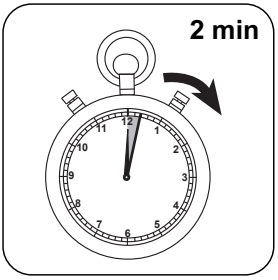
Disolver la(s) tableta(s) girando.



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.

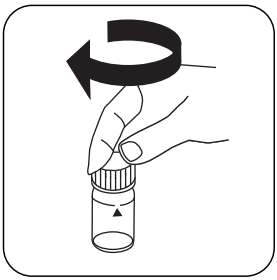
Ejecución de la determinación Cobre total con tableta

Seleccionar el método en el aparato.

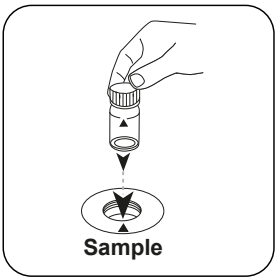
Seleccione además la determinación: total

Para este método, no es necesario realizar una medición CERO cada vez en los siguientes dispositivos: XD 7000, XD 7500

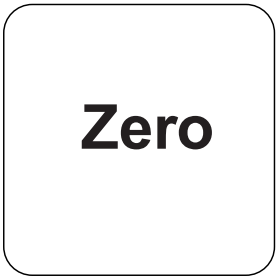
Llenar la cubeta de 24 mm con **10 mL de muestra** .



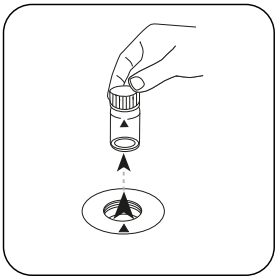
Cerrar la(s) cubeta(s).



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

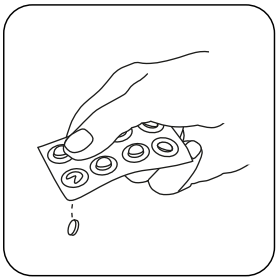


Pulsar la tecla **ZERO**.

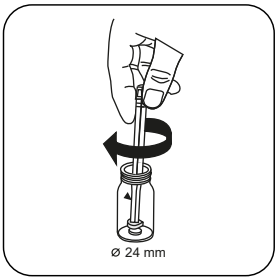


Extraer la cubeta del compartimiento de medición.

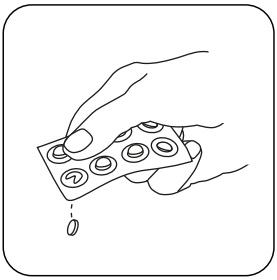
Para los aparatos que **no requieran medición CERO** , **empezar aquí**.



Añadir **tableta COPPER No. 1**.

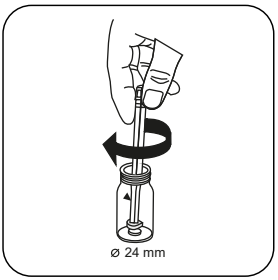


Triturar la(s) tableta(s) girando ligeramente y disolver.

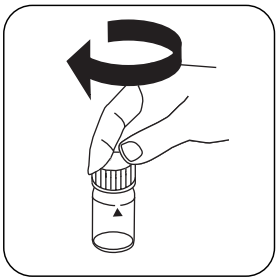


Añadir **tableta COPPER No. 2**.

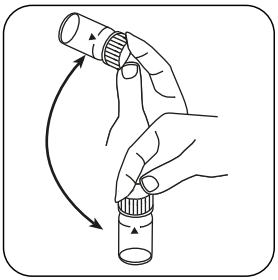
ES



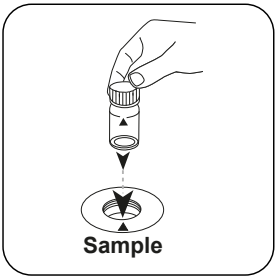
Triturar la(s) tableta(s) girando ligeramente.



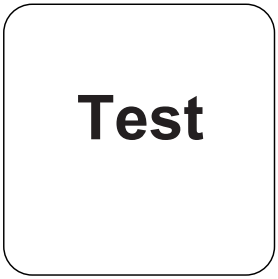
Cerrar la(s) cubeta(s).



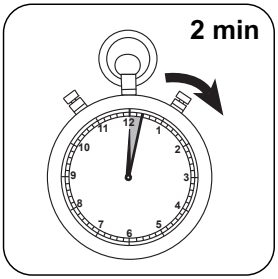
Disolver la(s) tableta(s) girando.



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



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.

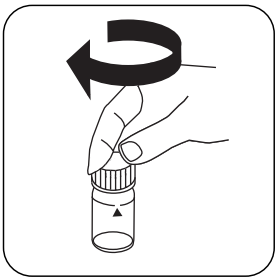
Ejecución de la determinación Cobre, determinación diferenciada con tableta

Seleccionar el método en el aparato.

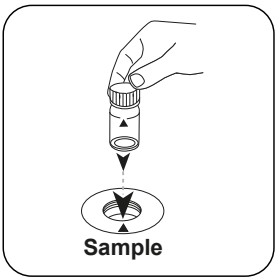
Seleccione además la determinación: diferenciado

Para este método, no es necesario realizar una medición CERO cada vez en los siguientes dispositivos: XD 7000, XD 7500

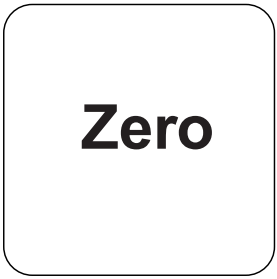
Llenar la cubeta de 24 mm con **10 mL de muestra** .



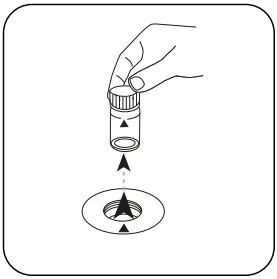
Cerrar la(s) cubeta(s).



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

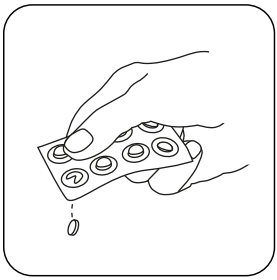


Pulsar la tecla **ZERO**.

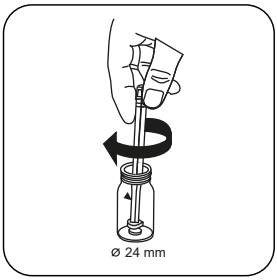


Extraer la cubeta del compartimiento de medición.

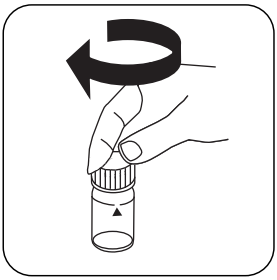
Para los aparatos que **no requieran medición CERO** , **empezar aquí**.



Añadir **tableta COPPER No. 1**.



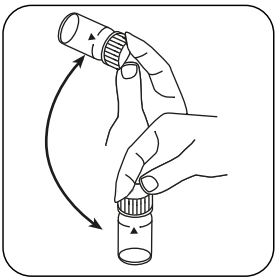
Triturar la(s) tableta(s) girando ligeramente.



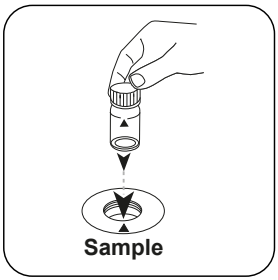
Cerrar la(s) cubeta(s).

ES

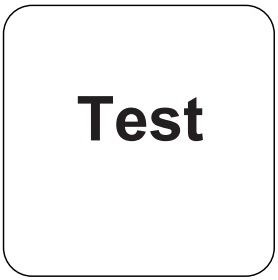
ES



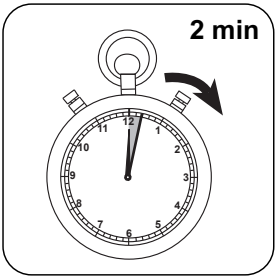
Disolver la(s) tableta(s) girando.



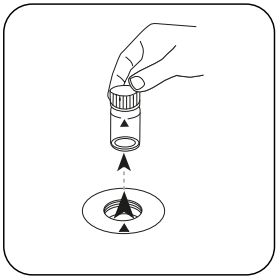
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



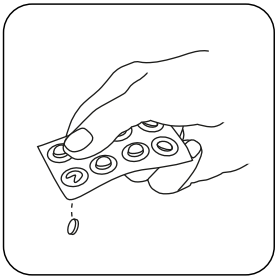
Pulsar la tecla **TEST** (XD: **START**).



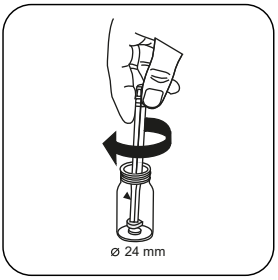
Esperar **2 minutos como periodo de reacción**.



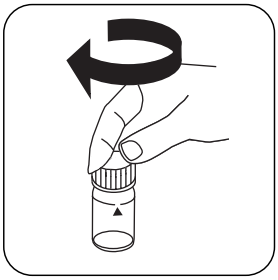
Extraer la cubeta del compartimiento de medición.



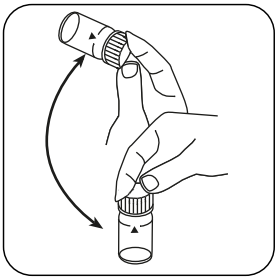
Añadir **tableta COPPER No. 2**.



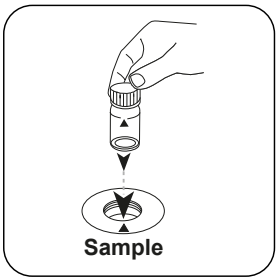
Triturar la(s) tableta(s) girando ligeramente.



Cerrar la(s) cubeta(s).



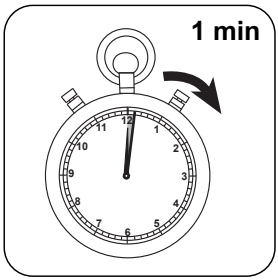
Disolver la(s) tableta(s) girando.



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

Test

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



Esperar **1 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; Cobre combinado; Cobre total.

Método químico

Biquinolina

Apéndice

ES

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

Cobre VLR PP M152

2 - 210 µg/L Cu

Porphyrine Indicator

ES

Material

Material requerido (parcialmente opcional):

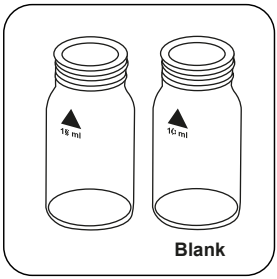
Reactivos	Unidad de embalaje	No. de referencia
Copper VARIO, juego F10	1 Set	535140

Notas

1. Para obtener resultados más precisos, debe realizarse una medición en blanco con reactivos.
2. El pH de la muestra debe adaptarse mediante la adición de una solución de hidróxido de sodio o de ácido salpétrico a un rango de 2 a 6 antes de iniciar la medición.

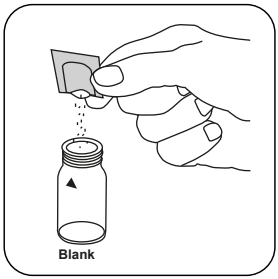
Ejecución de la determinación Cobre VLR con sobres de polvos

Seleccionar el método en el aparato.

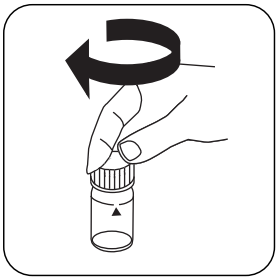


Preparar dos cubetas limpias de 24 mm. Identificar una como cubeta en blanco.

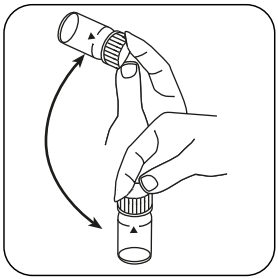
Añadir en cada cubeta **10 mL de muestra**.



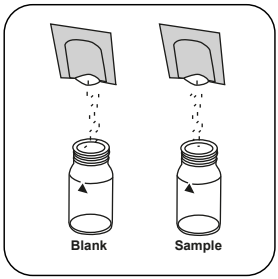
Añadir un **sobre de polvos CU3 Masking F10** en la cubeta en blanco.



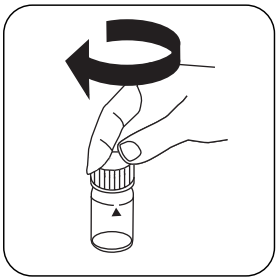
Cerrar la(s) cubeta(s).



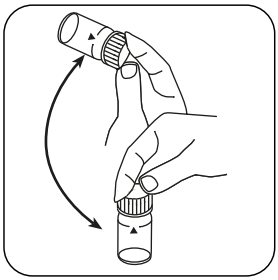
Disolver los polvos girando.



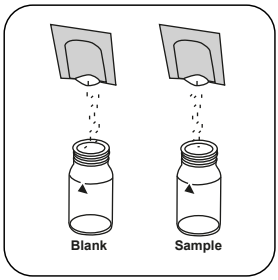
Añadir **un sobre de polvos de CU1 Porphyrin F10** en cada cubeta.



Cerrar la(s) cubeta(s).

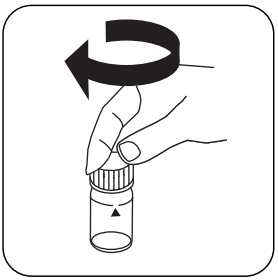


Disolver los polvos girando.

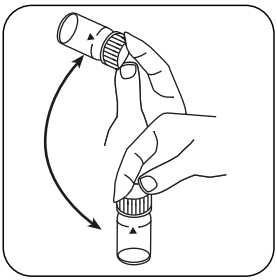


Añadir **un sobre de polvos de CU2 Porphyrin F10** en cada cubeta.

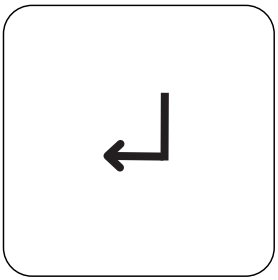
ES



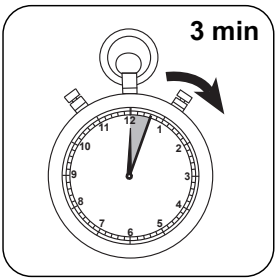
Cerrar la(s) cubeta(s).



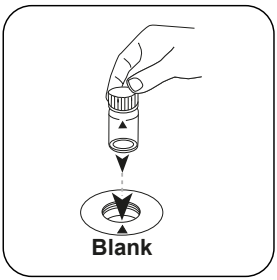
Disolver los polvos girando.



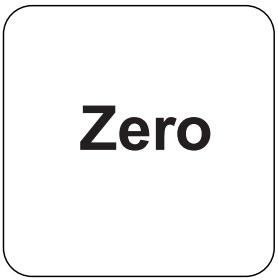
Pulsar la tecla **ENTER**.



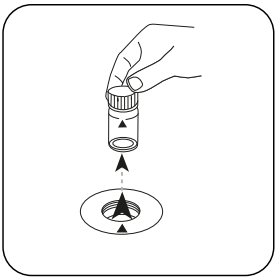
Esperar **3 minutos como periodo de reacción**.



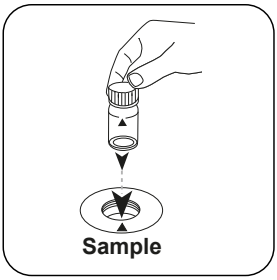
Poner la **cubeta en blanco** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



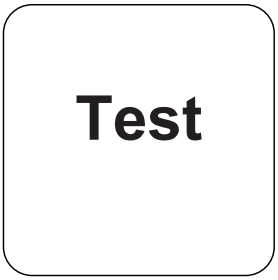
Pulsar la tecla **ZERO**.



Extraer la cubeta del compartimiento de medición.



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



Pulsar la tecla **TEST**.

A continuación se visualiza el resultado en **µg/L** Cobre.

Método químico

Porphyrine Indicator

Interferencia

Interferencias persistentes

1. Las sustancias complejantes pueden interferir en cualquier concentración.

Interferencia	de / [mg/L]
Al^{3+}	60
Cd^{2+}	10
Ca^{2+}	15000
Cl^{-}	90000
Cr^{6+}	110
Co^{2+}	100
F^{-}	30000
Pb^{2+}	3
Mg^{2+}	10000
Mn	140
Mo	11
Ni^{2+}	60
K^{+}	60000
Na^{+}	90000
Zn^{2+}	9
Fe	6
Hg	3

Validación del método

Límite de detección	2.6 µg/L
Límite de determinación	7.9 µg/L
Límite del rango de medición	210 µg/L
Sensibilidad	156 µg/L/Abs
Intervalo de confianza	5.5 µg/L
Desviación estándar	2.3 µg/L
Coeficiente de variación	2.2 %

Cobre PP M153

0.05 - 5 mg/L Cu Cu

Bicinchoninat

ES

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Cu1 F10 VARIO	Polvos / 100 Cantidad	530300
Cu1 F10 VARIO	Polvos / 1000 Cantidad	530303
ValidCheck cobre 2 mg/l	1 Cantidad	48141525

Preparación

1. Para la determinación del cobre total es necesaria una disgregación.
2. El pH de la muestra debe ajustarse entre 4 y 6 antes del análisis (con solución de hidróxido potásico o ácido nítrico). Cualquier dilución resultante debe tenerse en cuenta en el resultado.
   Atención: Con valores mayores a pH 6 el cobre puede precipitarse.

Notas

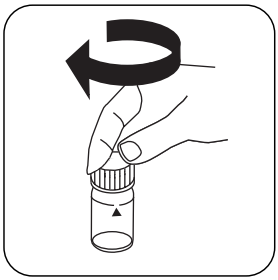
1. Los polvos no disueltos no influyen en la exactitud del método.

Ejecución de la determinación Cobre, libre con sobres de polvos Vario

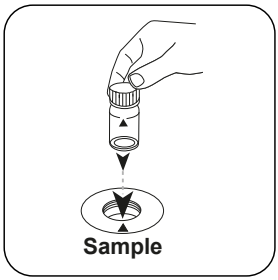
Seleccionar el método en el aparato.

Para este método, no es necesario realizar una medición CERO cada vez en los siguientes dispositivos: XD 7000, XD 7500

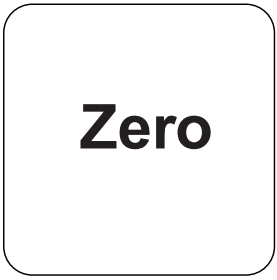
Llenar la cubeta de 24 mm con **10 mL de muestra** .



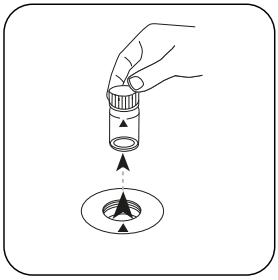
Cerrar la(s) cubeta(s).



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

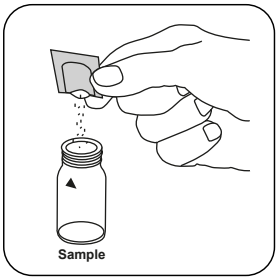


Pulsar la tecla **ZERO**.

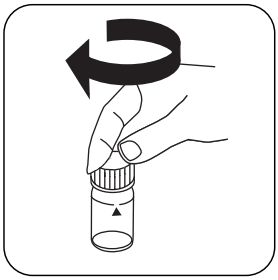


Extraer la cubeta del compartimiento de medición.

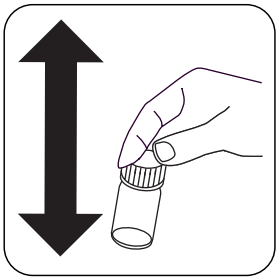
Para los aparatos que **no requieran medición CERO** , **empezar aquí**.



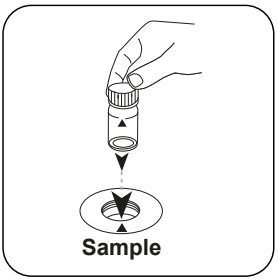
Añadir un **sobre de polvos Vario Cu 1 F10** .

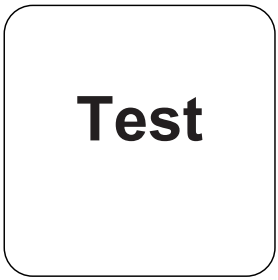


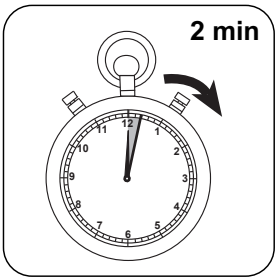
Cerrar la(s) cubeta(s).



Mezclar el contenido agitando.







ES

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.

Método químico

Bicinchoninat

Apéndice

Interferencia

Interferencias persistentes

El dureza, Al y Fe producen resultados de pruebas inferiores.

Interferencias extraibles

1. Cianuro, CN^-: El cianuro impide una reacción colorea completa.
   Una perturbación debido a cianuro debe solucionarse del modo siguiente: Añadir 0,2 ml de formaldehído a 10 ml de muestra y esperar 4 minutos como tiempo de reacción. (El cianuro se enmascarará). Realice a continuación la determinación como se ha descrito anteriormente. Multiplique el resultado por el factor 1,02 para considerar la dilución de la muestra.
2. Plata, Ag^+: Un enturbiamiento que se colorea de negro puede ser producido por plata. Añadir a 75 ml de muestra acuosa 10 gotas de solución saturada de cloruro potásico, filtrándola a continuación por un filtro fino. Utilizar 10 ml de la muestra filtrada para realizar la determinación.

Validación del método

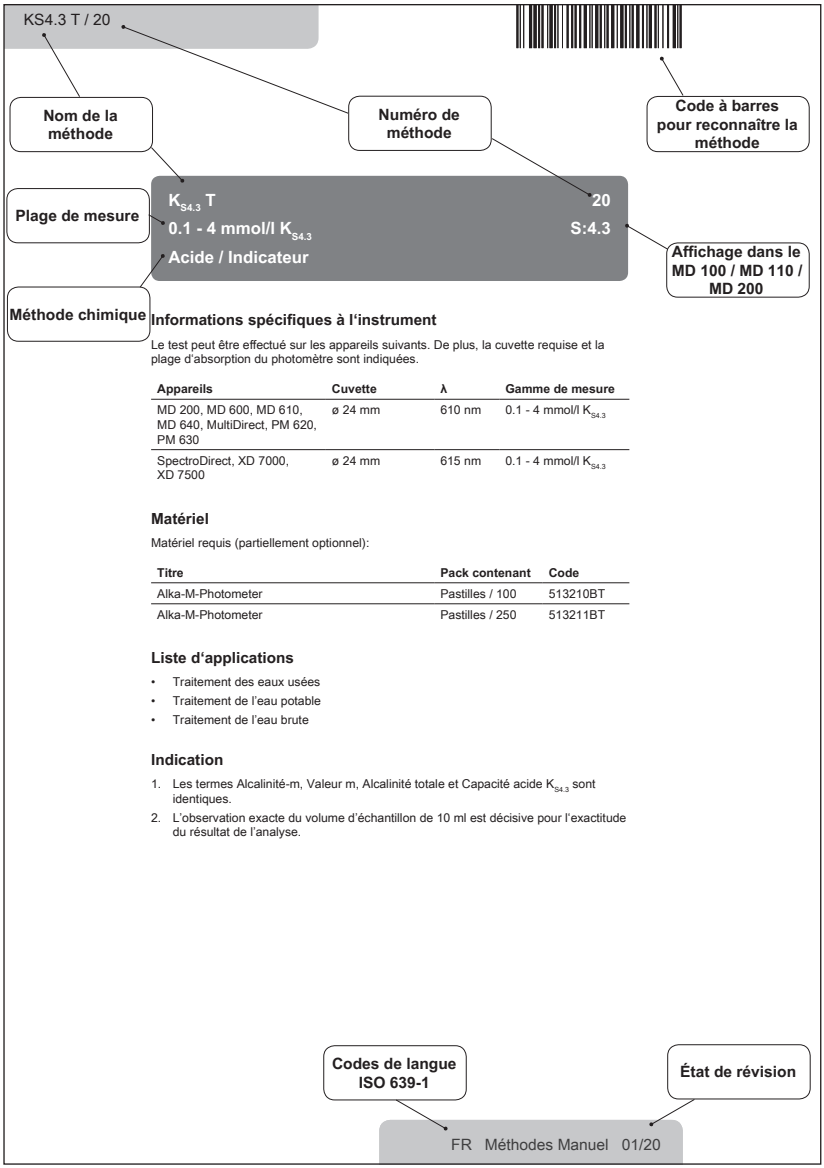
Límite de detección	0.05 mg/L
Límite de determinación	0.15 mg/L
Límite del rango de medición	5 mg/L
Sensibilidad	3.77 mg/L / Abs
Intervalo de confianza	0.064 mg/L
Desviación estándar	0.027 mg/L
Coeficiente de variación	1.07 %

Bibliografía

S. Nakano, Y. Zasshi, 82 486 - 491 (1962) [Chemical Abstracts, 58 3390e (1963)]

Derivado de

Método APHA 3500Cu



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.

Procédure du test

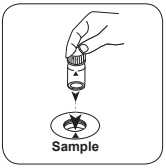
Réalisation de la quantification Capacité acide $K_{S4.3}$ avec pastille

Sélectionnez la méthode sur l'appareil.

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

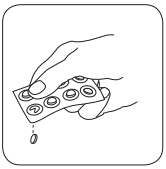
Remplissez une cuvette de 24 mm de **10 ml d'échantillon**.

Fermez la(les) cuvette(s).

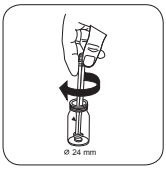


Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.

• • •



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



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

Fermez la(les) cuvette(s).

Cuivre T **M150**

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

Biquinoline

FR

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
Cuivre N° 1	Pastilles / 100	513550BT
Cuivre N° 1	Pastilles / 250	513551BT
Cuivre N° 2	Pastilles / 100	513560BT
Cuivre N° 2	Pastilles / 250	513561BT
Kit cuivre N° 1/N° 2#	100 chacun	517691BT
Kit cuivre N° 1/N° 2#	250 chacun	517692BT
ValidCheck Cuivre 2 mg/l	1 Pièces	48141525

Préparation

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

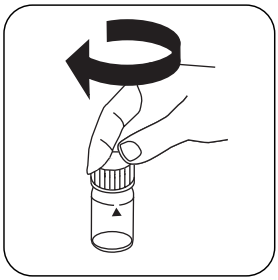
Réalisation de la quantification Cuivre, libre avec pastille

Sélectionnez la méthode sur l'appareil.

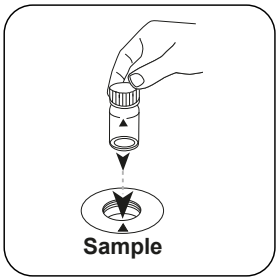
Sélectionnez également la quantification : libre

Pour cette méthode, il n'est pas nécessaire d'effectuer une mesure ZERO à chaque fois sur les appareils suivants : XD 7000, XD 7500

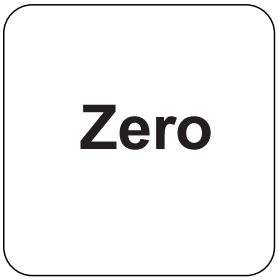
Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



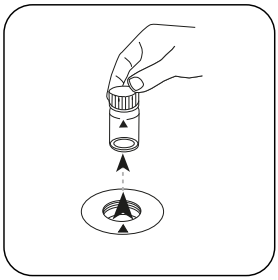
Fermez la(les) cuvette(s).



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

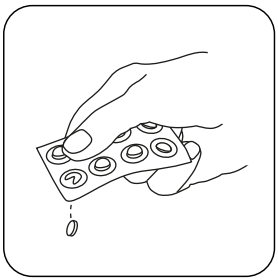


Appuyez sur la touche **ZERO**.

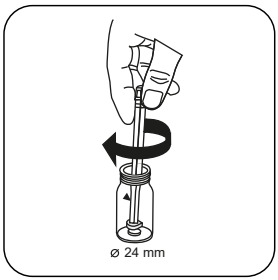


Retirez la cuvette de la chambre de mesure.

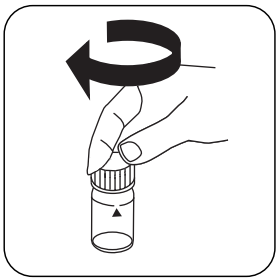
Sur les appareils ne nécessitant **aucune mesure ZÉRO** , **commencez ici**.



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

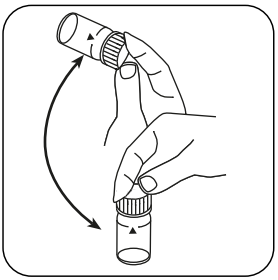


Écrasez la(les) pastille(s) en la(les) tournant un peu.

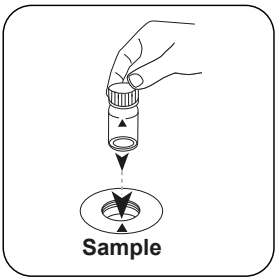


Fermez la(les) cuvette(s).

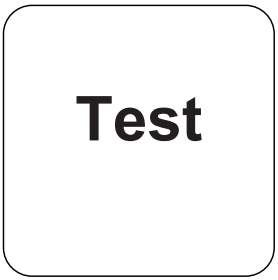
FR



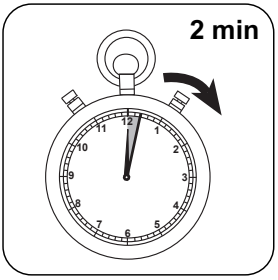
Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



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



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



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.

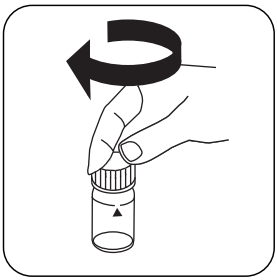
Réalisation de la quantification Cuivre, total avec pastille

Sélectionnez la méthode sur l'appareil.

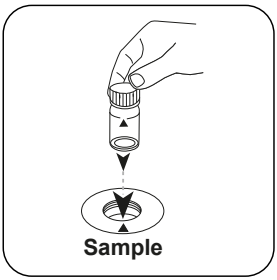
Sélectionnez également la quantification : total

Pour cette méthode, il n'est pas nécessaire d'effectuer une mesure ZERO à chaque fois sur les appareils suivants : XD 7000, XD 7500

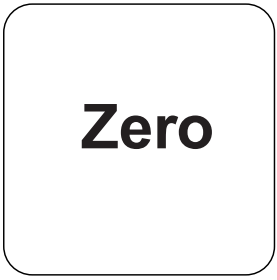
Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



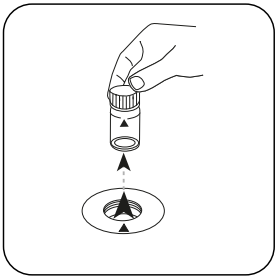
Fermez la(les) cuvette(s).



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

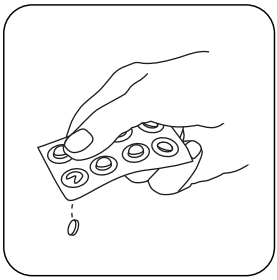


Appuyez sur la touche **ZERO**.

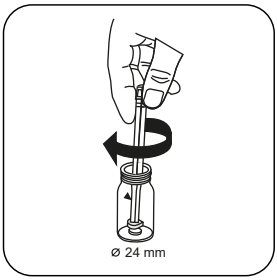


Retirez la cuvette de la chambre de mesure.

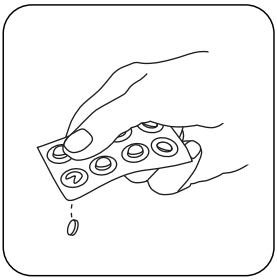
Sur les appareils ne nécessitant **aucune mesure ZÉRO** , **commencez ici**.



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**.

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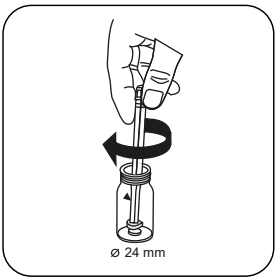
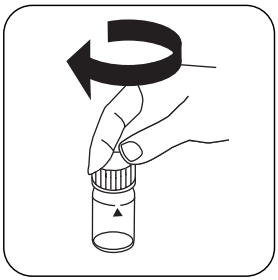
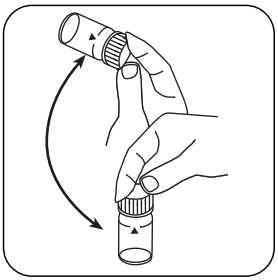


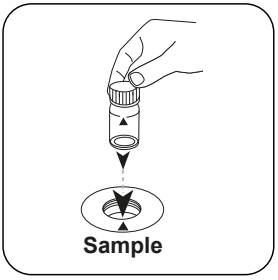
Écrasez la(les) pastille(s) en la(les) tournant un peu.



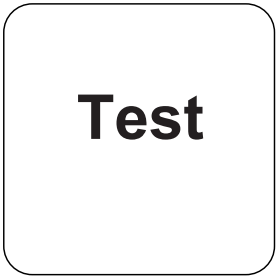
Fermez la(les) cuvette(s).



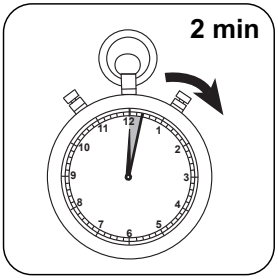
Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



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, total.

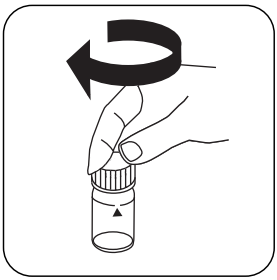
Réalisation de la quantification Cuivre, quantification différenciée avec pastille

Sélectionnez la méthode sur l'appareil.

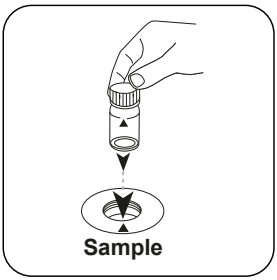
Sélectionnez également la quantification : différencié

Pour cette méthode, il n'est pas nécessaire d'effectuer une mesure ZERO à chaque fois sur les appareils suivants : XD 7000, XD 7500

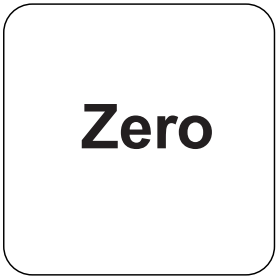
Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



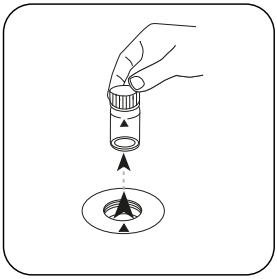
Fermez la(les) cuvette(s).



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

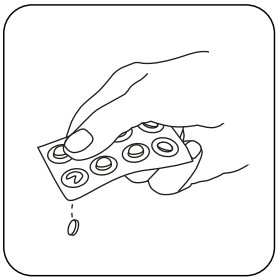


Appuyez sur la touche **ZERO**.

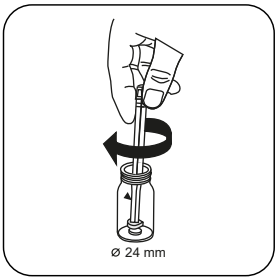


Retirez la cuvette de la chambre de mesure.

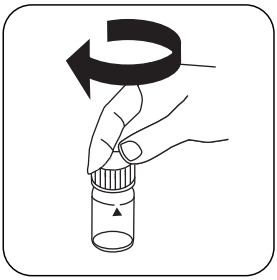
Sur les appareils ne nécessitant **aucune mesure ZÉRO** , **commencez ici**.



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

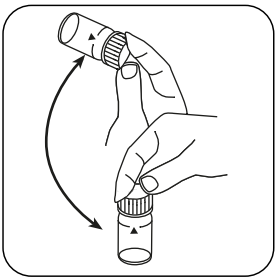


Écrasez la(les) pastille(s) en la(les) tournant un peu.

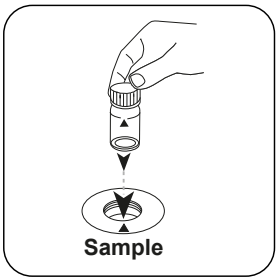


Fermez la(les) cuvette(s).

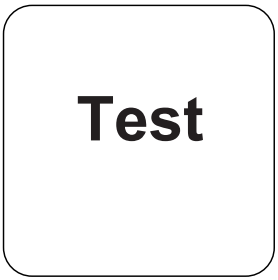
FR



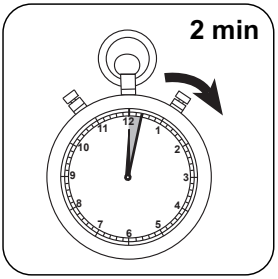
Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



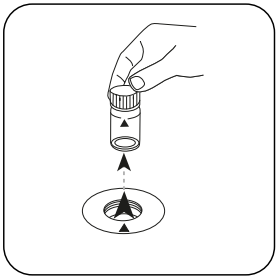
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



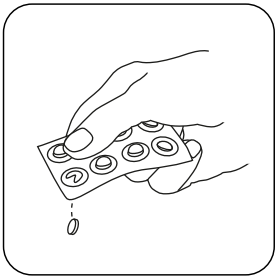
Appuyez sur la touche **TEST** (XD: **START**).



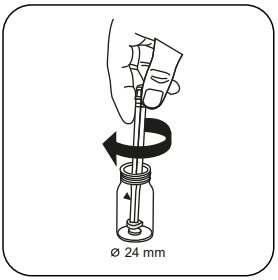
Attendez la fin du **temps de réaction de 2 minute(s)** .



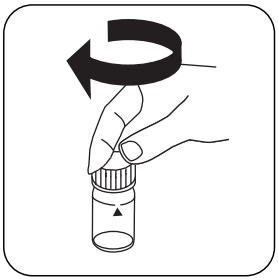
Retirez la cuvette de la chambre de mesure.



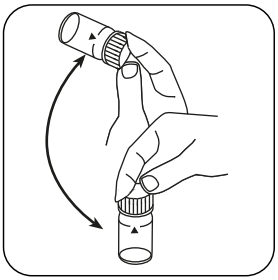
Ajoutez une **pastille de COPPER No. 2**.



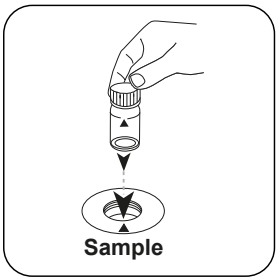
Écrasez la(les) pastille(s) en la(les) tournant un peu.



Fermez la(les) cuvette(s).



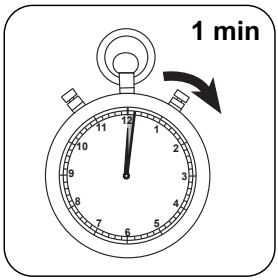
Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



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 1 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; cuivre combiné; cuivre total.

Méthode chimique

Biquinoline

Appendice

FR

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

Cuivre VLR PP M152

2 - 210 µg/L Cu

Porphyrine Indicator

FR

Matériel

Matériel requis (partiellement optionnel):

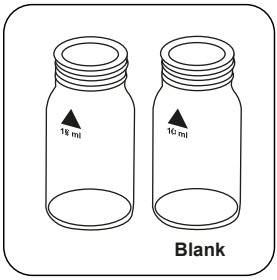
Réactifs	Pack contenant	Code
VARIO Copper, kit F10	1 Kit	535140

Indication

1. Pour obtenir des résultats plus précis, il faut effectuer une mesure à blanc des réactifs.
2. Le pH de l'échantillon doit être adapté par l'ajout d'une solution d'hydroxyde de sodium ou d'acide salpêtrique dans une plage de 2 à 6 avant de commencer la mesure.

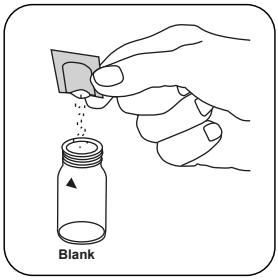
Réalisation de la quantification Cuivre VLR avec sachet de poudre

Sélectionnez la méthode sur l'appareil.

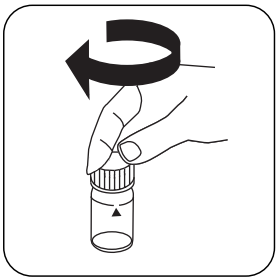


Préparez deux cuvettes propres de 24 mm. L'une des deux cuvettes sera la cuvette du blanc. Étiquetez-la.

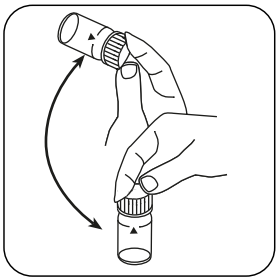
Dans chaque cuvette, versez **10 mL d'échantillon**.



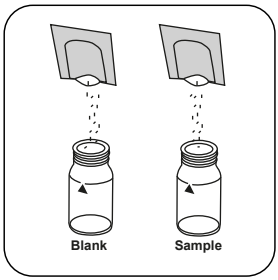
Ajoutez à la cuvette du blanc un **sachet de poudre CU3 Masking F10**.



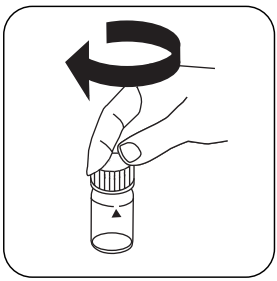
Fermez la(les) cuvette(s).



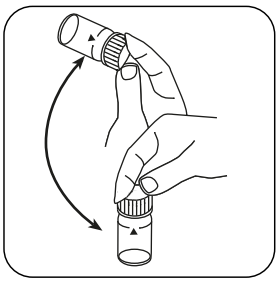
Dissolvez la poudre en mettant plusieurs fois le tube à l'envers puis à l'endroit.



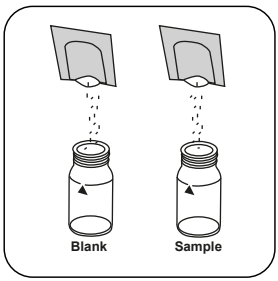
Dans chaque cuvette, versez **un sachet de poudre CU1 Porphyrin F10**.



Fermez la(les) cuvette(s).

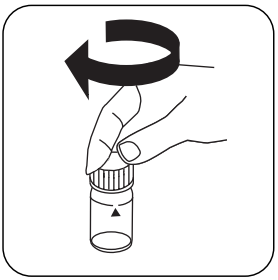


Dissolvez la poudre en mettant plusieurs fois le tube à l'envers puis à l'endroit.

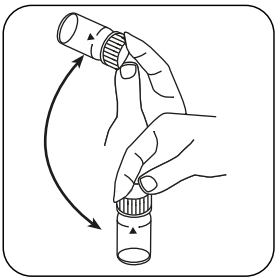


Dans chaque cuvette, versez **un sachet de poudre CU2 Porphyrin F10**.

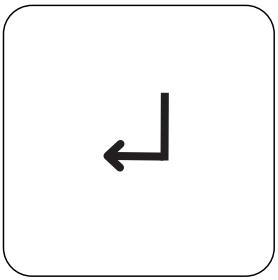
FR



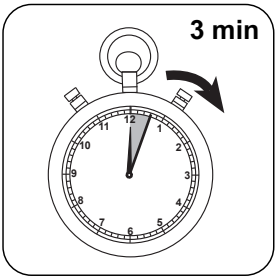
Fermez la(les) cuvette(s).



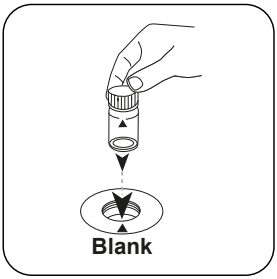
Dissolvez la poudre en mettant plusieurs fois le tube à l'envers puis à l'endroit.



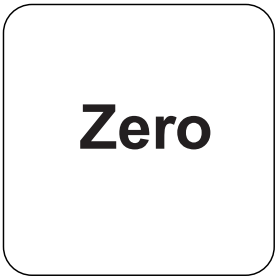
Appuyez sur la touche **ENTER**.



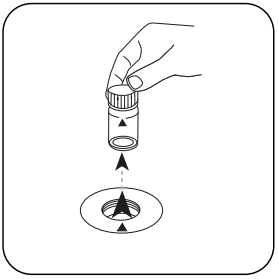
Attendez la fin du **temps de réaction de 3 minute(s)** .



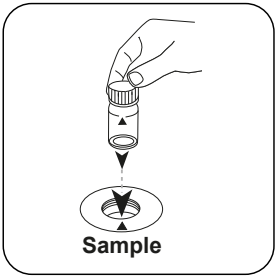
Placez la **cuvette du blanc** dans la chambre de mesure. Attention à la positionner correctement.



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**.

Le résultat s'affiche à l'écran en **µg/L** Cuivre.

Méthode chimique

Porphyrine Indicator

Interférences

Interférences persistantes

1. Les substances complexantes peuvent interférer, quelle que soit leur concentration.

Interférences	de / [mg/L]
Al^{3+}	60
Cd^{2+}	10
Ca^{2+}	15000
Cl^{-}	90000
Cr^{6+}	110
Co^{2+}	100
F^{-}	30000
Pb^{2+}	3
Mg^{2+}	10000
Mn	140
Mo	11
Ni^{2+}	60
K^{+}	60000
Na^{+}	90000
Zn^{2+}	9
Fe	6
Hg	3

Méthode Validation

Limite de détection	2.6 µg/L
Limite de détermination	7.9 µg/L
Fin de la gamme de mesure	210 µg/L
Sensibilité	156 µg/L/Abs
Intervalle de confiance	5.5 µg/L
Déviation standard	2.3 µg/L
Coefficient de variation	2.2 %

Cuivre PP M153

0.05 - 5 mg/L Cu Cu

Bicinchoninate

FR

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
VARIO Cu1 F10	Poudre / 100 Pièces	530300
VARIO Cu1 F10	Poudre / 1000 Pièces	530303
ValidCheck Cuivre 2 mg/l	1 Pièces	48141525

Préparation

1. La quantification du cuivre total nécessite un fractionnement.
2. Le pH de l'échantillon doit être ajusté entre 4 et 6 avant l'analyse (avec une solution d'hydroxyde de potassium ou d'acide nitrique). Toute dilution qui en résulte doit être prise en compte dans le résultat.
   Attention : À des pH supérieurs à 6, le cuivre peut causer des précipités.

Indication

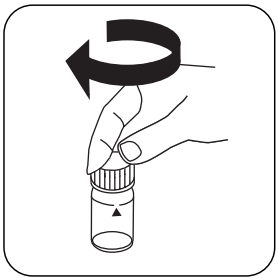
1. L'exactitude n'est pas influencée par de la poudre non dissoute.

Réalisation de la quantification Cuivre, libre avec sachet de poudre Vario

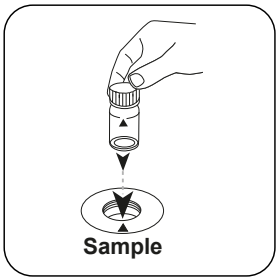
Sélectionnez la méthode sur l'appareil.

Pour cette méthode, il n'est pas nécessaire d'effectuer une mesure ZERO à chaque fois sur les appareils suivants : XD 7000, XD 7500

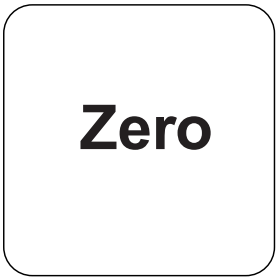
Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



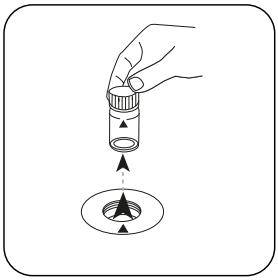
Fermez la(les) cuvette(s).



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

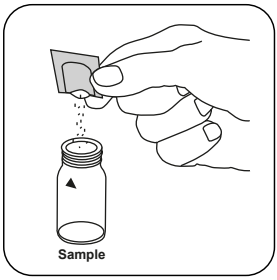


Appuyez sur la touche **ZERO**.

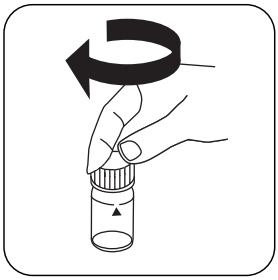


Retirez la cuvette de la chambre de mesure.

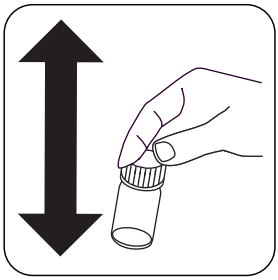
Sur les appareils ne nécessitant **aucune mesure ZÉRO** , **commencez ici**.



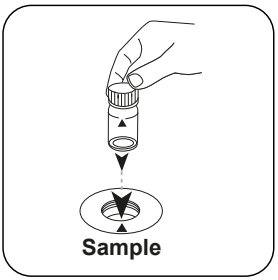
Ajoutez un **sachet de poudre Vario Cu 1 F10** .

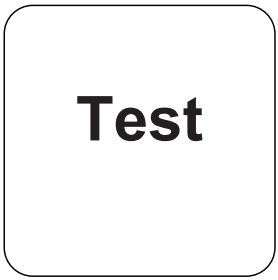


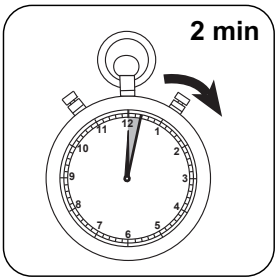
Fermez la(les) cuvette(s).



Mélangez le contenu en agitant.







FR

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.

Méthode chimique

Bicinchoninate

Appendice

Interférences

Interférences persistantes

La dureté, Al et Fe rabaissent les résultats.

Interférences exclues

1. Cyanure, CN^- : Le cyanure perturbe le développement complet de la coloration. Éliminez la perturbation causée par le cyanure comme suit : Ajoutez 0,2 ml de formaldéhyde à 10 ml d'échantillon et patientez pendant le temps de réaction de 4 minutes. (Le cyanure est masqué). Ensuite, effectuez le test conformément à la description. Multipliez le résultat par 1,02 pour tenir compte de la dilution de l'échantillon au formaldéhyde.
2. Argent, Ag^+ : L'argent peut causer une turbidité qui noircit. Ajoutez 10 gouttes d'une solution de chlorure de potassium saturée à 75 ml d'échantillon puis filtrez le tout avec un filtre fin. Pour la procédure, utilisez 10 ml de l'échantillon filtré.

Méthode Validation

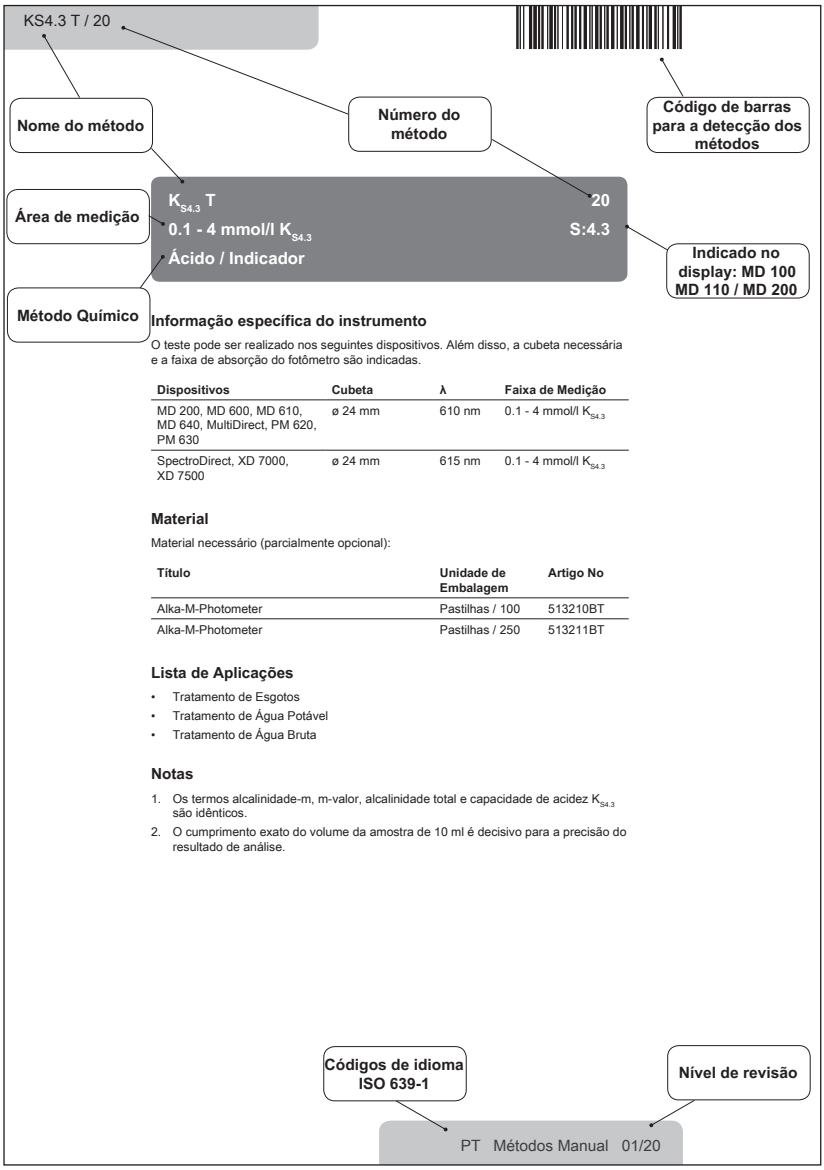
Limite de détection	0.05 mg/L
Limite de détermination	0.15 mg/L
Fin de la gamme de mesure	5 mg/L
Sensibilité	3.77 mg/L / Abs
Intervalle de confiance	0.064 mg/L
Déviation standard	0.027 mg/L
Coefficient de variation	1.07 %

Bibliographie

S. Nakano, Y. Zasshi, 82 486 - 491 (1962) [Chemical Abstracts, 58 3390e (1963)]

Dérivé de

APHA Method 3500Cu


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

Efetuar a medição

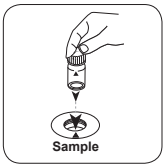
Realização da determinação Capacidade de acidez $K_{S4.3}$ com pastilha

Escolher o método no equipamento.

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

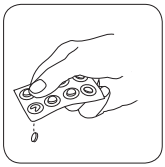
Encher a célula de 24 mm com **10 ml de amostra** .

Fechar a(s) célula(s).

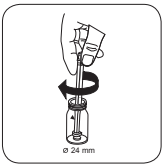


Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

• • •



Pastilha ALKA-M-PHOTOMETER.



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

Fechar a(s) célula(s).

Cobre T **M150**

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

Biquinoline

PT

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
Cobre Não. 1	Pastilhas / 100	513550BT
Cobre Não. 1	Pastilhas / 250	513551BT
Cobre Não. 2	Pastilhas / 100	513560BT
Cobre Não. 2	Pastilhas / 250	513561BT
Definir número de cobre 1/Não. 2#	cada 100	517691BT
Definir número de cobre 1/Não. 2#	cada 250	517692BT
ValidCheck Cobre 2 mg/l	1 pc.	48141525

Preparação

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

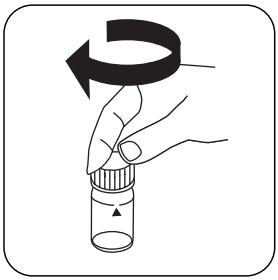
Realização da determinação Cobre, livre com pastilha

Escolher o método no equipamento.

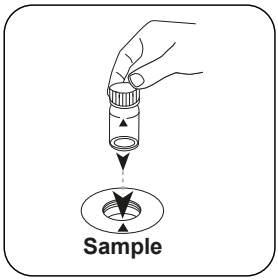
Escolha ainda a determinação: livre

Para este método, uma medição ZERO não precisa ser realizada todas as vezes nos seguintes dispositivos: XD 7000, XD 7500

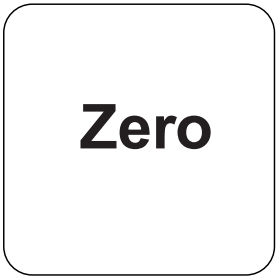
Encher a célula de 24 mm com **10 mL de amostra** .



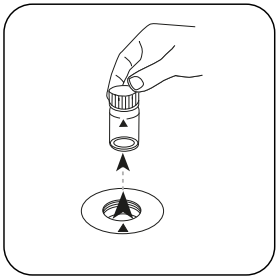
Fechar a(s) célula(s).



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

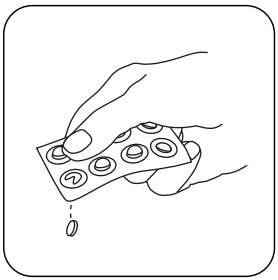


Premir a tecla **ZERO**.

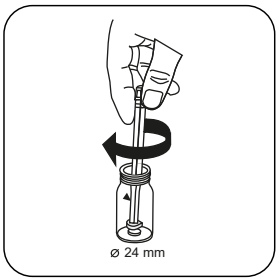


Retirar a célula do compartimento de medição.

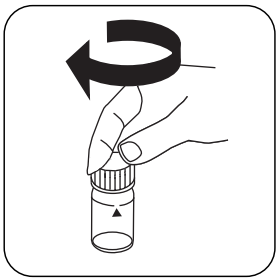
Nos equipamentos que **não requerem uma medição ZERO** , **deve começar aqui**.



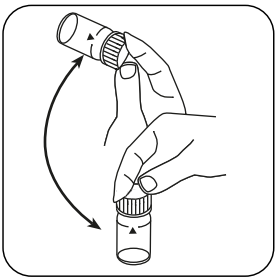
Pastilha COPPER No. 1.



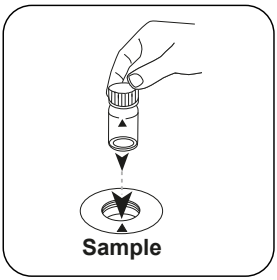
Esmagar a(s) pastilha(s) rodando ligeiramente.



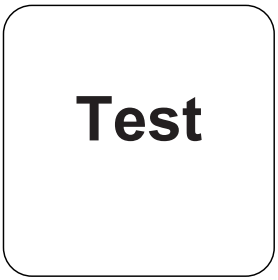
Fechar a(s) célula(s).



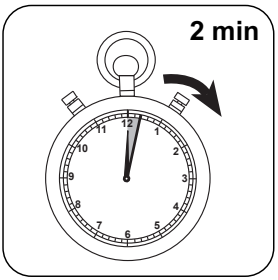
Dissolver a(s) pastilha(s) girando.



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.

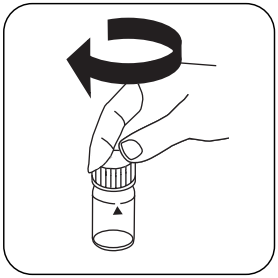
Realização da determinação Cobre, total com pastilha

Escolher o método no equipamento.

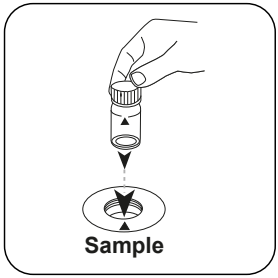
Escolha ainda a determinação: total

Para este método, uma medição ZERO não precisa ser realizada todas as vezes nos seguintes dispositivos: XD 7000, XD 7500

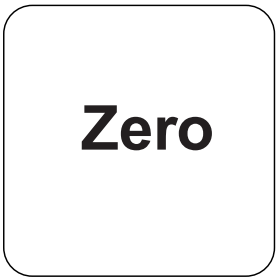
Encher a célula de 24 mm com **10 mL de amostra** .



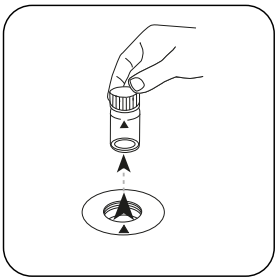
Fechar a(s) célula(s).



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

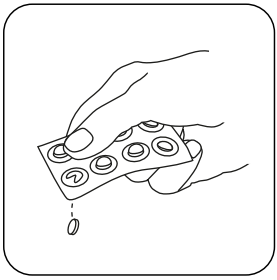


Premir a tecla **ZERO**.



Retirar a célula do compartimento de medição.

Nos equipamentos que **não requerem uma medição ZERO** , **deve começar aqui**.



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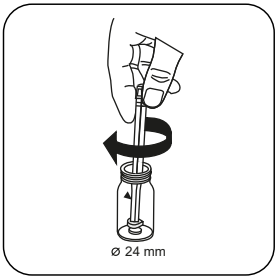
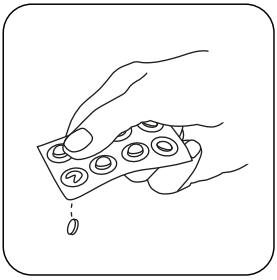


Esmagar a(s) pastilha(s) rodando ligeiramente e dissolver.



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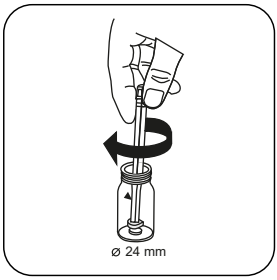
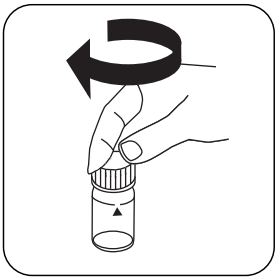
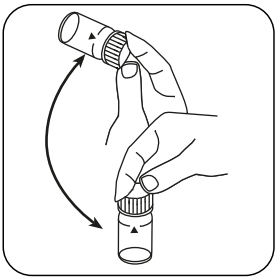


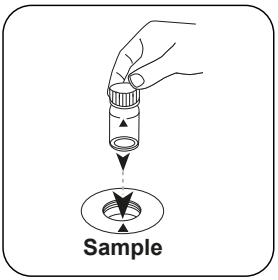
Esmagar a(s) pastilha(s) rodando ligeiramente.



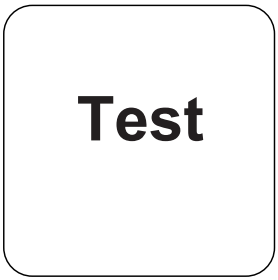
Fechar a(s) célula(s).



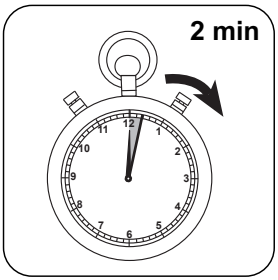
Dissolver a(s) pastilha(s) girando.



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 total.

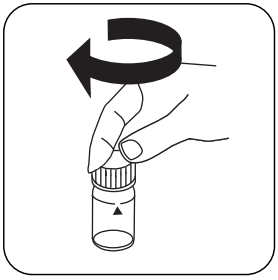
Realização da determinação Cobre, determinação diferenciada com pastilha

Escolher o método no equipamento.

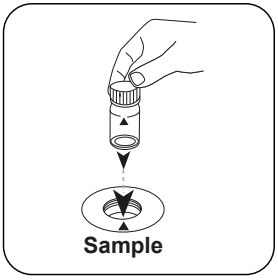
Escolha ainda a determinação: diferenciado

Para este método, uma medição ZERO não precisa ser realizada todas as vezes nos seguintes dispositivos: XD 7000, XD 7500

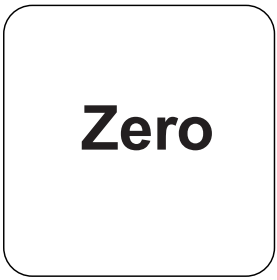
Encher a célula de 24 mm com **10 mL de amostra** .



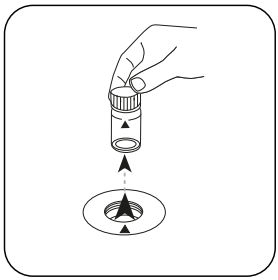
Fechar a(s) célula(s).



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

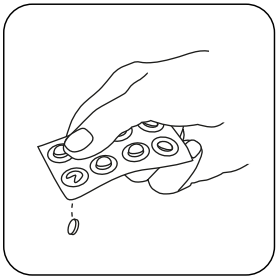


Premir a tecla **ZERO**.

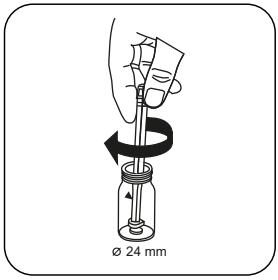


Retirar a célula do compartimento de medição.

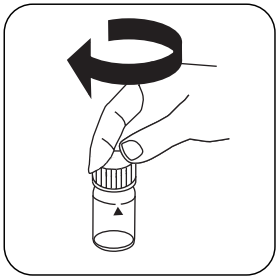
Nos equipamentos que **não requerem uma medição ZERO** , **deve começar aqui**.



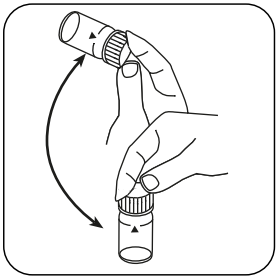
Pastilha COPPER No. 1.



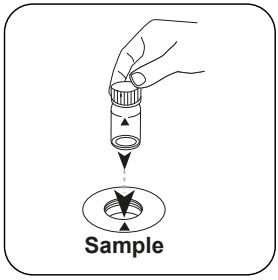
Esmagar a(s) pastilha(s) rodando ligeiramente.



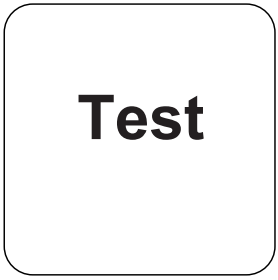
Fechar a(s) célula(s).



Dissolver a(s) pastilha(s) girando.

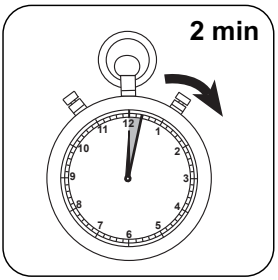


Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

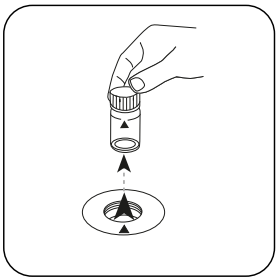


Premir a tecla **TEST** (XD: **START**).

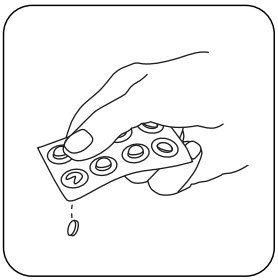
PT



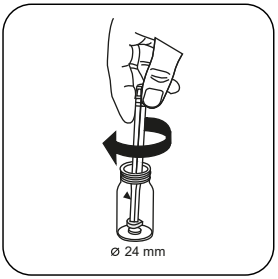
Aguardar **2 minuto(s) de tempo de reação**.



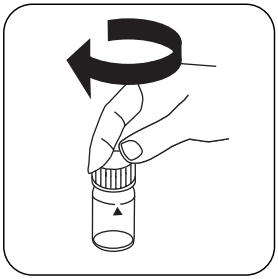
Retirar a célula do compartimento de medição.



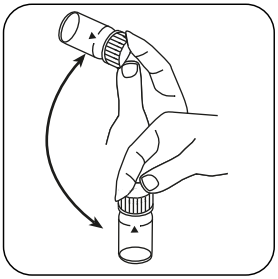
Pastilha COPPER No. 2.



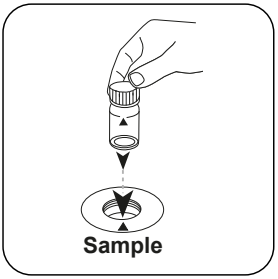
Esmagar a(s) pastilha(s) rodando ligeiramente.



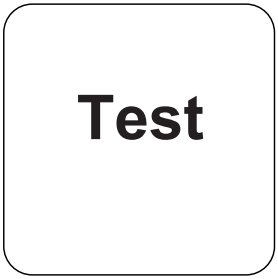
Fechar a(s) célula(s).



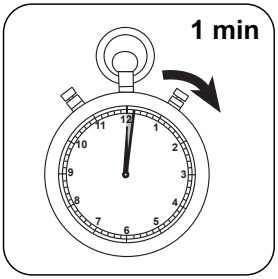
Dissolver a(s) pastilha(s) girando.



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



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



Aguardar **1 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; mg/l Cobre combinado; 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

Cobre VLR PP M152

2 - 210 µg/L Cu

Porphyrine Indicator

Material

Material necessário (parcialmente opcional):

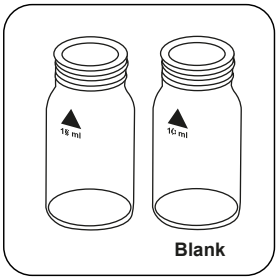
Reagentes	Unidade de Embalagem	Código do Produto
VARIO Copper, Set F10	1 Conjunto	535140

Notas

1. Para resultados mais precisos, deve ser realizada uma medição de reagentes em branco.
2. O pH da amostra tem de ser adaptado por adição de solução de hidróxido de sódio ou ácido salínico a uma gama de 2-6 antes de se iniciar a medição.

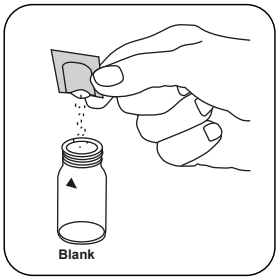
Realização da determinação Copper VLR com pacote de pó

Escolher o método no equipamento.

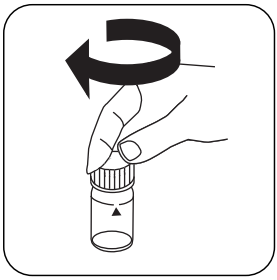


Preparar duas células de 24 mm limpas. Identificar uma célula como célula zero.

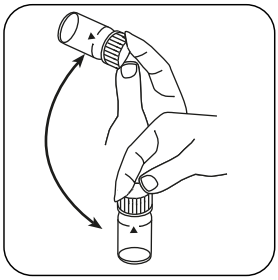
Introduzir em cada célula **10 mL de amostra** .



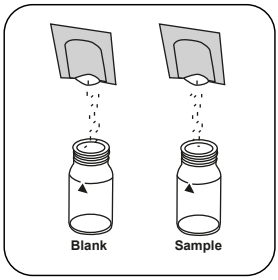
Adicionar à célula zero um **pacote de pó CU3 Masking F10** .



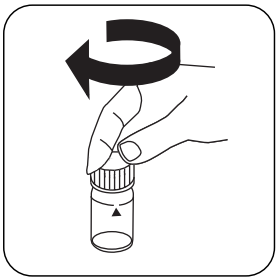
Fechar a(s) célula(s).



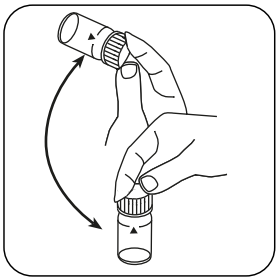
Dissolver o pó girando.



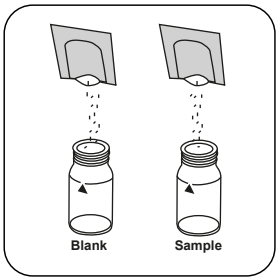
Introduzir em cada célula **um pacote de pó CU1 Porphyrin F10**.



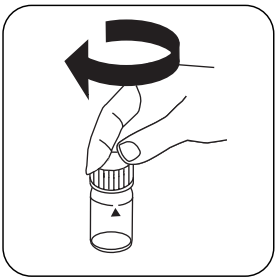
Fechar a(s) célula(s).



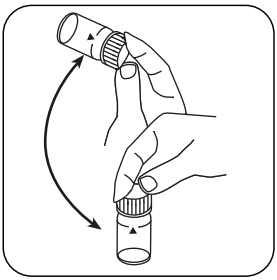
Dissolver o pó girando.



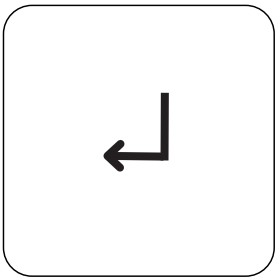
Introduzir em cada célula **um pacote de pó CU2 Porphyrin F10**.



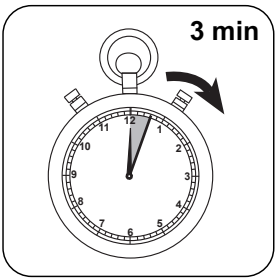
Fechar a(s) célula(s).



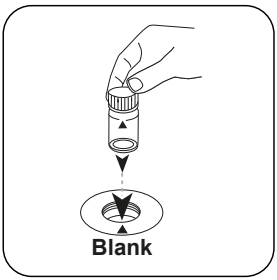
Dissolver o pó girando.



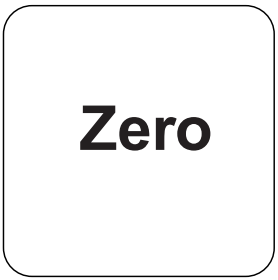
Premir a tecla **ENTER**.



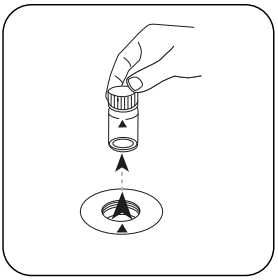
Aguardar **3 minuto(s) de tempo de reação**.



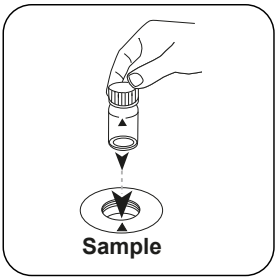
Colocar a **célula zero** no compartimento de medição. Observar o posicionamento.



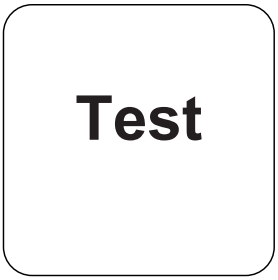
Premir a tecla **ZERO**.



Retirar a célula do compartimento de medição.



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



Premir a tecla **TEST**.

No visor aparece o resultado em **µg/L** Cobre.

Método Químico

Porphyrine Indicator

Texto de Interferências

Interferências Pesistentes

1. As substâncias complexantes podem interferir em qualquer concentração.

Interferências	a partir de / [mg/L]
Al^{3+}	60
Cd^{2+}	10
Ca^{2+}	15000
Cl^{-}	90000
Cr^{6+}	110
Co^{2+}	100
F^{-}	30000
Pb^{2+}	3
Mg^{2+}	10000
Mn	140
Mo	11
Ni^{2+}	60
K^{+}	60000
Na^{+}	90000
Zn^{2+}	9
Fe	6
Hg	3

Validação de método

Limite de Detecção	2.6 µg/L
Limite de Determinação	7.9 µg/L
Fim da Faixa de Medição	210 µg/L
Sensibilidade	156 µg/L/Abs
Faixa de Confiança	5.5 µg/L
Desvio Padrão	2.3 µg/L
Coeficiente de Variação	2.2 %

Cobre PP M153

0.05 - 5 mg/L Cu Cu

Bicinchoninate

PT

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
VARIO Cu1 F10	Pó / 100 pc.	530300
VARIO Cu1 F10	Pó / 1000 pc.	530303
ValidCheck Cobre 2 mg/l	1 pc.	48141525

Preparação

1. A determinação de cobre total requer uma digestão.
2. O pH da amostra deve ser ajustado entre 4 e 6 antes da análise (com solução de hidróxido de potássio ou ácido nítrico). A diluição resultante deve ser tida em conta no resultado.
   Atenção: Nos valores PH acima de 6, o cobre pode falhar.

Notas

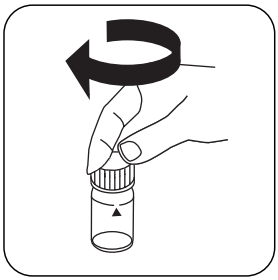
1. A precisão não é influenciada pelo pó não dissolvido.

Realização da determinação Cobre, livre com pacote de pó Vario

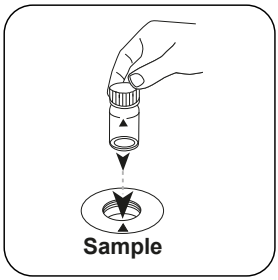
Escolher o método no equipamento.

Para este método, uma medição ZERO não precisa ser realizada todas as vezes nos seguintes dispositivos: XD 7000, XD 7500

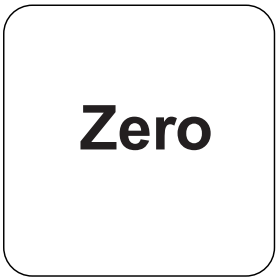
Encher a célula de 24 mm com **10 mL de amostra** .



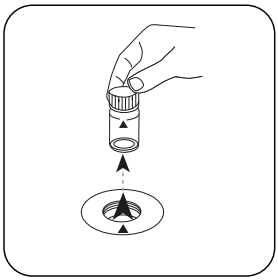
Fechar a(s) célula(s).



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

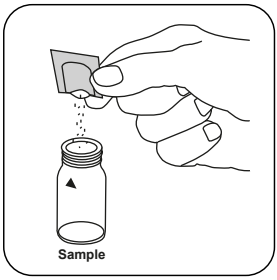


Premir a tecla **ZERO**.

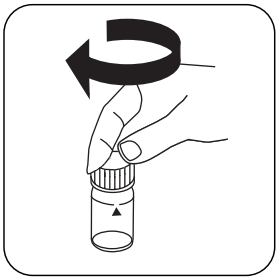


Retirar a célula do compartimento de medição.

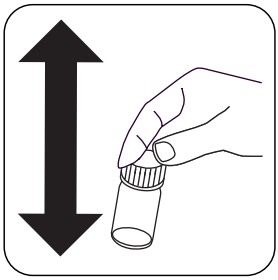
Nos equipamentos que **não requerem uma medição ZERO** , **deve começar aqui**.



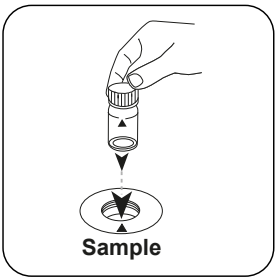
Adicionar um **pacote de pó Vario Cu 1 F10** .

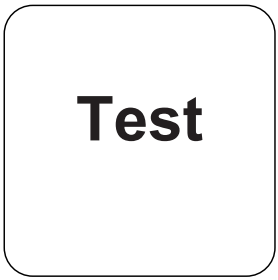


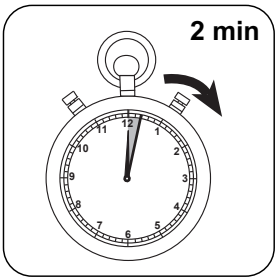
Fechar a(s) célula(s).



Misturar o conteúdo agitando.







PT

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.

Método Químico

Bicinchoninate

Apêndice

Texto de Interferências

Interferências Pesistentes

Dureza, Al e Fe produzem resultados de teste mais baixos.

Interferências Removíveis

1. Cianeto, CN^-: O cianeto impede uma formação completa da cor. Uma interferência por cianeto é eliminada do seguinte modo: Colocar 10 ml de amostra em 0,2 ml de formaldeído e aguardar um tempo de reação de 4 minutos. (Cianeto não mascarado). De seguida, execute o teste conforme descrito. Multiplicar o resulta por 1,02 para considerar a diluição da amostra com formaldeído.
2. Prata, Ag^+: Uma turvação persistente que fica preta pode ter sido causada por prata. Juntar 75 ml de amostra com 10 gotas de uma solução saturada de cloreto de potássio e depois filtrar por um filtro fino. Usar 10 ml da amostra filtrada para a execução.

Validação de método

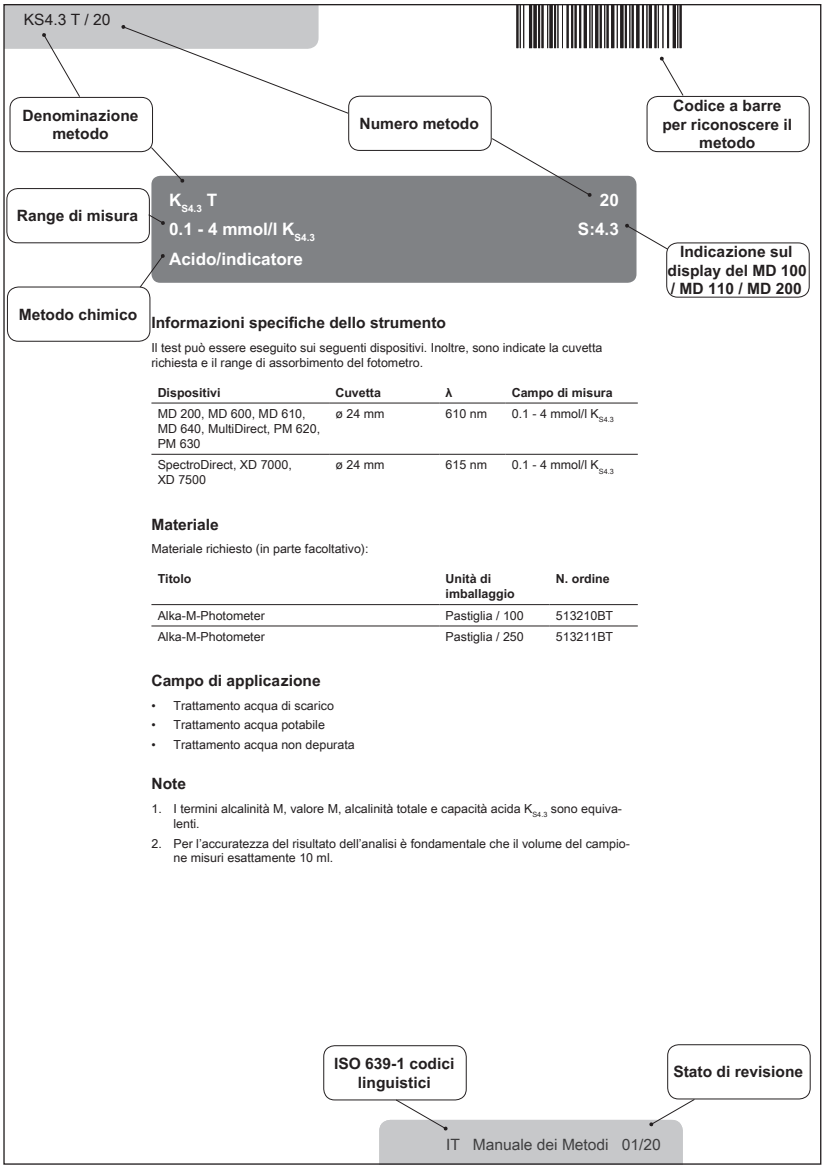
Limite de Detecção	0.05 mg/L
Limite de Determinação	0.15 mg/L
Fim da Faixa de Medição	5 mg/L
Sensibilidade	3.77 mg/L / Abs
Faixa de Confiança	0.064 mg/L
Desvio Padrão	0.027 mg/L
Coeficiente de Variação	1.07 %

Bibliografia

S. Nakano, Y. Zasshi, 82 486 - 491 (1962) [Chemical Abstracts, 58 3390e (1963)]

Derivado de

APHA Method 3500Cu


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

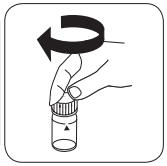
Svolgimento della misurazione

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

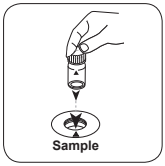
Selezionare il metodo nel dispositivo.

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

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



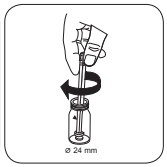
Chiudere la/e cuvetta/e.



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

• • •

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



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

Chiudere la/e cuvetta/e.

Rame T M150

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

Bichinolina

IT

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
Rame No. 1	Pastiglia / 100	513550BT
Rame No. 1	Pastiglia / 250	513551BT
Rame No. 2	Pastiglia / 100	513560BT
Rame No. 2	Pastiglia / 250	513561BT
Set Rame No. 1/no. 2#	ciascuna 100	517691BT
Set Rame No. 1/no. 2#	ciascuna 250	517692BT
ValidCheck Rame 2 mg/l	1 pz.	48141525

Preparazione

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

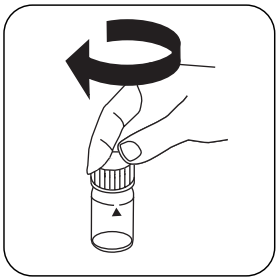
Esecuzione della rilevazione Rame, libero con pastiglia

Selezionare il metodo nel dispositivo.

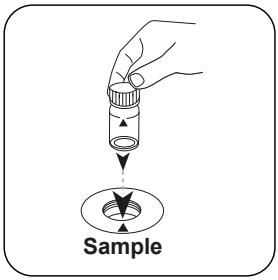
Selezionare inoltre la determinazione: libero

Per questo metodo, non è necessario eseguire una misurazione ZERO ogni volta sui seguenti dispositivi: XD 7000, XD 7500

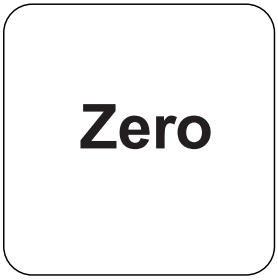
Riempire una cuvetta da 24 mm con **10 mL di campione**.



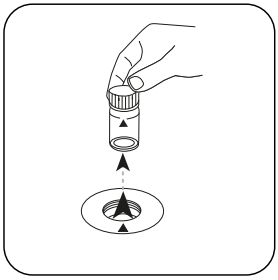
Chiudere la/e cuvetta/e.



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

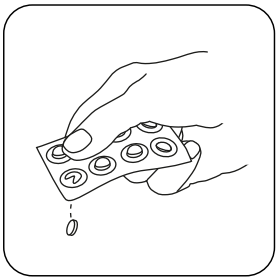


Premere il tasto **ZERO**.

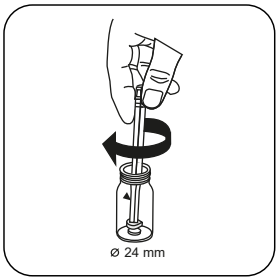


Prelevare la cuvetta dal vano di misurazione.

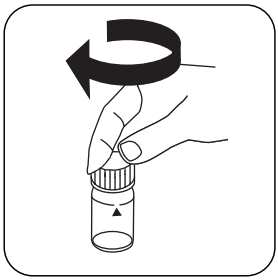
In caso di dispositivi che **non richiedono una misurazione ZERO**, **iniziare da qui**.



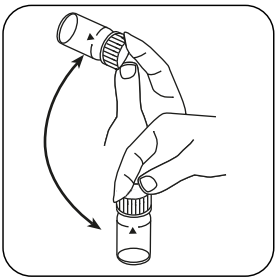
Aggiungere **una pastiglia COPPER No. 1**.



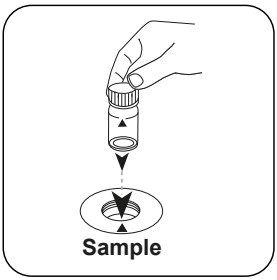
Frantumare la/e pastiglia/e con una leggera rotazione.



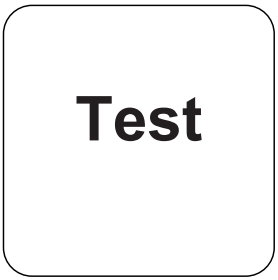
Chiudere la/e cuvetta/e.



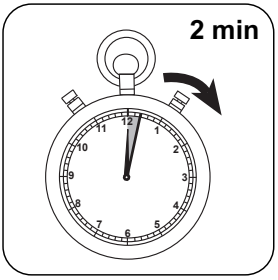
Far sciogliere la/e pastiglia/e agitando.



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



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.

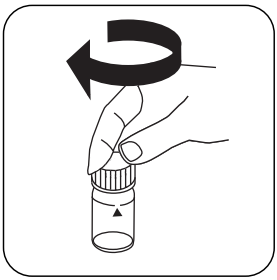
Esecuzione della rilevazione Rame, totale con pastiglia

Selezionare il metodo nel dispositivo.

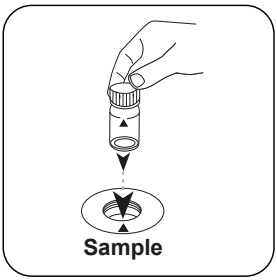
Selezionare inoltre la determinazione: totale

Per questo metodo, non è necessario eseguire una misurazione ZERO ogni volta sui seguenti dispositivi: XD 7000, XD 7500

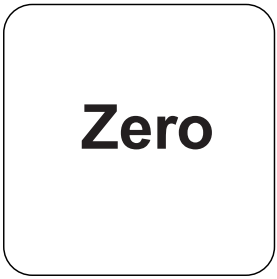
Riempire una cuvetta da 24 mm con **10 mL di campione**.



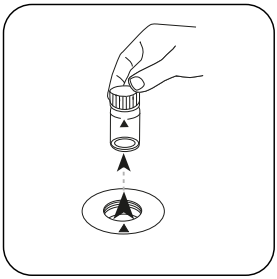
Chiudere la/e cuvetta/e.



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

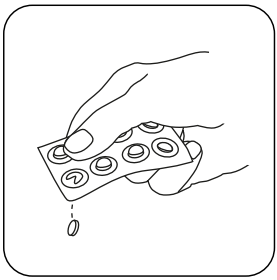


Premere il tasto **ZERO**.

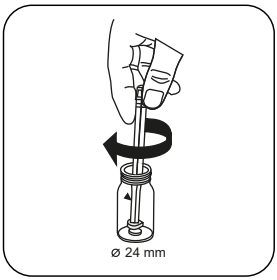


Prelevare la cuvetta dal vano di misurazione.

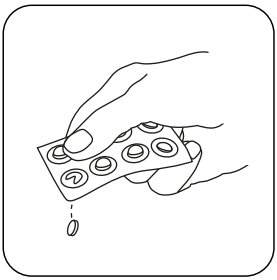
In caso di dispositivi che **non richiedono una misurazione ZERO**, **iniziare da qui**.



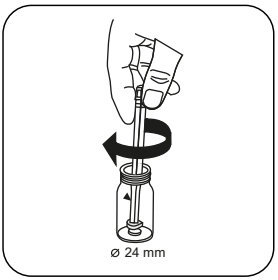
Aggiungere **una pastiglia COPPER No. 1**.



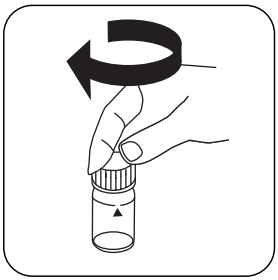
Frantumare e far sciogliere la/e pastiglia/e con una leggera rotazione.



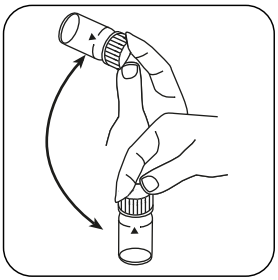
Aggiungere **una pastiglia COPPER No. 2**.



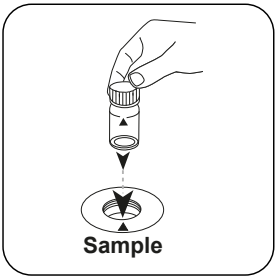
Frantumare la/e pastiglia/e con una leggera rotazione.



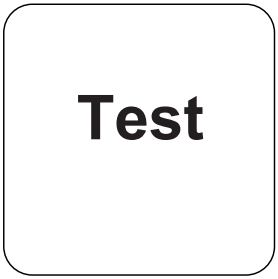
Chiudere la/e cuvetta/e.



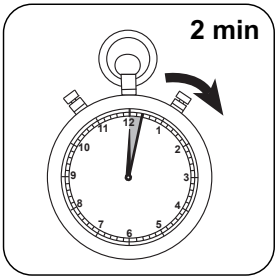
Far sciogliere la/e pastiglia/e agitando.



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



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.

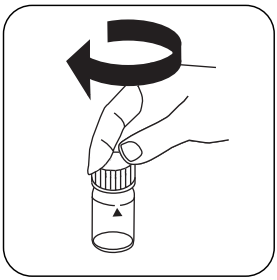
Esecuzione della rilevazione Rame, determinazione differenziata con pastiglia

Selezionare il metodo nel dispositivo.

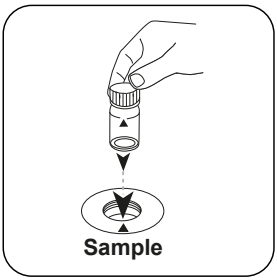
Selezionare inoltre la determinazione: differenziato

Per questo metodo, non è necessario eseguire una misurazione ZERO ogni volta sui seguenti dispositivi: XD 7000, XD 7500

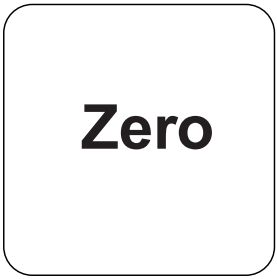
Riempire una cuvetta da 24 mm con **10 mL di campione**.



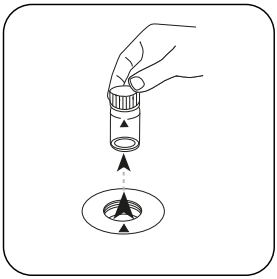
Chiudere la/e cuvetta/e.



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

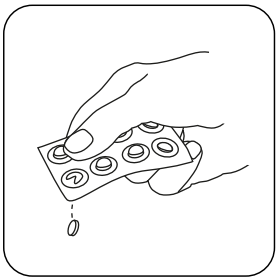


Premere il tasto **ZERO**.

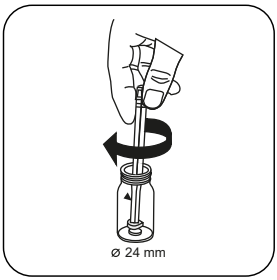


Prelevare la cuvetta dal vano di misurazione.

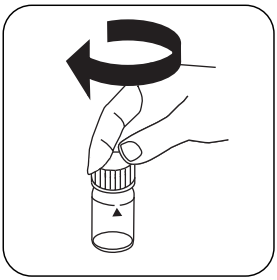
In caso di dispositivi che **non richiedono una misurazione ZERO**, **iniziare da qui**.



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

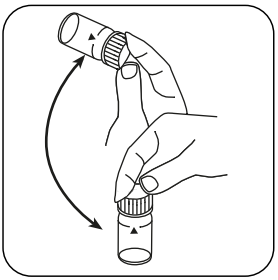


Frantumare la/e pastiglia/e con una leggera rotazione.

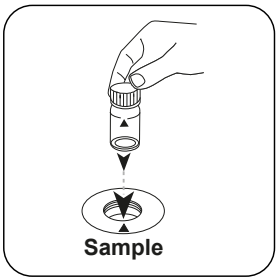


Chiudere la/e cuvetta/e.

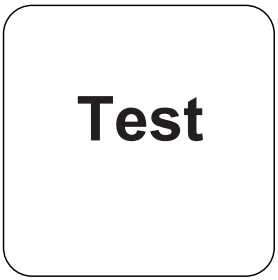
IT



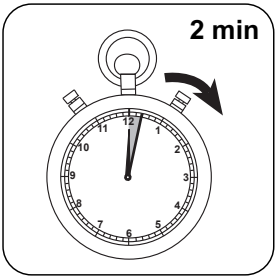
Far sciogliere la/e pastiglia/e agitando.



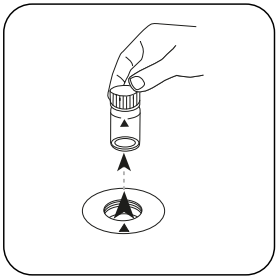
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



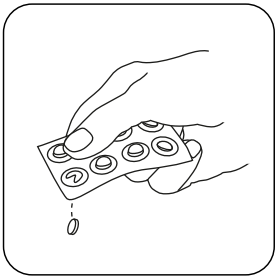
Premere il tasto **TEST** (XD: **START**).



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



Prelevare la cuvetta dal vano di misurazione.



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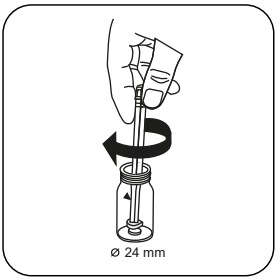
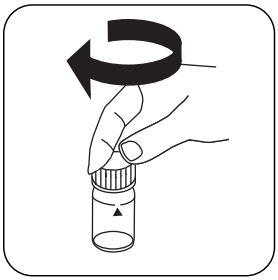
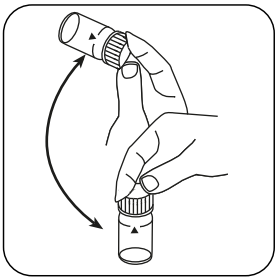


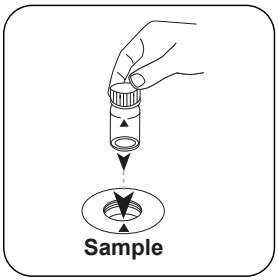
Frantumare la/e pastiglia/e con una leggera rotazione.



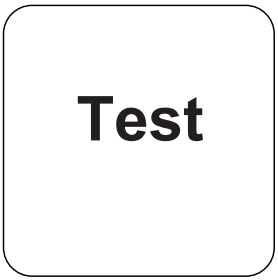
Chiudere la/e cuvetta/e.



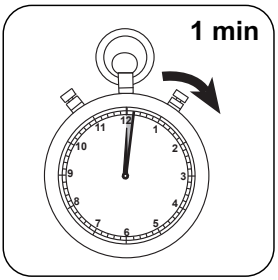
Far sciogliere la/e pastiglia/e agitando.



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



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



Attendere un **tempo di reazione di 1 minuto/i** .

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

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

Metodo chimico

Bichinolina

Appendice

IT

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 | [b)#]Bacchetta compresa

Rame VLR PP M152

2 - 210 µg/L Cu

Porphyrine Indicator

Materiale

Materiale richiesto (in parte facoltativo):

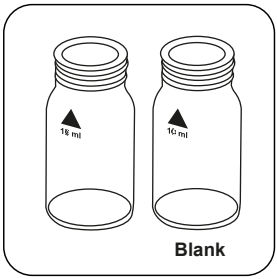
Reagenti	Unità di imballaggio	N. ordine
VARIO Copper, set F10	1 set	535140

Note

1. Per ottenere risultati più accurati, è necessario eseguire una misura in bianco con reagente.
2. Il pH del campione deve essere adattato con l'aggiunta di una soluzione di idrossido di sodio o di acido salnitrico in un intervallo compreso tra 2 e 6 prima di iniziare la misurazione.

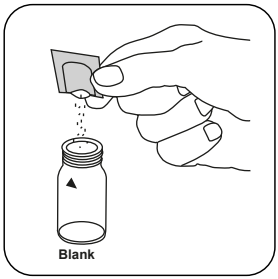
Esecuzione della rilevazione Rame VLR con polvere in bustine

Selezionare il metodo nel dispositivo.

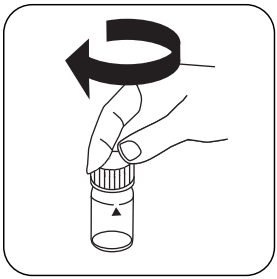


Preparare due cuvette pulite da 24 mm. Contrassegnare una cuvetta come cuvetta zero.

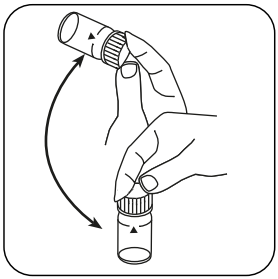
Immettere **10 mL di campione** in ogni cuvetta.



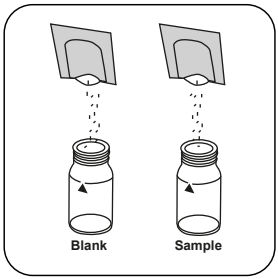
Immettere **una bustina di polvere CU3 Masking F10** nella cuvetta zero.



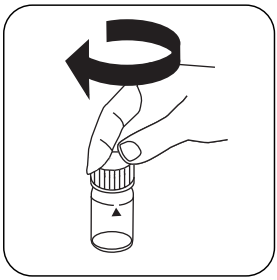
Chiudere la/e cuvetta/e.



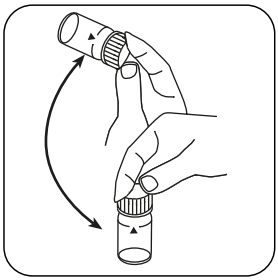
Far sciogliere la polvere capovolgendo.



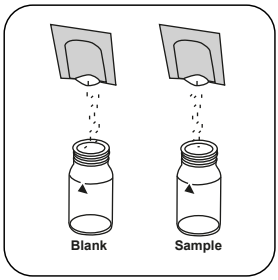
Immettere **una bustina di polvere CU1 Porphyrin F10** in ogni cuvetta.



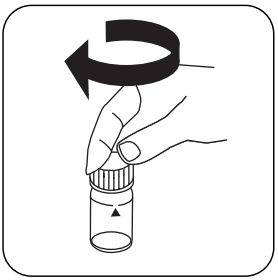
Chiudere la/e cuvetta/e.



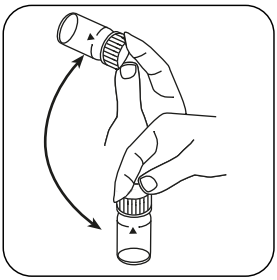
Far sciogliere la polvere capovolgendo.



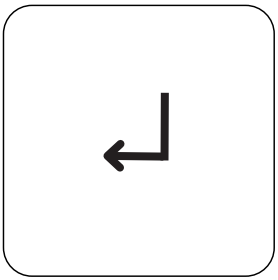
Immettere **una bustina di polvere CU2 Porphyrin F10** in ogni cuvetta.



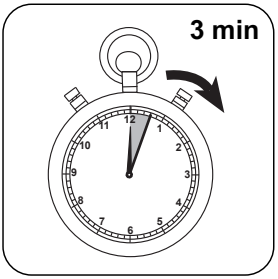
Chiudere la/e cuvetta/e.



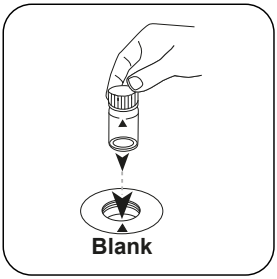
Far sciogliere la polvere capovolgendo.



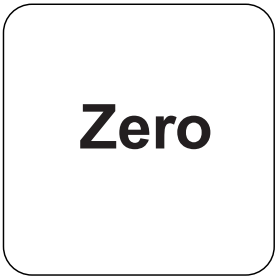
Premere il tasto **ENTER**.



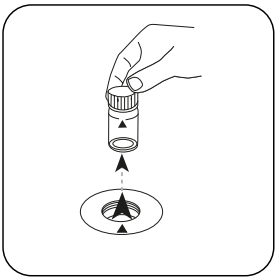
Attendere un **tempo di reazione di 3 minuto/i** .



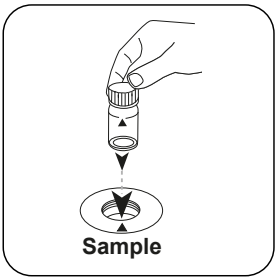
Posizionare la **cuvetta zero** nel vano di misurazione. Fare attenzione al posizionamento.



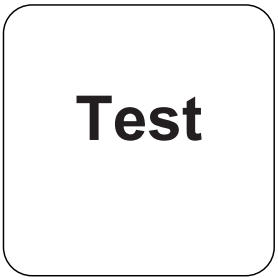
Premere il tasto **ZERO**.



Prelevare la cuvetta dal vano di misurazione.



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



Premere il tasto **TEST**.

Sul display compare il risultato in **µg/L** di Rame.

Metodo chimico

Porphyrine Indicator

Interferenze

Interferenze permanenti

1. Le sostanze complessanti possono interferire in qualsiasi concentrazione.

Interferenze	da / [mg/L]
Al^{3+}	60
Cd^{2+}	10
Ca^{2+}	15000
Cl^{-}	90000
Cr^{6+}	110
Co^{2+}	100
F^{-}	30000
Pb^{2+}	3
Mg^{2+}	10000
Mn	140
Mo	11
Ni^{2+}	60
K^{+}	60000
Na^{+}	90000
Zn^{2+}	9
Fe	6
Hg	3

Validazione metodo

Limite di rilevabilità	2.6 µg/L
Limite di quantificazione	7.9 µg/L
Estremità campo di misura	210 µg/L
Sensibilità	156 µg/L/Abs
Intervallo di confidenza	5.5 µg/L
Deviazione standard della procedura	2.3 µg/L
Coefficiente di variazione della procedura	2.2 %

Rame PP M153

0.05 - 5 mg/L Cu Cu

Acido bicinconinico

IT

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
VARIO Cu1 F10	Polvere / 100 pz.	530300
VARIO Cu1 F10	Polvere / 1000 pz.	530303
ValidCheck Rame 2 mg/l	1 pz.	48141525

Preparazione

1. Per la rilevazione del rame totale è necessaria una digestione.
2. Il valore del pH del campione deve essere regolato tra 4 e 6 prima dell'analisi (con soluzione di idrossido di potassio o acido nitrico). L'eventuale diluizione risultante deve essere presa in considerazione nel risultato.
   Attenzione: Con valori di pH maggiori di 6 il rame può precipitare.

Note

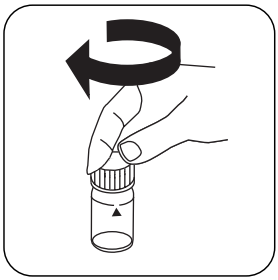
1. L’accuratezza non viene modificata da eventuale polvere non disciolta.

Esecuzione della rilevazione Rame libero con polvere in bustine Vario

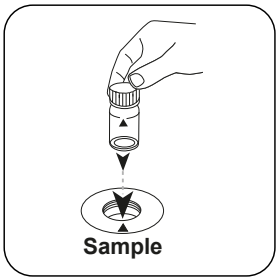
Selezionare il metodo nel dispositivo.

Per questo metodo, non è necessario eseguire una misurazione ZERO ogni volta sui seguenti dispositivi: XD 7000, XD 7500

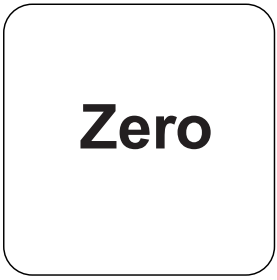
Riempire una cuvetta da 24 mm con **10 mL di campione**.



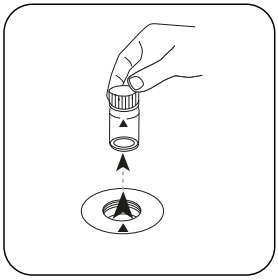
Chiudere la/e cuvetta/e.



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

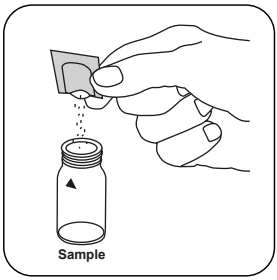


Premere il tasto **ZERO**.

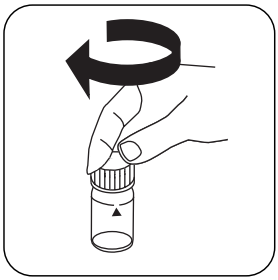


Prelevare la cuvetta dal vano di misurazione.

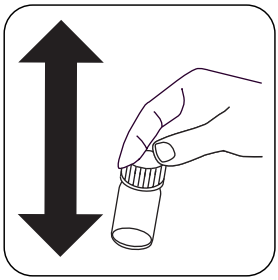
In caso di dispositivi che **non richiedono una misurazione ZERO**, **iniziare da qui**.



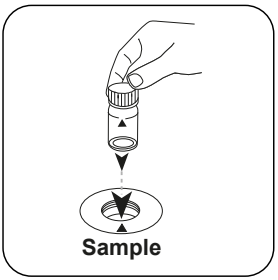
Aggiungere **una bustina di polvere Vario Cu 1 F10** .

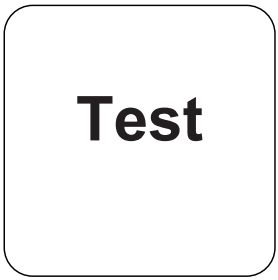


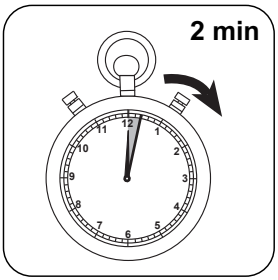
Chiudere la/e cuvetta/e.



Miscelare il contenuto agitando.







IT

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 Rame.

Metodo chimico

Acido bicinconinico

Appendice

Interferenze

Interferenze permanenti

Durezza, Al e Fe producono risultati più bassi.

Interferenze escludibili

1. Cianuro, CN^-: il cianuro impedisce lo sviluppo completo della colorazione. L'interferenza da parte del cianuro può essere eliminata nel modo seguente: addizionare 10 ml di campione con 0,2 ml di formaldeide e attendere un tempo di reazione di 4 minuti (il cianuro viene mascherato). Successivamente eseguire il test come descritto. Moltiplicare il risultato per 1,02 per considerare la diluizione del campione con formaldeide.
2. Argento, Ag^+: Un'eventuale torbidità preesistente che assume il colore nero può essere provocata dall'argento. Addizionare 75 ml di campione con 10 gocce di una soluzione satura di cloruro di potassio e successivamente filtrare con un filtro fine. Utilizzare 10 ml del campione filtrato per il test.

Validazione metodo

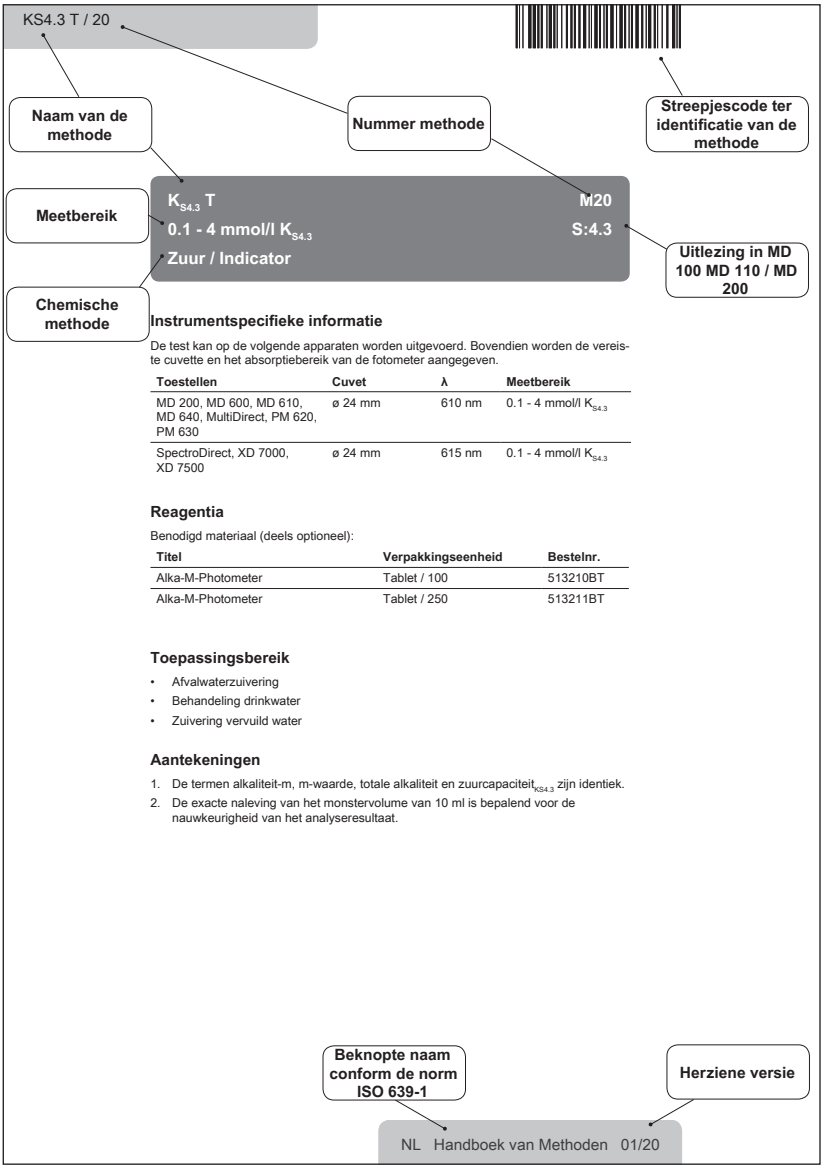
Limite di rilevabilità	0.05 mg/L
Limite di quantificazione	0.15 mg/L
Estremità campo di misura	5 mg/L
Sensibilità	3.77 mg/L / Abs
Intervallo di confidenza	0.064 mg/L
Deviazione standard della procedura	0.027 mg/L
Coefficiente di variazione della procedura	1.07 %

Riferimenti bibliografici

S. Nakano, Y. Zasshi, 82 486 - 491 (1962) [Chemical Abstracts, 58 3390e (1963)]

Derivato di

APHA Method 3500Cu



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.

Uitvoering van de meting

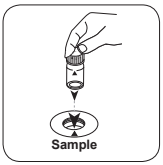
Uitvoering van de bepaling Zuurcapaciteit $K_{S4.3}$ met tablet

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.

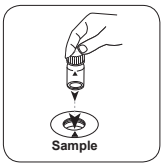
De spoelbakjes afsluiten.



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 $K_{S4.3}$.

Koper T **M150**

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

Biquinoline

NL

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
Koper Nr. 1	Tablet / 100	513550BT
Koper Nr. 1	Tablet / 250	513551BT
Koper Nr. 2	Tablet / 100	513560BT
Koper Nr. 2	Tablet / 250	513561BT
Set koper nr. 1/Nr. 2[#]	per 100	517691BT
Set koper nr. 1/Nr. 2[#]	per 250	517692BT
ValidCheck koper 2 mg/l	1 St.	48141525

Voorbereiding

1. Sterk alkalisch of zuur water moet vóór de analyse op een pH-waarde van 4 tot 6 worden ingesteld.

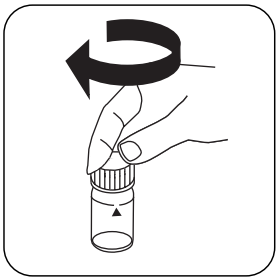
Uitvoering van de bepaling Koper, vrij met tablet

De methode in het apparaat selecteren.

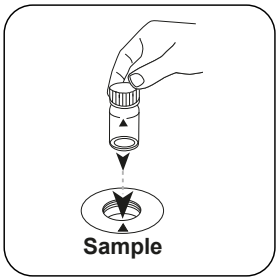
Selecteer bovendien de bepaling: vrij

Voor deze methode hoeft niet elke keer een nulmeting uitgevoerd te worden op de volgende apparaten: XD 7000, XD 7500

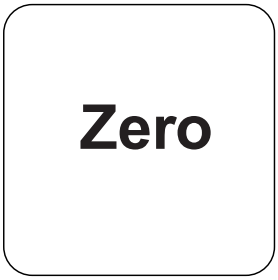
Spoelbakje van 24 mm met **10 mL staal** vullen.



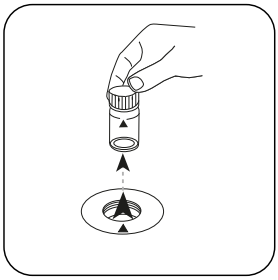
De spoelbakjes afsluiten.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

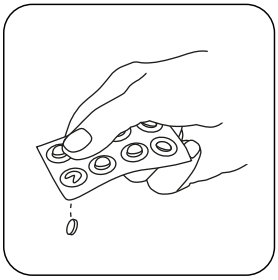


De toets **NUL** indrukken.

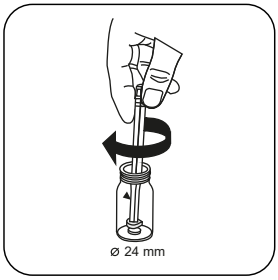


Het spoelbakje uit de meetschacht nemen.

Bij apparaten die **geen nulmeting** vereisen, **hier beginnen**.



Een COPPER Nr. 1 tablet toevoegen.



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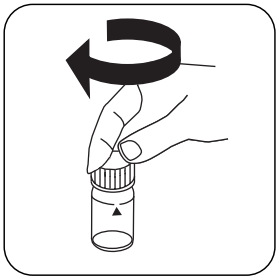
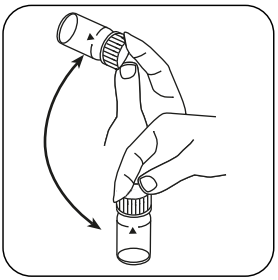
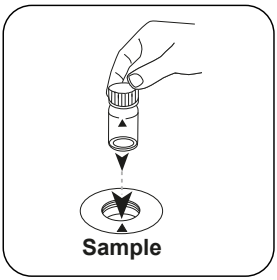


De spoelbakjes afsluiten.

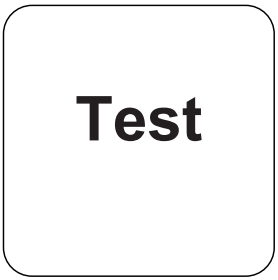
NL



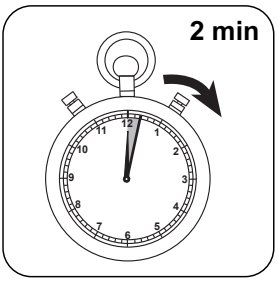
Tabletten oplossen door om te draaien



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.

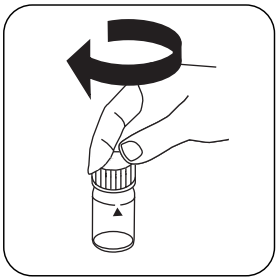
Uitvoering van de bepaling Koper, totaal met tablet

De methode in het apparaat selecteren.

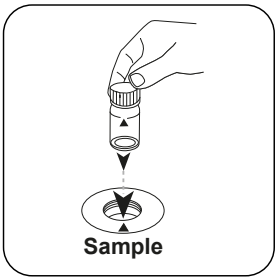
Selecteer bovendien de bepaling: totaal

Voor deze methode hoeft niet elke keer een nulmeting uitgevoerd te worden op de volgende apparaten: XD 7000, XD 7500

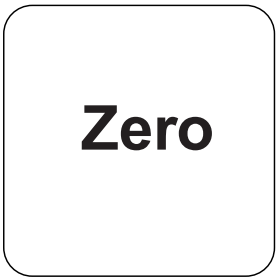
Spoelbakje van 24 mm met **10 mL staal** vullen.



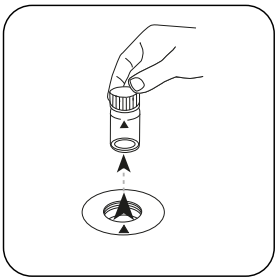
De spoelbakjes afsluiten.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

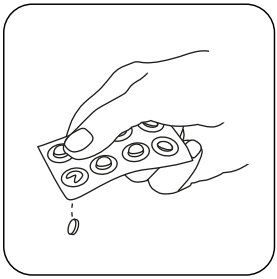


De toets **NUL** indrukken.

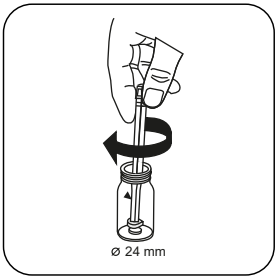


Het spoelbakje uit de meetschacht nemen.

Bij apparaten die **geen nulmeting** vereisen, **hier beginnen**.



Een COPPER Nr. 1 tablet toevoegen.



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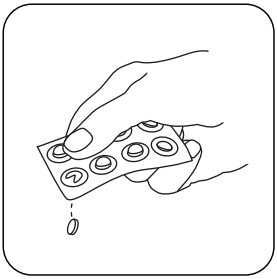
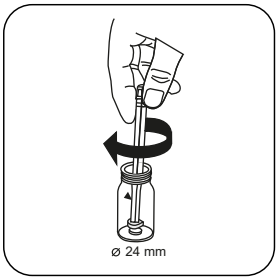


Een COPPER Nr. 2 tablet toevoegen.



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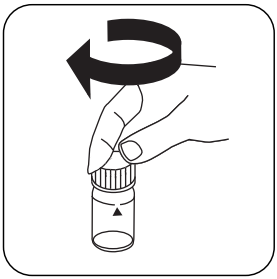
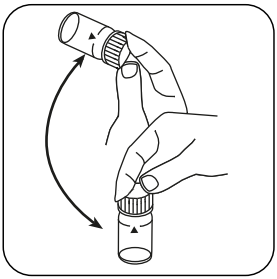
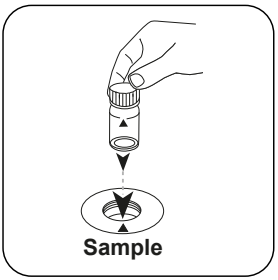


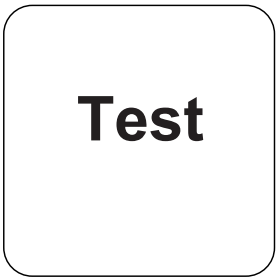
De spoelbakjes afsluiten.



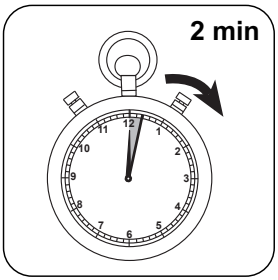
Tabletten oplossen door om te draaien



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.

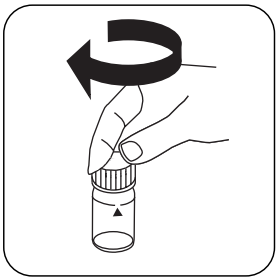
Uitvoering van de bepaling Koper, gedifferentieerde bepaling met tablet

De methode in het apparaat selecteren.

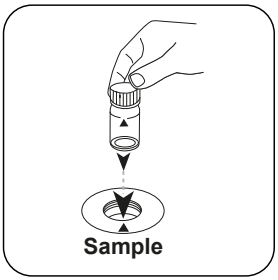
Selecteer bovendien de bepaling: gedifferentieerd

Voor deze methode hoeft niet elke keer een nulmeting uitgevoerd te worden op de volgende apparaten: XD 7000, XD 7500

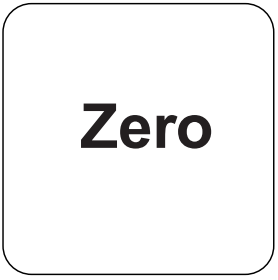
Spoelbakje van 24 mm met **10 mL staal** vullen.



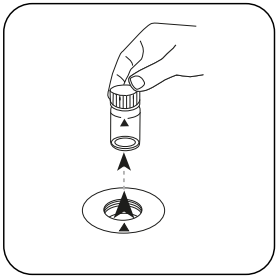
De spoelbakjes afsluiten.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

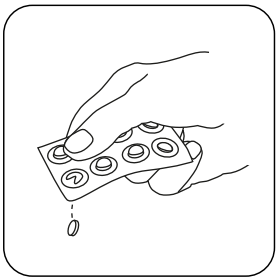


De toets **NUL** indrukken.

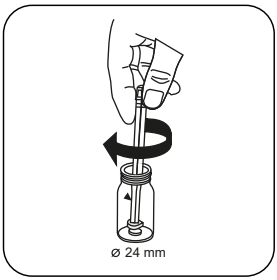


Het spoelbakje uit de meetschacht nemen.

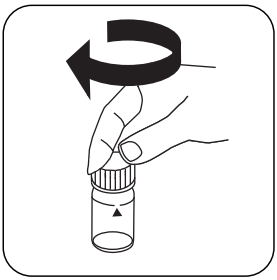
Bij apparaten die **geen nulmeting** vereisen, **hier beginnen**.



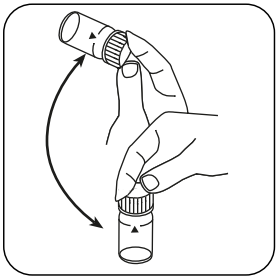
Een COPPER Nr. 1 tablet toevoegen.



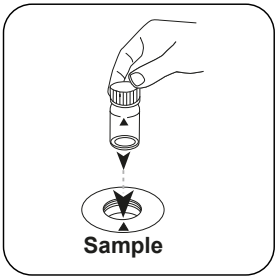
De tabletten onder lichte rotatie verpletteren.



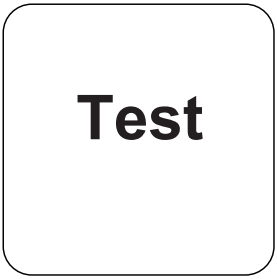
De spoelbakjes afsluiten.



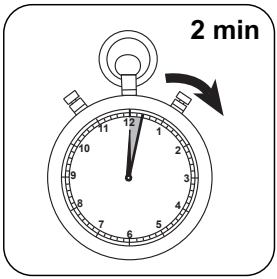
Tabletten oplossen door om te draaien



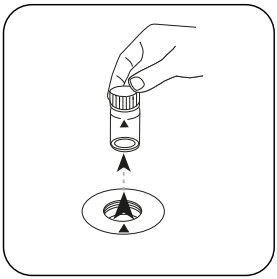
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



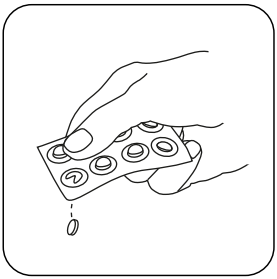
De toets **TEST** (XD: **START**) indrukken.



De reactietijd van 2 minuten afwachten.

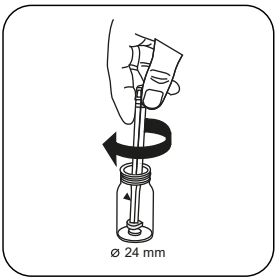


Het spoelbakje uit de meetschacht nemen.

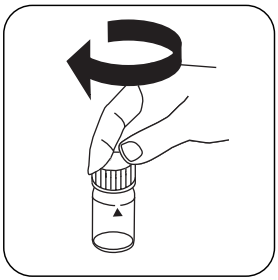


Een COPPER Nr. 2 tablet toevoegen.

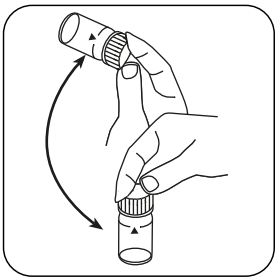
NL



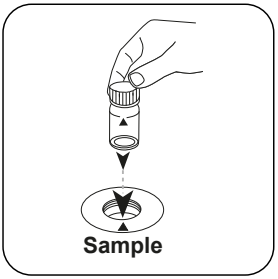
De tabletten onder lichte rotatie verpletteren.



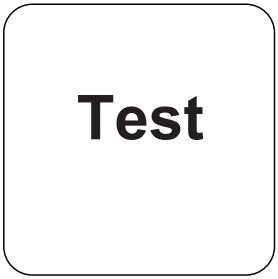
De spoelbakjes afsluiten.



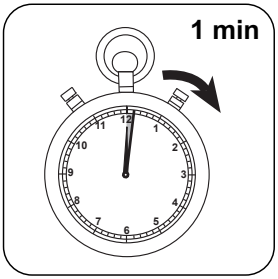
Tabletten oplossen door om te draaien



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



De toets **TEST** (XD: **START**) indrukken.



De reactietijd van 1 minuten afwachten.

Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

De display toont het resultaat in mg/L vrij koper; mg/l gebonden koper; 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

Koper VLR PP M152

2 - 210 µg/L Cu

Porphyrine Indicator

NL

Reagentia

Benodigd materiaal (deels optioneel):

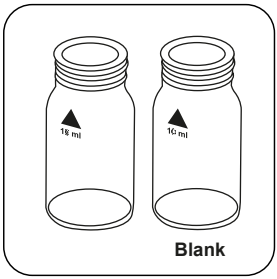
Reagentia	Verpakkingseenheid	Bestelnr.
VARIO Copper, set F10	1 Zin	535140

Aantekeningen

1. Voor de meest nauwkeurige resultaten moet een reagensblancometing worden uitgevoerd.
2. De pH van het monster moet worden aangepast door toevoeging van natriumhydroxideoplossing of salpeterzuur tot een bereik van 2-6 alvorens met de meting te beginnen.

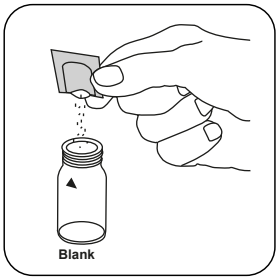
Uitvoering van de bepaling Koper met poederpakje

De methode in het apparaat selecteren.

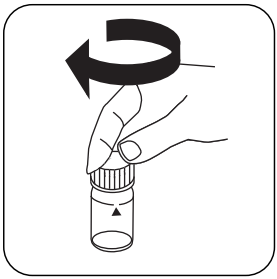


Twee propere spoelbakjes van 24 mm klaarzetten. Een als nulspoelbakje kenmerken.

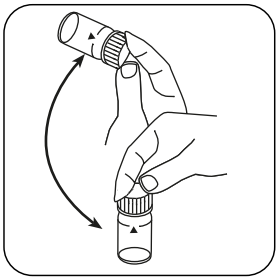
In elk spoelbakje **10 mL staal** doen.



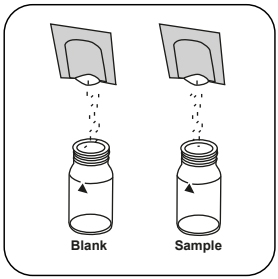
Een **CU3 Masking F10 poederpakje** aan het nulspoelbakje toevoegen.



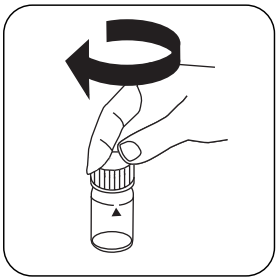
De spoelbakjes afsluiten.



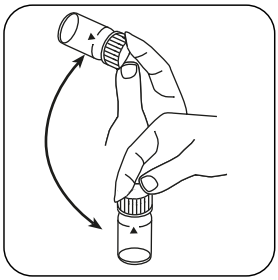
Het poeder oplossen door om te draaien.



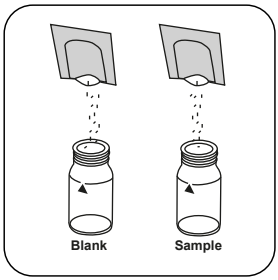
In elk spoelbakje **een CU1 Porphyrin F10 poederpakje** doen.



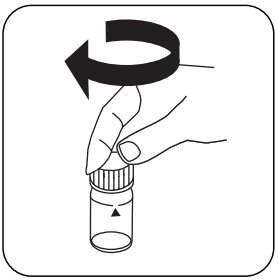
De spoelbakjes afsluiten.



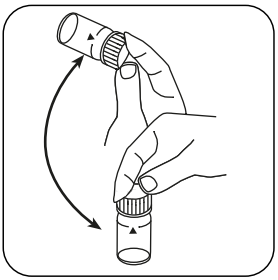
Het poeder oplossen door om te draaien.



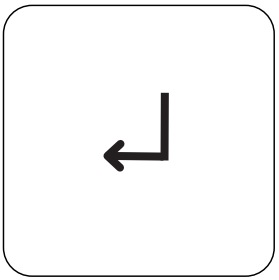
In elk spoelbakje **een CU2 Porphyrin F10 poederpakje** doen.



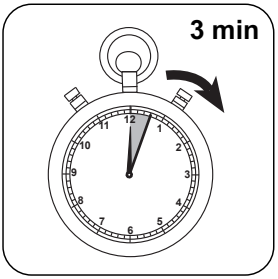
De spoelbakjes afsluiten.



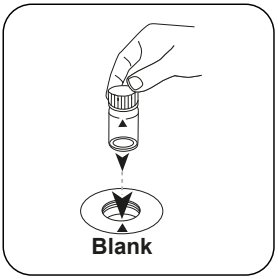
Het poeder oplossen door om te draaien.



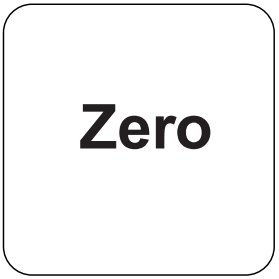
De toets **ENTER** indrukken.



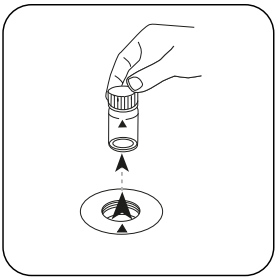
De reactietijd van 3 minuten afwachten.



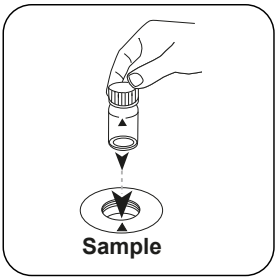
Het **nulspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



De toets **NUL** indrukken.



Het spoelbakje uit de meetschacht nemen.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

De toets **TEST** indrukken.

De display toont het resultaat in **µg/L** Koper.

Chemische methode

Porphyrine Indicator

Verstoringen

Permanente verstoringen

1. Complexvormende stoffen kunnen in elke concentratie interfereren.

Verstoringen	verstoort vanaf
Al^{3+}	60
Cd^{2+}	10
Ca^{2+}	15000
Cl^{-}	90000
Cr^{6+}	110
Co^{2+}	100
F^{-}	30000
Pb^{2+}	3
Mg^{2+}	10000
Mn	140
Mo	11
Ni^{2+}	60
K^{+}	60000
Na^{+}	90000
Zn^{2+}	9
Fe	6
Hg	3

Validatie van de methodes

Aantoonbaarheidsgrens	2.6 µg/L
Bepaalbaarheidsgrens	7.9 µg/L
Einde meetbereik	210 µg/L
Gevoeligheid	156 µg/L/Abs
Betrouwbaarheidsgrenzen	5.5 µg/L
Standaardafwijking procedure	2.3 µg/L
Variatiecoefficient procedure	2.2 %

Koper PP M153

0.05 - 5 mg/L Cu Cu

Bicinchinaat

NL

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
VARIO Cu1 F10	Poeder / 100 St.	530300
VARIO Cu1 F10	Poeder / 1000 St.	530303
ValidCheck koper 2 mg/l	1 St.	48141525

Voorbereiding

1. Voor de bepaling van het totale kopergehalte is spijsvertering noodzakelijk.
2. De pH-waarde van het monster moet vóór de analyse tussen 4 en 6 worden gebracht (met kaliumhydroxideoplossing of salpeterzuur). Bij het resultaat moet rekening worden gehouden met een eventuele verdunning.
   Opgelet: Koper kan neerslaan bij een pH-waarde van meer dan 6.

Aantekeningen

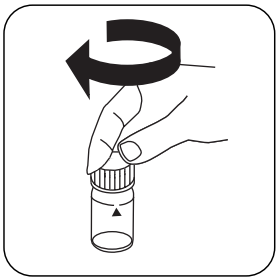
1. De nauwkeurigheid wordt niet beïnvloed door onopgelost poeder.

Uitvoering van de bepaling Koper, vrij met Vario-poederpakje

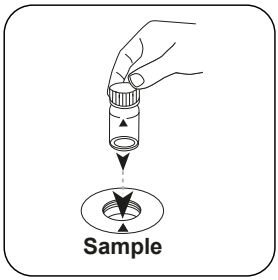
De methode in het apparaat selecteren.

Voor deze methode hoeft niet elke keer een nulmeting uitgevoerd te worden op de volgende apparaten: XD 7000, XD 7500

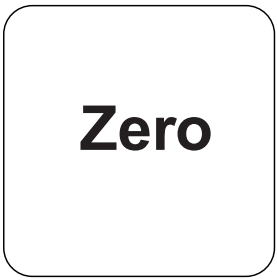
Spoelbakje van 24 mm met **10 mL staal** vullen.



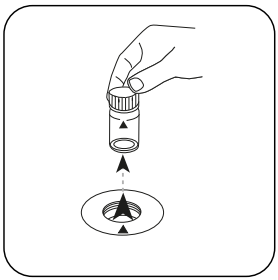
De spoelbakjes afsluiten.



Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

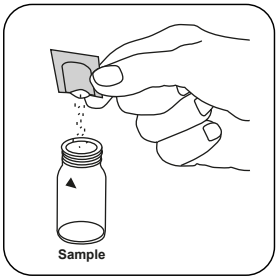


De toets **NUL** indrukken.

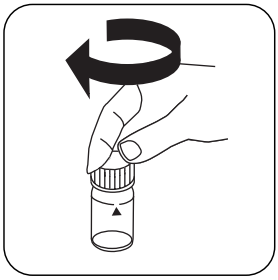


Het spoelbakje uit de meetschacht nemen.

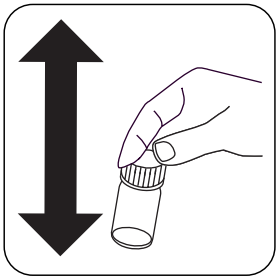
Bij apparaten die **geen nulmeting** vereisen, **hier beginnen**.



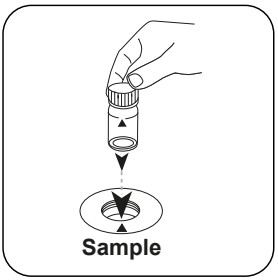
Een **Vario Cu 1 F10 poederpakje** toevoegen.

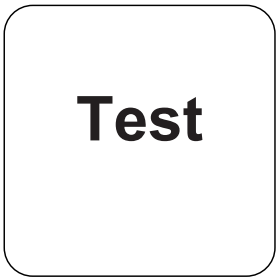


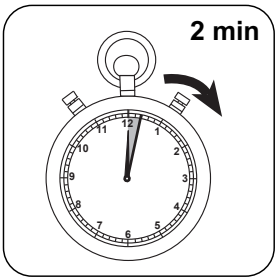
De spoelbakjes afsluiten.



De inhoud mengen door te schudden.







NL

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 Koper.

Chemische methode

Bicinchinaat

Aanhangsel

Verstoringen

Permanente verstoringen

Hardheid, Al en Fe veroorzaken lagere testresultaten.

Uit te sluiten verstoringen

1. Cyanide, CN^-: Cyanide voorkomt volledige kleurontwikkeling.
   Een verstoring door cyanide moet als volgt worden geëlimineerd: Voeg 0,2 ml formaldehyde toe aan 10 ml monster en wacht 4 minuten op de reactietijd. (Cyanide is gemaskeerd). Voer vervolgens de test uit zoals beschreven. Vermenigvuldig het resultaat met 1,02 om rekening te houden met de verdunning van het monster met formaldehyde.
2. Zilver, Ag^+: Een bestaande troebelheid die zwart wordt, kan worden veroorzaakt door zilver. Voeg 75 ml monster met 10 druppels van een verzadigde kaliumchlorideoplossing toe en filtreer door een fijn filter. Gebruik 10 ml van het gefilterde monster voor de test.

Validatie van de methodes

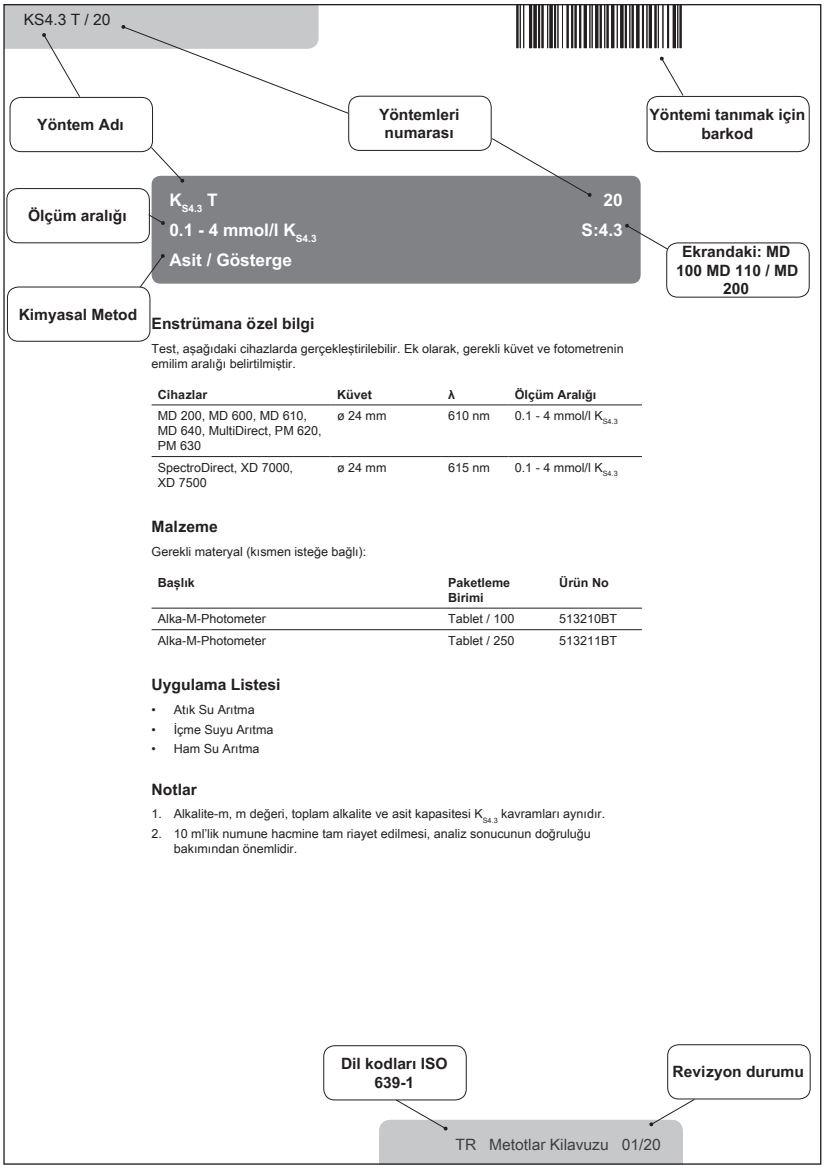
Aantoonbaarheidsgrens	0.05 mg/L
Bepaalbaarheidsgrens	0.15 mg/L
Einde meetbereik	5 mg/L
Gevoeligheid	3.77 mg/L / Abs
Betrouwbaarheidsgrenzen	0.064 mg/L
Standaardafwijking procedure	0.027 mg/L
Variatiecoefficient procedure	1.07 %

Literatuurverwijzing

S. Nakano, Y. Zasshi, 82 486 - 491 (1962) [Chemical Abstracts, 58 3390e (1963)]

Afgeleid van

APHA-methode 3500Cu



Enstrümana özel bilgi

Test, aşağıdaki cihazlarda gerçekleştirilebilir. Ek olarak, gerekli küvet ve fotometrenin emilim aralığı belirtilmiştir.

Cihazlar	Küvet	λ	Ölçüm Aralığı
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 $K_{S4.3}$

Malzeme

Gerekli materyal (kısmen isteğe bağlı):

Başlık	Paketleme Birimi	Ürün No
Alka-M-Photometer	Tablet / 100	513210BT
Alka-M-Photometer	Tablet / 250	513211BT

Uygulama Listesi

- Atık Su Arıtma
- İçme Suyu Arıtma
- Ham Su Arıtma

Notlar

1. Alkalite-m, m değeri, toplam alkalite ve asit kapasitesi $K_{S4.3}$ kavramları aynıdır.
2. 10 ml'lik numune hacmine tam riayet edilmesi, analiz sonucunun doğruluğu bakımından önemlidir.

Testin uygulanması

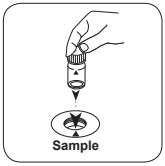
Tespitin uygulanması Tabletli asit kapasitesi $K_{S4.3}$

Cihazda metot seçin.

Bu metot için şu cihazlarda ZERO ölçümü yapılması gerekmez: XD 7000, XD 7500

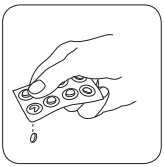
24 mm'lik küveti **10 ml numune** ile doldurun.

Küveti(küvetleri) kapatın.

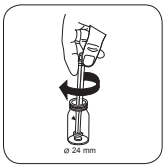


Numune küvetini ölçüm haznesine koyun. Doğru konumlandırılmasına dikkat edin.

• • •



ALKA-M-PHOTOMETER tablet ilave edin.



Tableti(tabletleri) hafifçe döndürerek ezin.

Küveti(küvetleri) kapatın.

TR Metotlar Kilavuzu 01/20

Bakır T **M150**

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

Biquinoline

TR

Malzeme

Gerekli materyal (kısmen isteğe bağlı):

Ayıraçlar	Paketleme Birimi	Ürün No
Bakır No. 1	Tablet / 100	513550BT
Bakır No. 1	Tablet / 250	513551BT
Bakır No. 2	Tablet / 100	513560BT
Bakır No. 2	Tablet / 250	513561BT
Set bakır No. 1/No. 2#	her bir 100	517691BT
Set bakır No. 1/No. 2#	her bir 250	517692BT
ValidCheck Bakır 2 mg/l	1 adetler	48141525

Hazırlık

1. Analizden önce aşırı alkali veya asidik suların pH değeri 4 ile 6 arasında ayarlanmalıdır.

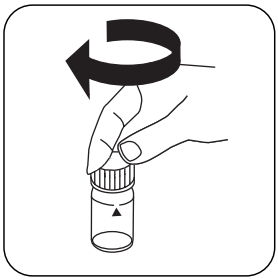
Tespitin uygulanması Bakır, tabletle birlikte serbest

Cihazda metot seçin.

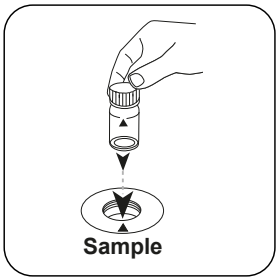
Buna ek olarak tespiti seçin: serbest

Bu yöntem için, aşağıdaki cihazlarda her seferinde SIFIR ölçümünün yapılması gerekmez: XD 7000, XD 7500

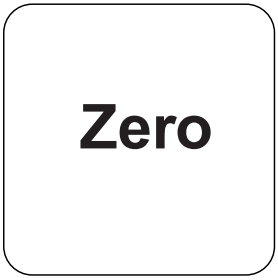
24 mm'lik küveti **10 mL numune** ile doldurun.



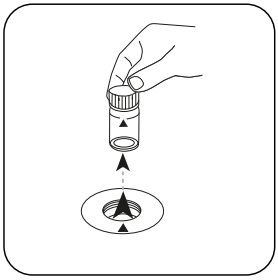
Küveti(küvetleri) kapatın.



Numune küvetini ölçüm haznesine koyun. Doğru konumlandırılmasına dikkat edin.

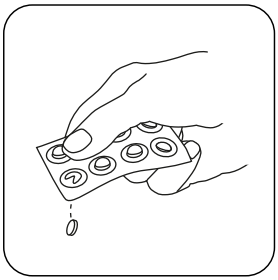


ZERO tuşuna basın.

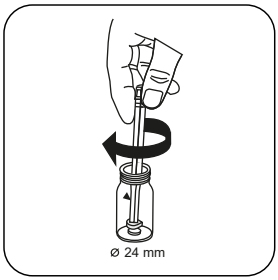


Küveti ölçüm haznesinden alın.

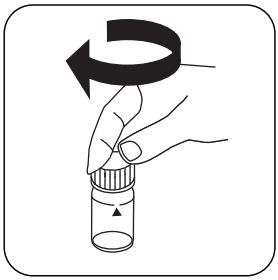
ZERO ölçümü gerektirmeyen cihazlarda **buradan başlayın**.



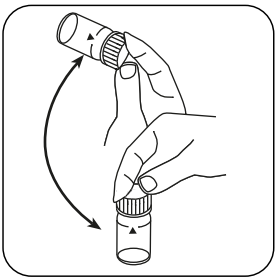
COPPER No. 1 tablet ilave edin.



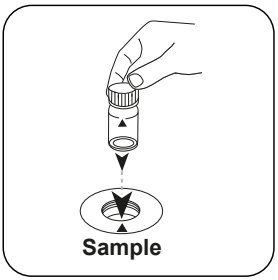
Tableti(tabletleri) hafifçe döndürerek ezin.



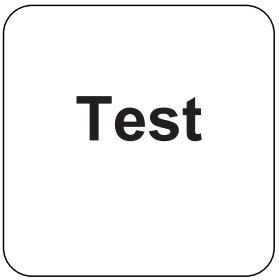
Küveti(küvetleri) kapatın.



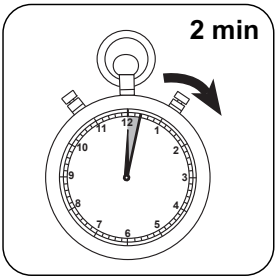
Tableti(tabletleri) sallayarak çözdürün.



Numune küvetini ölçüm haznesine koyun. Doğru konumlandırılmasına dikkat edin.



TEST (XD: **START**) tuşuna basın.



2 dakika tepkime süresi bekleyin.

Tepkime süresinin sona ermesinden sonra ölçüm otomatik gerçekleşir.

Ekranda sonuç mg/L serbest bakır cinsinden belirir.

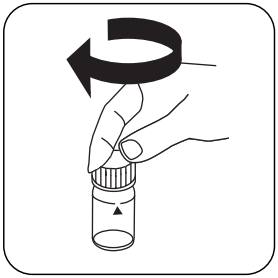
Tespitin uygulanması Bakır, tabletle birlikte toplam

Cihazda metot seçin.

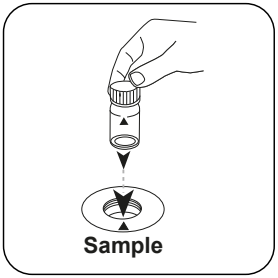
Buna ek olarak tespiti seçin: toplam

Bu yöntem için, aşağıdaki cihazlarda her seferinde SIFIR ölçümünün yapılması gerekmez: XD 7000, XD 7500

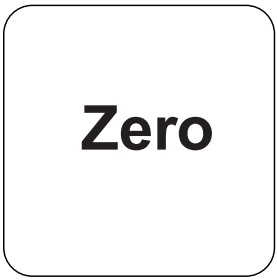
24 mm'lik küveti **10 mL numune** ile doldurun.



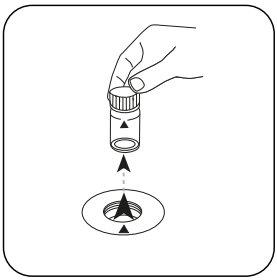
Küveti(küvetleri) kapatın.



Numune küvetini ölçüm haznesine koyun. Doğru konumlandırılmasına dikkat edin.

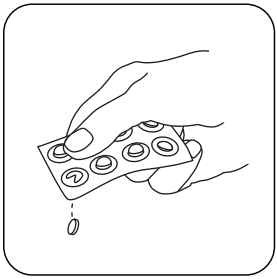


ZERO tuşuna basın.



Küveti ölçüm haznesinden alın.

ZERO ölçümü gerektirmeyen cihazlarda **buradan başlayın**.



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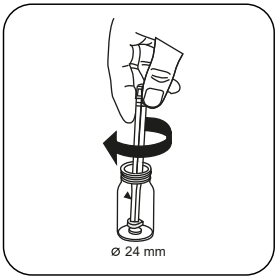

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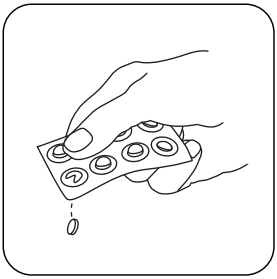

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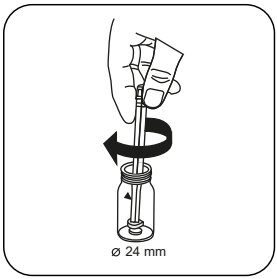

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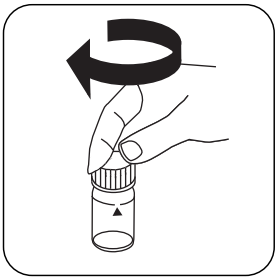
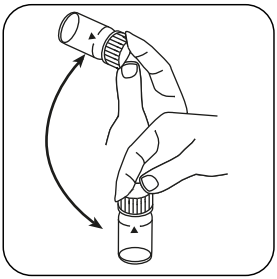


Küveti(küvetleri) kapatın.



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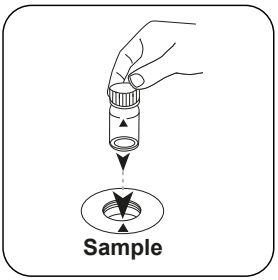
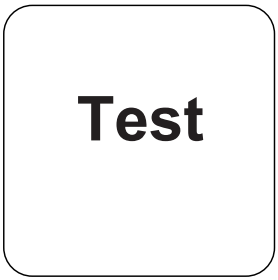
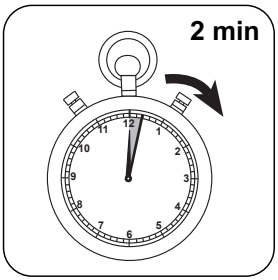


Numune küvetini ölçüm haznesine koyun. Doğru konumlandırılmasına dikkat edin.



TEST (XD: **START**) tuşuna basın.



2 dakika tepkime süresi bekleyin.

Tepkime süresinin sona ermesinden sonra ölçüm otomatik gerçekleşir.

Ekranda sonuç mg/L toplam bakır cinsinden belirir.

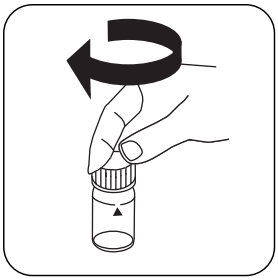
Tespitin uygulanması Bakır, tabletli ayrımlaştırılmış tespit

Cihazda metot seçin.

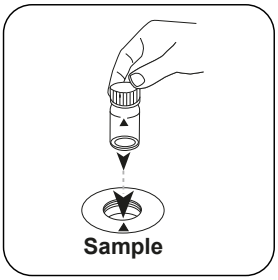
Buna ek olarak tespiti seçin: ayrılmış

Bu yöntem için, aşağıdaki cihazlarda her seferinde SIFIR ölçümünün yapılması gerekmez: XD 7000, XD 7500

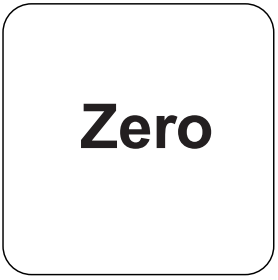
24 mm'lik küveti **10 mL numune** ile doldurun.



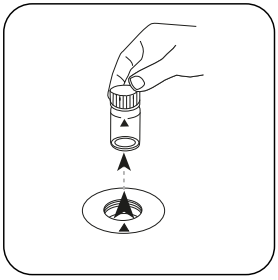
Küveti(küvetleri) kapatın.



Numune küvetini ölçüm haznesine koyun. Doğru konumlandırılmasına dikkat edin.

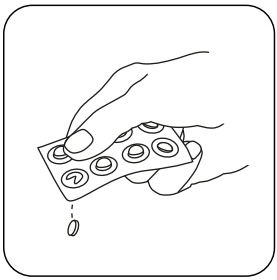


ZERO tuşuna basın.

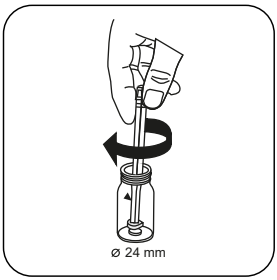


Küveti ölçüm haznesinden alın.

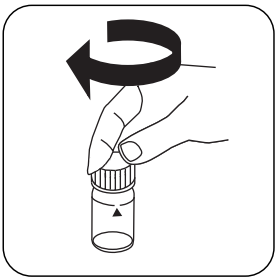
ZERO ölçümü gerektirmeyen cihazlarda **buradan başlayın**.



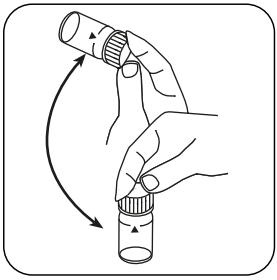
COPPER No. 1 tablet ilave edin.



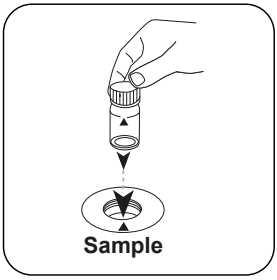
Tableti(tabletleri) hafifçe döndürerek ezin.



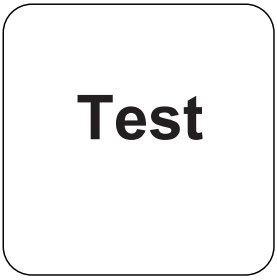
Küveti(küvetleri) kapatın.



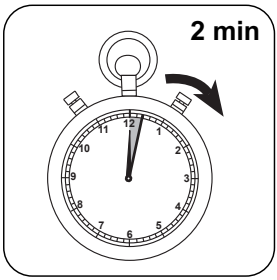
Tableti(tabletleri) sallayarak çözdürün.



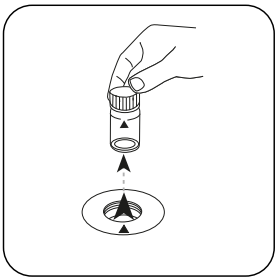
Numune küvetini ölçüm haznesine koyun. Doğru konumlandırılmasına dikkat edin.



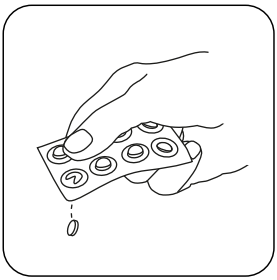
TEST (XD: **START**) tuşuna basın.



2 dakika tepkime süresi bekleyin.

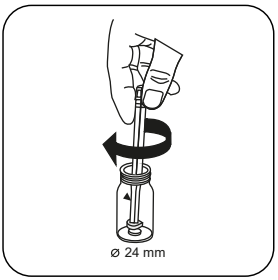


Küveti ölçüm haznesinden alın.

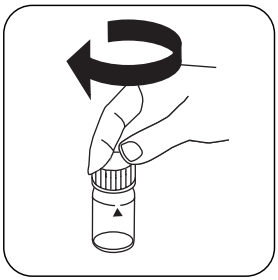


COPPER No. 2 tablet ilave edin.

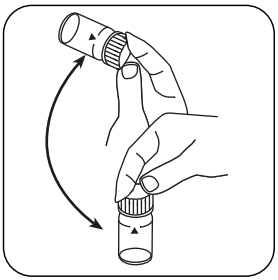
TR



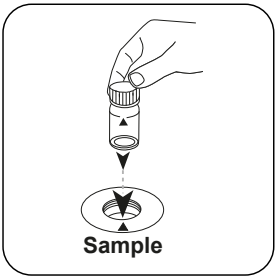
Tableti(tabletleri) hafifçe döndürerek ezin.



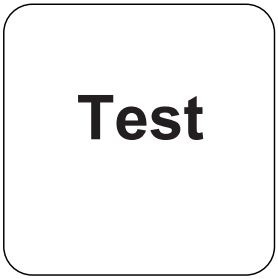
Küveti(küvetleri) kapatın.



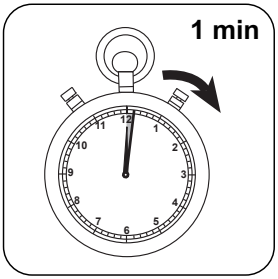
Tableti(tabletleri) sallayarak çözdürün.



Numune küvetini ölçüm haznesine koyun. Doğru konumlandırılmasına dikkat edin.



TEST (XD: **START**) tuşuna basın.



1 dakika tepkime süresi bekleyin.

Tepkime süresinin sona ermesinden sonra ölçüm otomatik gerçekleşir.

Ekranda sonuç mg/L serbest bakır; bağlı bakır; toplam bakır cinsinden belirir.

Kimyasal Metod

Biquinoline

Apandis

Girişim Metni

Kalıcı Girişimler

1. Siyanür CN^- ve Gümüş Ag^+ maddeler tespiti bozar.

Yöntem Doğrulama

Algılama Limiti	0.05 mg/L
Belirleme Limiti	0.15 mg/L
Ölçüm Aralığı Sonu	5 mg/L
Hassasiyet	3.8 mg/L / Abs
Güven Aralığı	0.026 mg/L
Standart Sapma	0.011 mg/L
Varyasyon Katsayısı	0.42 %

Bibliyografi

Photometrische Analyse, Lange/Vedjelek, Verlag Chemie 1980

[a] Serbest, bağlı ve toplam değerin belirlenmesi | # karıştırma çubuğu dahil

Bakır VLR PP M152

2 - 210 µg/L Cu

Porphyrine Indicator

Malzeme

Gerekli materyal (kısmen isteğe bağlı):

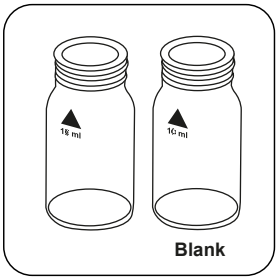
Ayıraçlar	Paketleme Birimi	Ürün No
VARIO Copper, set F10	1 Set	535140

Notlar

1. En doğru sonuçlar için bir reaktif boş ölçümü yapılmalıdır.
2. Numunenin pH değeri, ölçüme başlamadan önce sodyum hidroksit çözeltisi veya salpetrik asit eklenerek 2-6 aralığına ayarlanmalıdır.

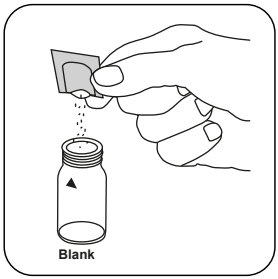
Tespitin uygulanması Toz paketli VLR bakır

Cihazda metot seçin.

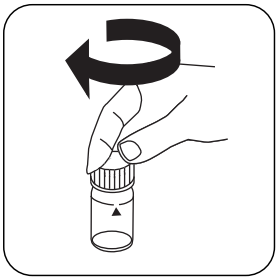


İki adet 24 mm'lik temiz küvet hazırlayın. Bunlardan birini boş küvet olarak işaretleyin.

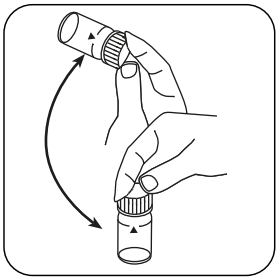
Her küvete **10 mL numune** ekleyin.



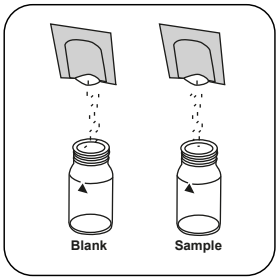
Sıfır küvetine **CU3 Masking F10 toz paketi** ilave edin.



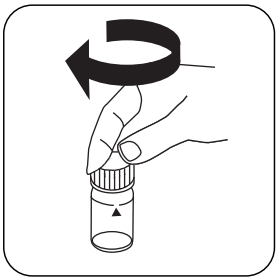
Küveti(küvetleri) kapatın.



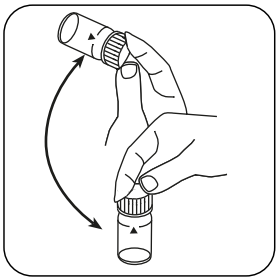
Tozu sallayarak çözdürün.



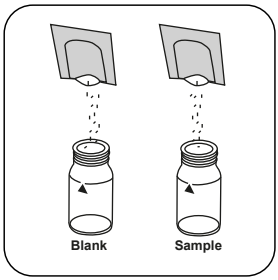
Her küvete **bir CU1 Porphyrin F10 toz paketi** ekleyin.



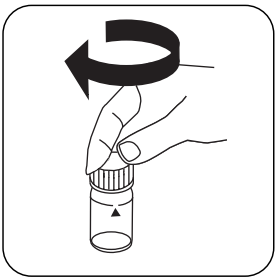
Küveti(küvetleri) kapatın.



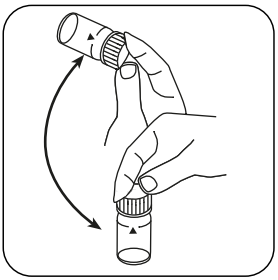
Tozu sallayarak çözdürün.



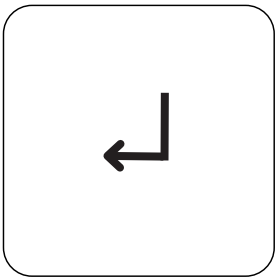
Her küvete **bir CU2 Porphyrin F10 toz paketi** ekleyin.



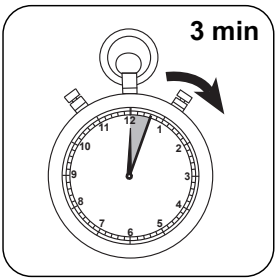
Küveti(küvetleri) kapatın.



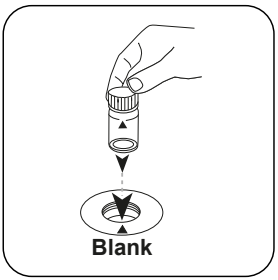
Tozu sallayarak çözdürün.



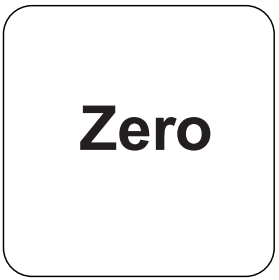
ENTER tuşuna basın.



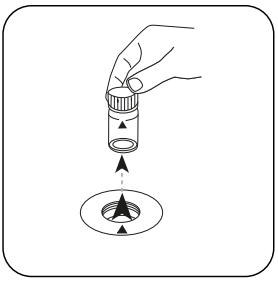
3 dakika tepkime süresi bekleyin.



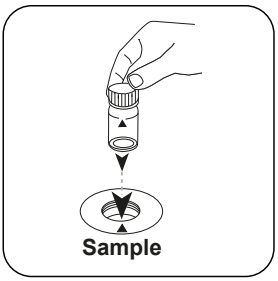
Boş küveti ölçüm haznesine koyun. Doğru konumlandırılmasına dikkat edin.



ZERO tuşuna basın.



Küveti ölçüm haznesinden alın.



Numune küvetini ölçüm haznesine koyun. Doğru konumlandırılmasına dikkat edin.

TEST tuşuna basın.

Ekranda sonuç **µg/L** bakır cinsinden belirir.

Kimyasal Metod

Porphyrine Indicator

Girişim Metni

Kalıcı Girişimler

1. Karmaşıklaştırıcı maddeler herhangi bir konsantrasyonda karışabilir.

Karışmalar	itibaren / [mg/L]
Al^{3+}	60
Cd^{2+}	10
Ca^{2+}	15000
Cl^{-}	90000
Cr^{6+}	110
Co^{2+}	100
F^{-}	30000
Pb^{2+}	3
Mg^{2+}	10000
Mn	140
Mo	11
Ni^{2+}	60
K^{+}	60000
Na^{+}	90000
Zn^{2+}	9
Fe	6
Hg	3

Yöntem Doğrulama

Algılama Limiti	2.6 µg/L
Belirleme Limiti	7.9 µg/L
Ölçüm Aralığı Sonu	210 µg/L
Hassasiyet	156 µg/L/Abs
Güven Aralığı	5.5 µg/L
Standart Sapma	2.3 µg/L
Varyasyon Katsayısı	2.2 %

Bakır PP M153

0.05 - 5 mg/L Cu Cu

Bicinchoninate

TR

Malzeme

Gerekli materyal (kısmen isteğe bağlı):

Ayıraçlar	Paketleme Birimi	Ürün No
VARIO Cu1 F10	Toz / 100 adetler	530300
VARIO Cu1 F10	Toz / 1000 adetler	530303
ValidCheck Bakır 2 mg/l	1 adetler	48141525

Hazırlık

1. Toplam bakır tespiti için bir parçalama işlemi gereklidir.
2. Numunenin pH değeri analizden önce 4 ila 6 arasında ayarlanmalıdır (potasyum hidroksit çözeltisi veya nitrik asit ile). Ortaya çıkan herhangi bir seyrelme sonuçta dikkate alınmalıdır.
   Dikkat: 6'nın üzerindeki pH değerlerinde bakır olmayabilir.

Notlar

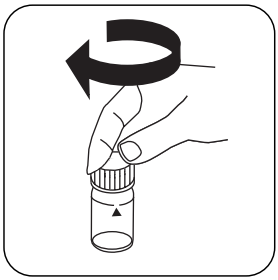
1. Doğruluk, çözünmemiş tozdan kaynaklı etkilenmez.

Tespitin uygulanması Vario toz paketli serbest bakır

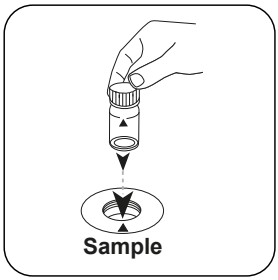
Cihazda metot seçin.

Bu yöntem için, aşağıdaki cihazlarda her seferinde SIFIR ölçümünün yapılması gerekmez: XD 7000, XD 7500

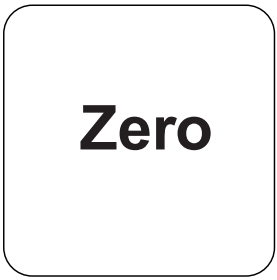
24 mm'lik küveti **10 mL numune** ile doldurun.



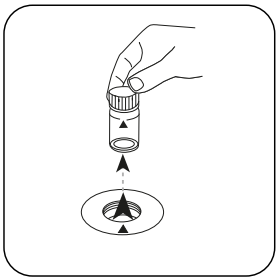
Küveti(küvetleri) kapatın.



Numune küvetini ölçüm haznesine koyun. Doğru konumlandırılmasına dikkat edin.

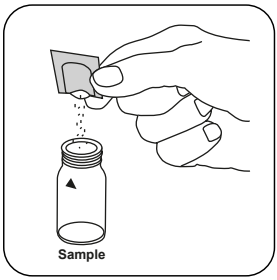


ZERO tuşuna basın.

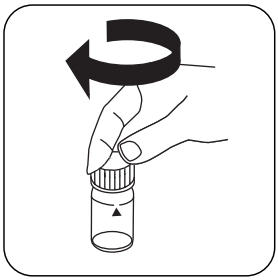


Küveti ölçüm haznesinden alın.

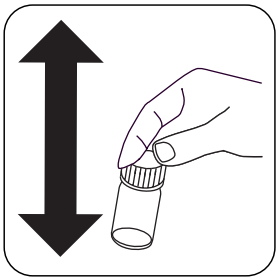
ZERO ölçümü gerektirmeyen cihazlarda **buradan başlayın**.



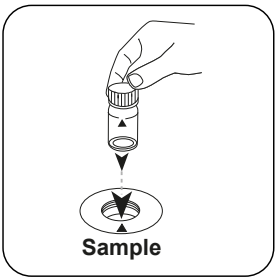
Vario Cu 1 F10 toz paketi ilave edin.

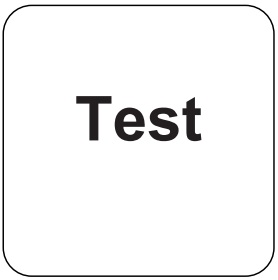


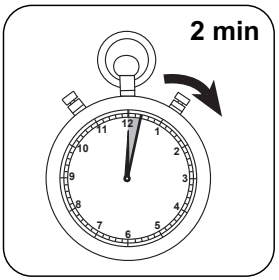
Küveti(küvetleri) kapatın.



Çalkalayarak içeriği karıştırın.







TR

Numune küvetini ölçüm haznesine koyun. Doğru konumlandırılmasına dikkat edin.

TEST (XD: **START**) tuşuna basın.

2 dakika tepkime süresi bekleyin.

Tepkime süresinin sona ermesinden sonra ölçüm otomatik gerçekleşir.

Ekranda sonuç mg/L bakır cinsinden belirir.

Kimyasal Metod

Bicinchoninate

Apandis

Girişim Metni

Kalıcı Girişimler

Sertlik derecesi, Al ve Fe daha düşük test sonuçları doğurur.

Giderilebilir Girişimler

1. Siyanür, CN^-: Siyanür tam renk oluşumunu engeller.
   Siyanür kaynaklı bir bozukluk şu şekilde giderilir: 10 ml numuneye 0,2 ml formaldehit katın ve 4 dk'lık tepkime süresini bekleyin. (Siyanür maskelenir). Ardından testi açıklandığı gibi yapın. Numunenin formaldehit ile seyreltilmiş olmasını da göz önünde bulundurmak için sonucu 1,02 ile çarpın.
2. Gümüş, Ag^+: Siyah renk alan bir bulanıklık gümüşten kaynaklanabilir. 75 ml numuneye 10 damla doymuş potasyum klorür çözeltisi katın ve ardından ince bir filtre ile filtreleyin. Filtrelenen numunenin 10 ml'sini uygulama için kullanın.

Yöntem Doğrulama

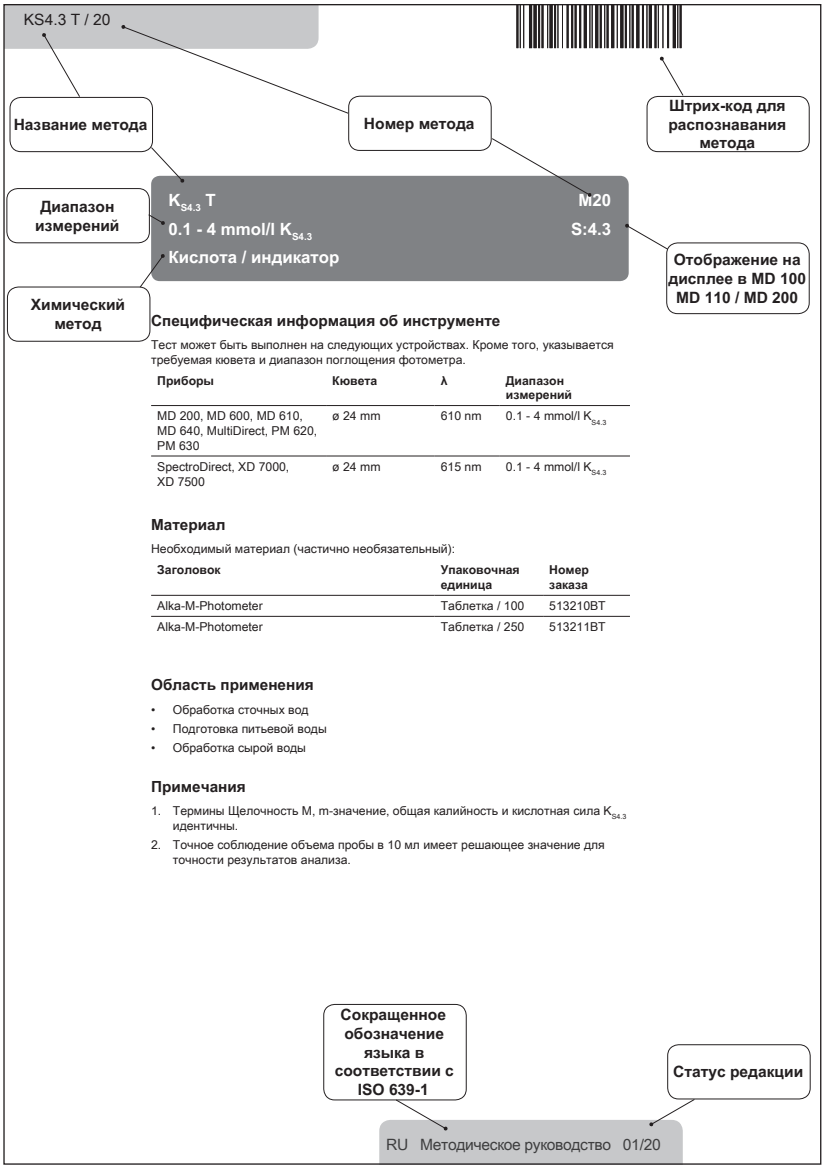
Algılama Limiti	0.05 mg/L
Belirleme Limiti	0.15 mg/L
Ölçüm Aralığı Sonu	5 mg/L
Hassasiyet	3.77 mg/L / Abs
Güven Aralığı	0.064 mg/L
Standart Sapma	0.027 mg/L
Varyasyon Katsayısı	1.07 %

Bibliyografi

S. Nakano, Y. Zasshi, 82 486 - 491 (1962) [Chemical Abstracts, 58 3390e (1963)]

Elde edilen

APHA Method 3500Cu


KS4.3 T / 20
Название метода
Номер метода
Штрих-код для распознавания метода
Диапазон измерений
K S4.3 T
M20
0.1 - 4 mmol/l K S4.3
S:4.3
Кислота / индикатор
Отображение на дисплее в MD 100 MD 110 / MD 200
Химический метод
Специфическая информация об инструменте
Тест может быть выполнен на следующих устройствах. Кроме того, указывается требуемая кювета и диапазон поглощения фотометра.
Приборы | Кювета | λ | Диапазон измерений
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
Материал
Необходимый материал (частично необязательный):
Заголовок | Упаковочная единица | Номер заказа
Alka-M-Photometer | Таблетка / 100 | 513210BT
Alka-M-Photometer | Таблетка / 250 | 513211BT
Область применения
• Обработка сточных вод
• Подготовка питьевой воды
• Обработка сырой воды
Примечания
1. Термины Щелочность M, m-значение, общая калийность и кислотная сила K S4.3 идентичны.
2. Точное соблюдение объема пробы в 10 мл имеет решающее значение для точности результатов анализа.
Сокращенное обозначение языка в соответствии с ISO 639-1
Статус редакции
RU Методическое руководство 01/20

Выполнение измерения

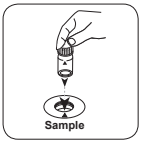
Выполнение определения Кислотная сила $K_{S4.3}$ с таблеткой

Выберите метод в устройстве.

Для этого метода измерения нуля не требуется для следующих устройств: XD 7000, XD 7500

24-Наполните кювету -мм **10** пробой мл.

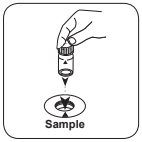
Закройте кювету(ы).



Поместите кювету для проб в измерительную шахту. Обращайте внимание на позиционирование.

■ ■ ■

Растворите таблетку (таблетки) покачиванием.



Поместите кювету для проб в измерительную шахту. Обращайте внимание на позиционирование.

Нажмите клавишу ТЕСТ (XD: СТАРТ).

На дисплее отображается результат в виде Кислотная сила $K_{S4.3}$.

Медь T **M150**

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

Биквинолин

RU

Материал

Необходимый материал (частично необязательный):

Реактивы	Упаковочная единица	Номер заказа
Медь № 1	Таблетка / 100	513550BT
Медь № 1	Таблетка / 250	513551BT
Медь № 2	Таблетка / 100	513560BT
Медь № 2	Таблетка / 250	513561BT
Набор Медь № 1/№ 2#	100 каждая	517691BT
Набор Медь № 1/№ 2#	250 каждая	517692BT
ValidCheck Медь 2 мг/л	1 Шт.	48141525

Подготовка

1. Сильно щелочные или кислые воды перед анализом следует довести до уровня pH от 4 до 6.

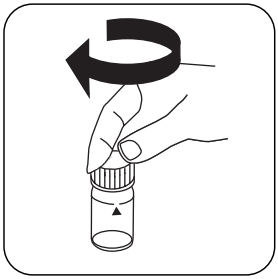
Выполнение определения свободной меди, с использованием таблетки

Выберите метод в устройстве.

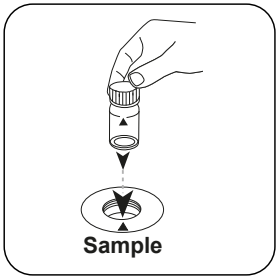
Также выберите определение: свободного.

Для этого метода необязательно проводить измерение НУЛЯ каждый раз на следующих устройствах: XD 7000, XD 7500

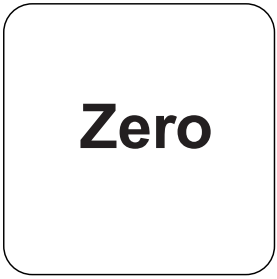
24-Наполните кювету -мм **10 пробой мл**.



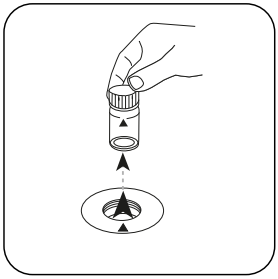
Закройте кювету(ы).



Поместите **кювету для проб** в измерительную шахту. Обращайте внимание на позиционирование.



Нажмите клавишу **НОЛЬ** .



Извлеките кювету из измерительной шахты.

Для приборов, для которых не требуется **измерение нулевого значения** , **начните отсюда**.

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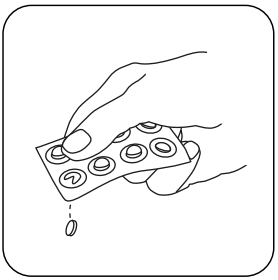
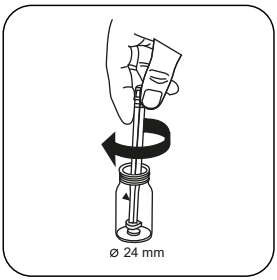
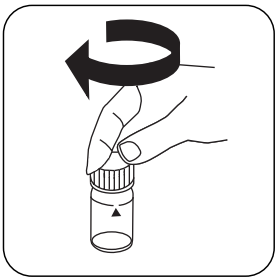


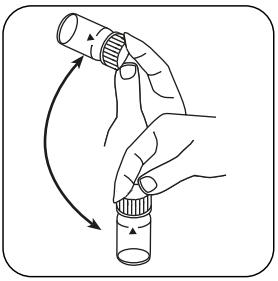
Добавить **таблетку COPPER No. 1**.



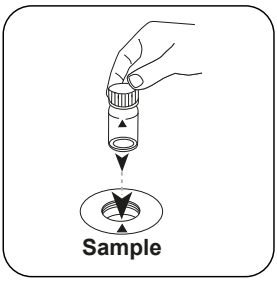
Раздавите таблетку (таблетки) легким вращением.



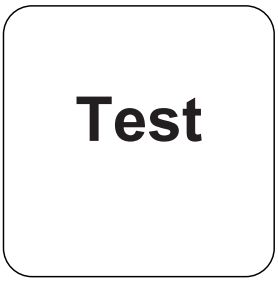
Закройте кювету(ы).



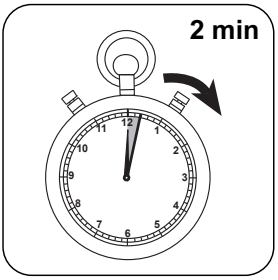
Растворите таблетку (таблетки) покачиванием.



Поместите **кювету для проб** в измерительную шахту. Обращайте внимание на позиционирование.



Нажмите клавишу **ТЕСТ** (XD: **СТАРТ**).



Выдержите **2 минут(ы) времени реакции**.

По истечении времени реакции измерение выполняется автоматически.

На дисплее отображается результат в мг/л свободной меди.

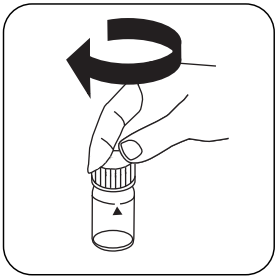
Выполнение определения общей меди, с использованием таблетки

Выберите метод в устройстве.

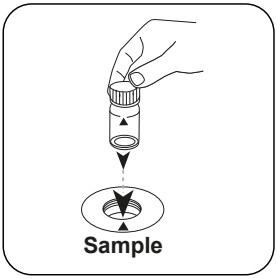
Также выберите определение: общего.

Для этого метода необязательно проводить измерение НУЛЯ каждый раз на следующих устройствах: XD 7000, XD 7500

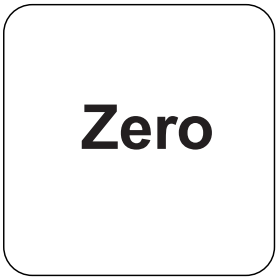
24-Наполните кювету -мм **10 пробой мл**.



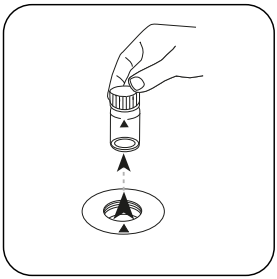
Закройте кювету(ы).



Поместите **кювету для проб** в измерительную шахту. Обращайте внимание на позиционирование.

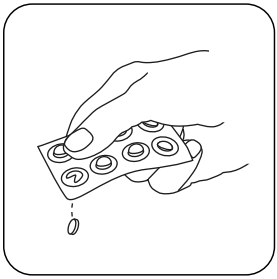


Нажмите клавишу **НОЛЬ** .

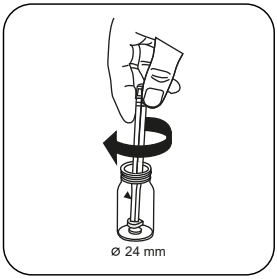


Извлеките кювету из измерительной шахты.

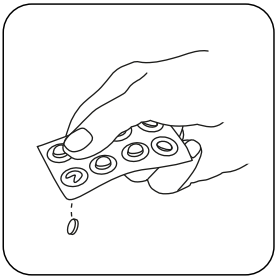
Для приборов, для которых не требуется **измерение нулевого значения** , **начните отсюда**.



Добавить **таблетку COPPER No. 1**.



Раздавите и растворите таблетку (таблетки) легким вращением.



Добавить **таблетку COPPER No. 2**.

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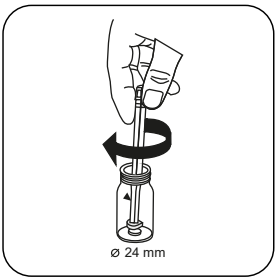
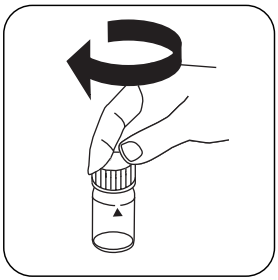
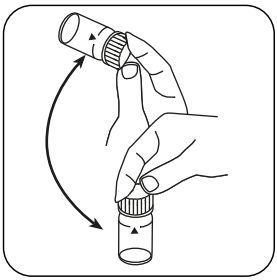


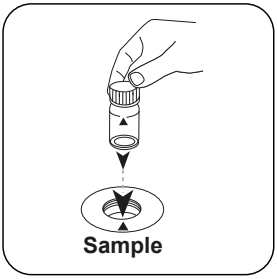
Раздавите таблетку (таблетки) легким вращением.



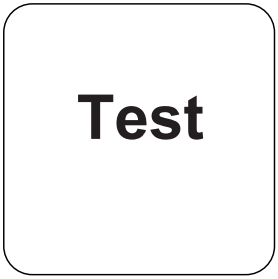
Закройте кювету(ы).



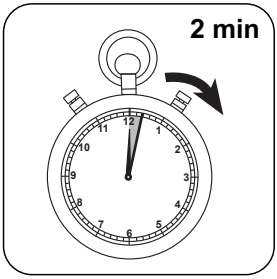
Растворите таблетку (таблетки) покачиванием.



Поместите **кювету для проб** в измерительную шахту. Обращайте внимание на позиционирование.



Нажмите клавишу **ТЕСТ** (XD: **СТАРТ**).



Выдержите **2 минут(ы) времени реакции**.

По истечении времени реакции измерение выполняется автоматически.

На дисплее отображается результат в мг/л общей меди.

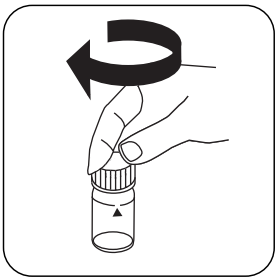
Выполнение определения Медь, дифференцированное определение с помощью таблетки

Выберите метод в устройстве.

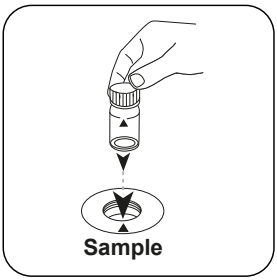
Также выберите определение: дифференцированное.

Для этого метода необязательно проводить измерение НУЛЯ каждый раз на следующих устройствах: XD 7000, XD 7500

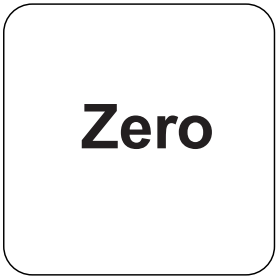
24-Наполните кювету -мм **10 пробой мл**.



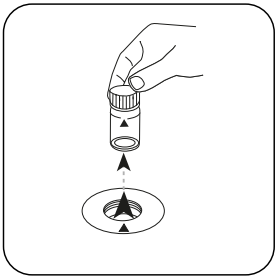
Закройте кювету(ы).



Поместите **кювету для проб** в измерительную шахту. Обращайте внимание на позиционирование.

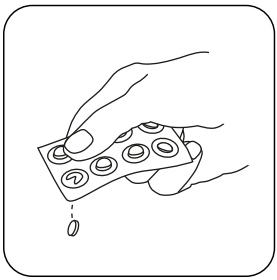


Нажмите клавишу **НОЛЬ** .

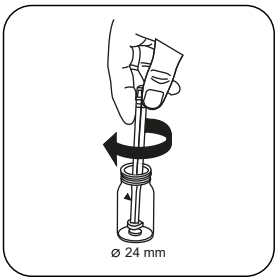


Извлеките кювету из измерительной шахты.

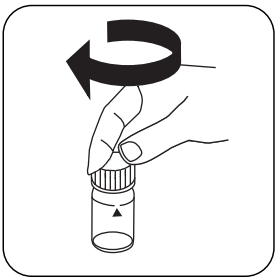
Для приборов, для которых не требуется **измерение нулевого значения** , **начните отсюда**.



Добавить **таблетку COPPER No. 1**.

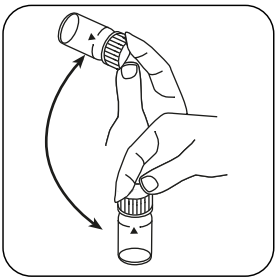


Раздавите таблетку (таблетки) легким вращением.

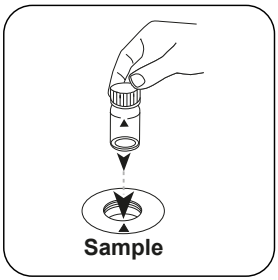


Закройте кювету(ы).

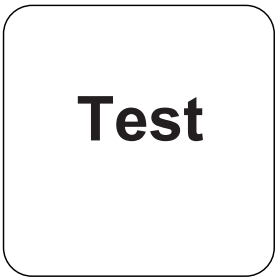
RU



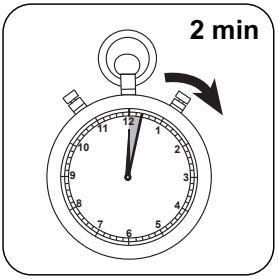
Растворите таблетку (таблетки) покачиванием.



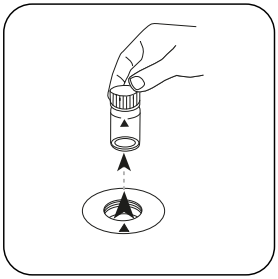
Поместите **кювету для проб** в измерительную шахту. Обращайте внимание на позиционирование.



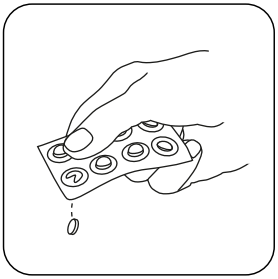
Нажмите клавишу **ТЕСТ** (XD: **СТАРТ**).



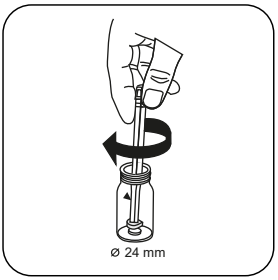
Выдержите **2 минут(ы) времени реакции**.



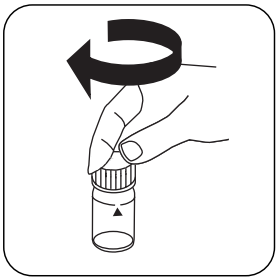
Извлеките кювету из измерительной шахты.



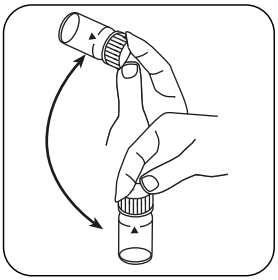
Добавить **таблетку COPPER No. 2**.



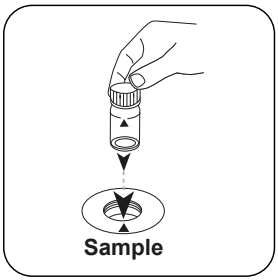
Раздавите таблетку (таблетки) легким вращением.



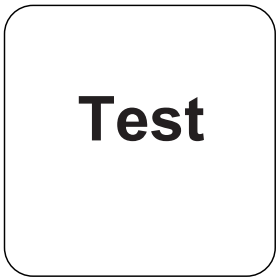
Закройте кювету(ы).



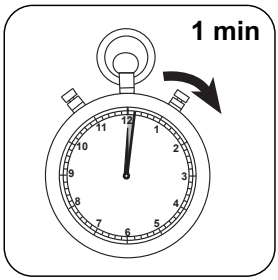
Растворите таблетку (таблетки) покачиванием.



Поместите **кювету для проб** в измерительную шахту. Обращайте внимание на позиционирование.



Нажмите клавишу **ТЕСТ** (XD: **СТАРТ**).



Выдержите **1 минут(ы) времени реакции**.

По истечении времени реакции измерение выполняется автоматически.

На дисплее отображается результат в мг/л свободной, связанной и общей меди.

Химический метод

Биквинолин

Приложение

RU

Нарушения

Постоянные нарушения

1. Определению мешают Цианид CN^- иСеребро Ag^+.

Проверка метода

Предел обнаружения	0.05 mg/L
Предел детерминации	0.15 mg/L
Конечное значение диапазона измерений	5 mg/L
Восприимчивость	3.8 mg/L / Abs
Доверительная область	0.026 mg/L
Среднеквадратическое отклонение процесса	0.011 mg/L
Коэффициент вариации метода	0.42 %

Ссылки на литературу

Photometrische Analyse, Lange/Vedjelek, Verlag Chemie 1980

[a)] определение свободного, связанного и общего содержания | [#] в комплект входит палочка для перемешивания

Медь VLR PP M152

2 - 210 µg/L Cu

Porphyrine Indicator

RU

Материал

Необходимый материал (частично необязательный):

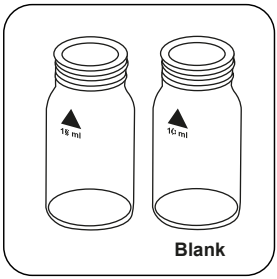
Реактивы	Упаковочная единица	Номер заказа
VARIO Copper, набор F10	1 Набор	535140

Примечания

1. Для получения наиболее точных результатов необходимо провести холостое измерение с реагентом.
2. Перед началом измерения pH образца должен быть адаптирован путем добавления раствора гидроксида натрия или сальпетриновой кислоты в диапазоне 2-6.

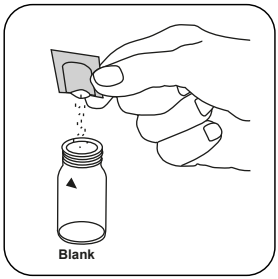
Выполнение определения Медь VLR с упаковкой порошка

Выберите метод в устройстве.

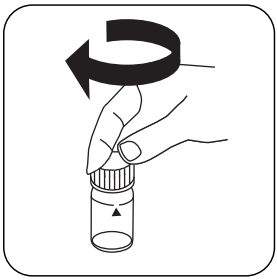


Подготовьте две чистые кюветы 24 мм. Отметьте одну кювету как нулевую.

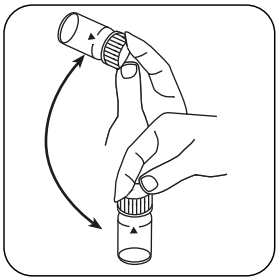
Добавьте **10 мл пробы** в каждую кювету.



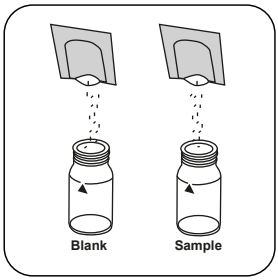
Добавьте в нулевую кювету **упаковку порошка CU3 Masking F10**.



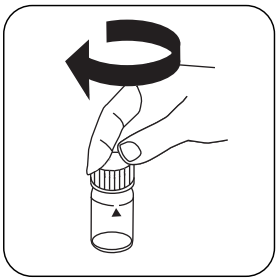
Закройте кювету(ы).



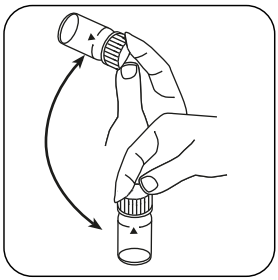
Растворите порошок покачиванием.



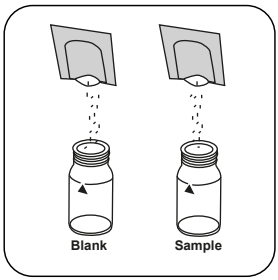
В каждую кювету добавьте **одну упаковку порошка CU1 Porphyrin F10**.



Закройте кювету(ы).

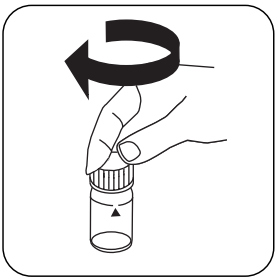


Растворите порошок покачиванием.

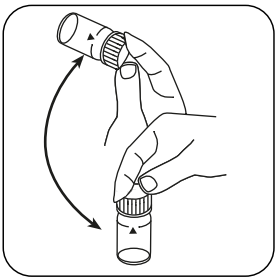


В каждую кювету добавьте **одну упаковку порошка CU2 Porphyrin F10**.

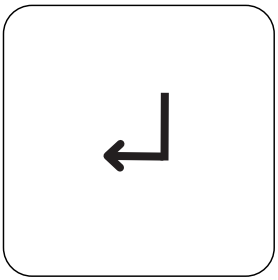
RU



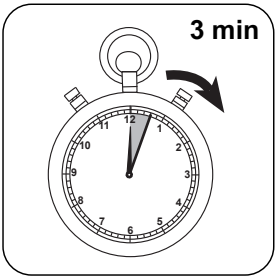
Закройте кювету(ы).



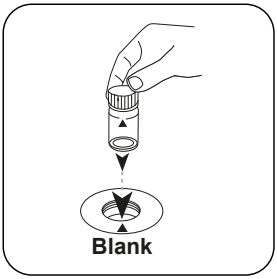
Растворите порошок покачиванием.



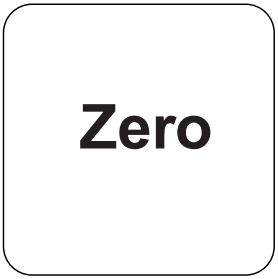
Нажмите клавишу **ENTER** .



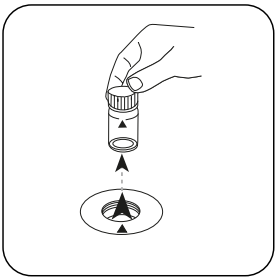
Выдержите **3 минут(ы) времени реакции**.



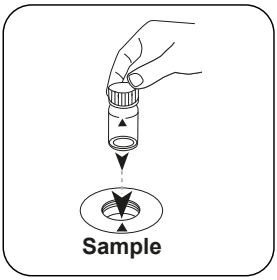
Поместите **нулевую кювету** в измерительную шахту. Обращайте внимание на позиционирование.



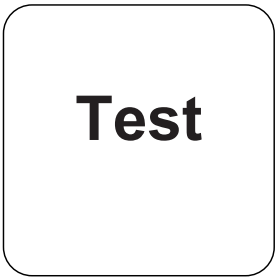
Нажмите клавишу **НОЛЬ** .



Извлеките кювету из измерительной шахты.



Поместите **кювету для проб** в измерительную шахту. Обращайте внимание на позиционирование.



Нажмите клавишу **ТЕСТ**.

На дисплее отображается результат в **мкг/л** Медь.

Химический метод

Porphyrine Indicator

Нарушения

Постоянные нарушения

1. Комплексообразующие вещества могут вмешиваться в любой концентрации.

Помехи	**от / [мг/л]**
Al^{3+}	60
Cd^{2+}	10
Ca^{2+}	15000
Cl^{-}	90000
Cr^{6+}	110
Co^{2+}	100
F^{-}	30000
Pb^{2+}	3
Mg^{2+}	10000
Mn	140
Mo	11
Ni^{2+}	60
K^{+}	60000
Na^{+}	90000
Zn^{2+}	9
Fe	6
Hg	3

Проверка метода

Предел обнаружения	2.6 µg/L
Предел детерминации	7.9 µg/L
Конечное значение диапазона измерений	210 µg/L
Восприимчивость	156 µg/L/Abs
Доверительная область	5.5 µg/L
Среднеквадратическое отклонение процесса	2.3 µg/L
Коэффициент вариации метода	2.2 %

Медь PP M153

0.05 - 5 mg/L Cu Cu

Бицинхонинат

RU

Материал

Необходимый материал (частично необязательный):

Реактивы	Упаковочная единица	Номер заказа
VARIO Cu1 F10	Порошок / 100 Шт.	530300
VARIO Cu1 F10	Порошок / 1000 Шт.	530303
ValidCheck Медь 2 мг/л	1 Шт.	48141525

Подготовка

1. Для определения общего содержания меди необходимо растворение.
2. Перед анализом значение pH образца должно быть отрегулировано между 4 и 6 (с помощью раствора гидроксида калия или азотной кислоты). Любое возникающее разбавление должно быть учтено в результатах.
   Внимание: Медь может осаждаться при pH выше 6.

Примечания

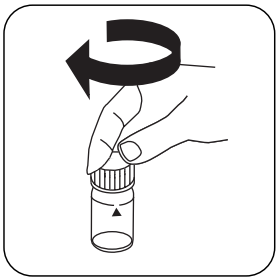
1. Нерастворенный порошок не влияет на точность измерений.

Выполнение определения Медь, свободная, с упаковкой порошка Vario

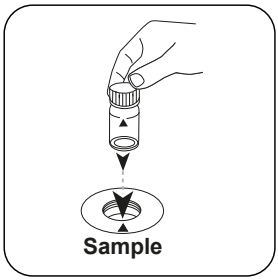
Выберите метод в устройстве.

Для этого метода необязательно проводить измерение НУЛЯ каждый раз на следующих устройствах: XD 7000, XD 7500

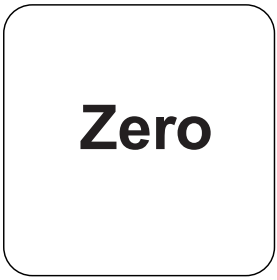
24-Наполните кювету -мм **10 пробой мл**.



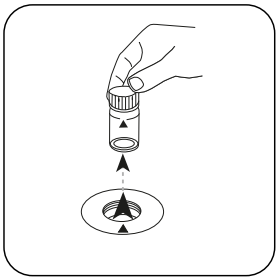
Закройте кювету(ы).



Поместите **кювету для проб** в измерительную шахту. Обращайте внимание на позиционирование.

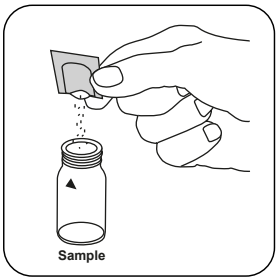


Нажмите клавишу **НОЛЬ** .

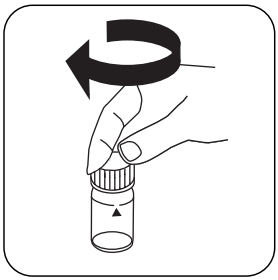


Извлеките кювету из измерительной шахты.

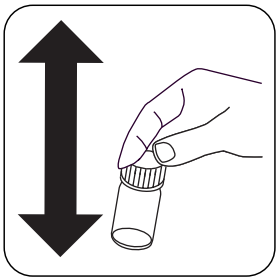
Для приборов, для которых не требуется **измерение нулевого значения** , **начните отсюда**.



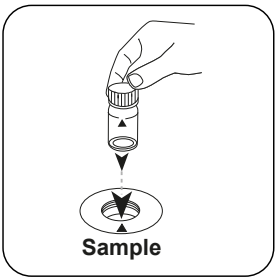
Добавьте **упаковку порошка Vario Cu 1 F10** .

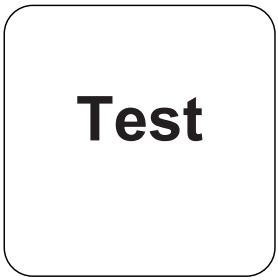


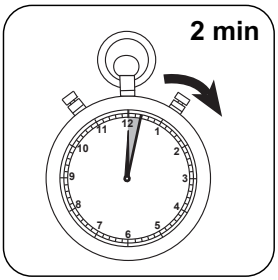
Закройте кювету(ы).



Перемешайте содержимое взбалтыванием.







RU

Поместите **кювету для проб** в измерительную шахту. Обращайте внимание на позиционирование.

Нажмите клавишу **ТЕСТ** (XD: **СТАРТ**).

Выдержите **2 минут(ы) времени реакции**.

По истечении времени реакции измерение выполняется автоматически.

На дисплее отображается результат в мг/л Медь.

Химический метод

Бицинхонинат

Приложение

Нарушения

Постоянные нарушения

Жесткость, Al и Fe дают более низкие результаты испытаний.

Исключаемые нарушения

1. Цианид, CN^-: Цианид препятствует полному развитию цвета. Нарушения, вызванные цианидом, должны быть устранены следующим образом: Добавьте 0,2 мл формальдегида к 10 мл пробы и выдержите время реакции 4 минуты. (цианид будет замаскирован). Затем выполните тест, как описано выше. Умножьте результат на 1,02, чтобы учесть разбавление пробы формальдегидом.
2. Серебро, Ag^+: Существующая мутность, которая становится черной, может быть вызвана серебром. Добавьте 75 мл пробы с 10 каплями насыщенного раствора хлорида калия и процедите через фильтр тонкой очистки. Используйте 10 мл отфильтрованной пробы для теста.

Проверка метода

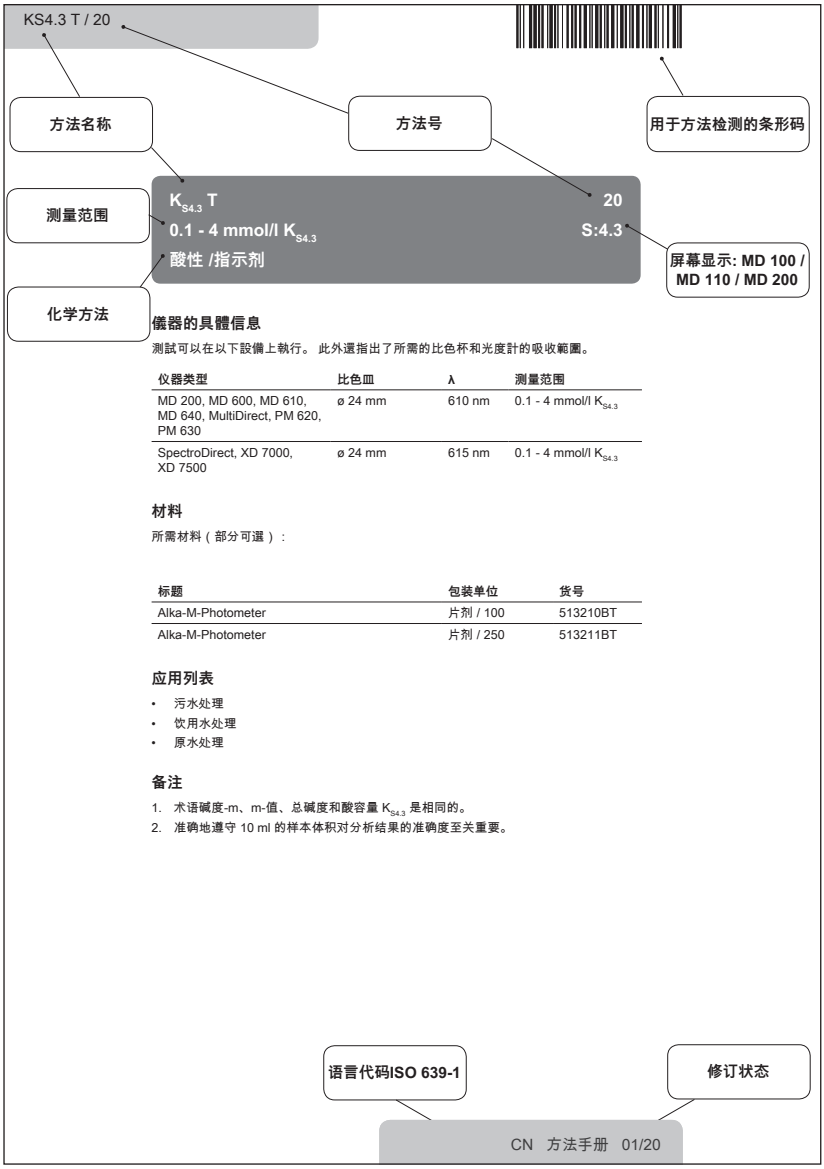
Предел обнаружения	0.05 mg/L
Предел детерминации	0.15 mg/L
Конечное значение диапазона измерений	5 mg/L
Восприимчивость	3.77 mg/L / Abs
Доверительная область	0.064 mg/L
Среднеквадратическое отклонение процесса	0.027 mg/L
Коэффициент вариации метода	1.07 %

Ссылки на литературу

S. Nakano, Y. Zasshi, 82 486 - 491 (1962) [Chemical Abstracts, 58 3390e (1963)]

Выведено из

Метод APHA 3500Cu



儀器的具體信息

測試可以在以下設備上執行。 此外還指出了所需的比色杯和光度計的吸收範圍。

仪器类型	比色皿	λ	测量范围
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630	ø 24 mm	610 nm	0.1 - 4 mmol/l $K_{S4.3}$
SpectroDirect, XD 7000, XD 7500	ø 24 mm	615 nm	0.1 - 4 mmol/l $K_{S4.3}$

材料

所需材料（部分可選）：

标题	包装单位	货号
Alka-M-Photometer	片剂 / 100	513210BT
Alka-M-Photometer	片剂 / 250	513211BT

应用列表

- 污水处理
- 饮用水处理
- 原水处理

备注

1. 术语碱度-m、m-值、总碱度和酸容量 $K_{S4.3}$ 是相同的。
2. 准确地遵守 10 ml 的样本体积对分析结果的准确度至关重要。

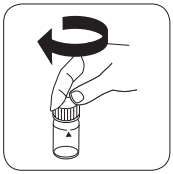
开始测量

进行测定 $K_{S4.3}$ 片剂酸容量

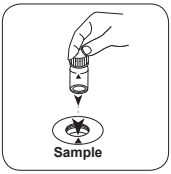
选择设备中的方法。

对于这种方法，在以下设备上不能进行 ZERO 测量：XD 7000, XD 7500

用 **10 ml** 样本填充 24 mm 比色杯。

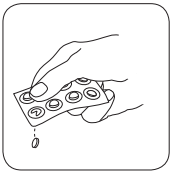


密封比色杯。

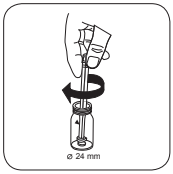


将样本比色杯放入测量轴中。注意定位。

• • •



加入 **ALKA-M-PHOTOMETER** 片剂。



用轻微的扭转压碎片剂。

密封比色杯。

CN 方法手册 01/20

T 铜 M150

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

双喹啉

材料
所需材料（部分可選）：

ZH

试剂	包装单位	货号
铜 No.1	片剂 / 100	513550BT
铜 No.1	片剂 / 250	513551BT
铜 No.2	片剂 / 100	513560BT
铜 No.2	片剂 / 250	513561BT
套件铜 No.1/No.2#	各100次	517691BT
套件铜 No.1/No.2#	各250次	517692BT
ValidCheck 铜 2 mg/l	1 片	48141525

准备

1. 在分析前应将强碱性或酸性水的 pH 从4到6 左右。

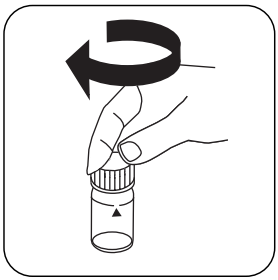
进行测定 余铜 片剂法

选择设备中的方法。

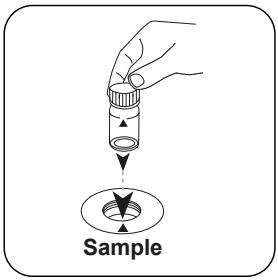
另外选择测定：余铜

对于此方法，不必每次都在以下设备上进行零测量：XD 7000, XD 7500

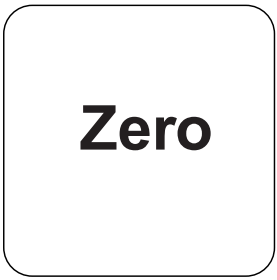
用 **10 mL 样本**填充 24 mm 比色杯。



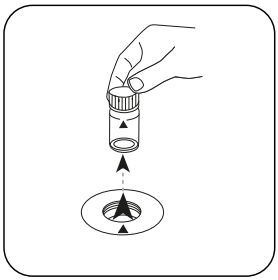
密封比色杯。



将**样本比色杯**放入测量轴中。注意定位。

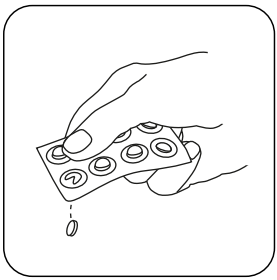


按下 **ZERO** 按钮。

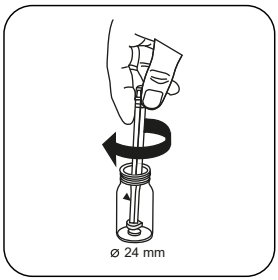


从测量轴上取下比色杯。

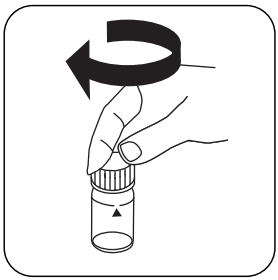
对于**不需要 ZERO 测量**的设备，**从这里开始。**



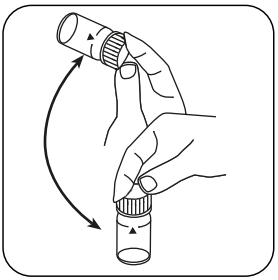
加入 **COPPER No. 1 片剂**。



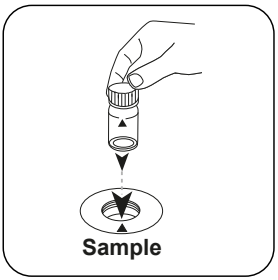
用轻微的扭转压碎片剂。



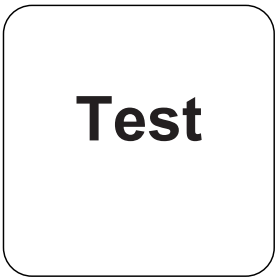
密封比色杯。



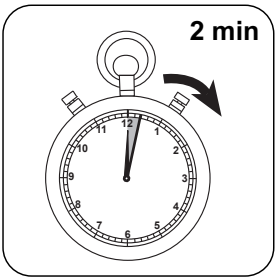
通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。



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。

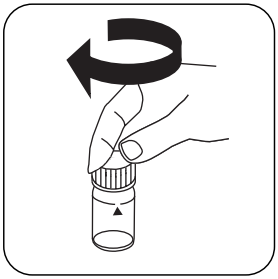
进行测定 总铜 片剂法

选择设备中的方法。

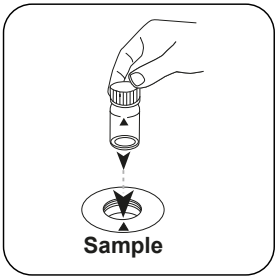
另外选择测定：总铜

对于此方法，不必每次都在以下设备上进行零测量：XD 7000, XD 7500

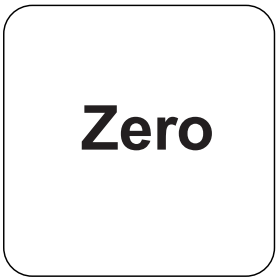
用 **10 mL 样本**填充 24 mm 比色杯。



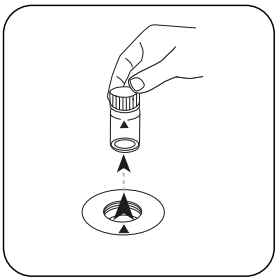
密封比色杯。



将**样本比色杯**放入测量轴中。注意定位。

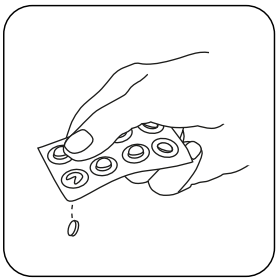


按下 **ZERO** 按钮。

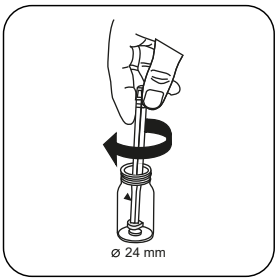


从测量轴上取下比色杯。

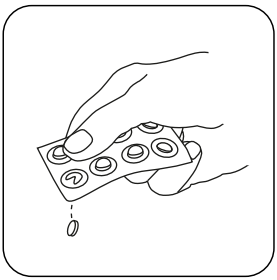
对于**不需要 ZERO 测量**的设备，**从这里开始。**



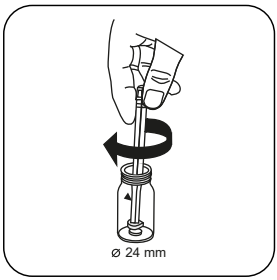
加入 **COPPER No. 1 片剂**。



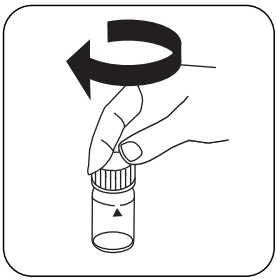
用轻微的扭转压碎片剂并溶解。



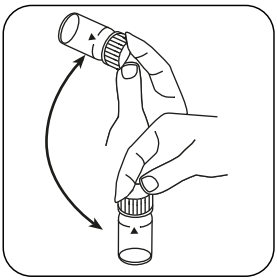
加入 **COPPER No. 2 片剂**。



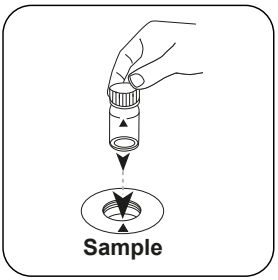
用轻微的扭转压碎片剂。



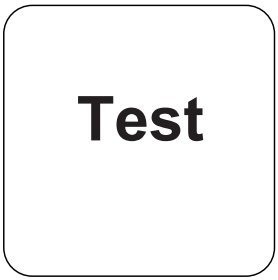
密封比色杯。



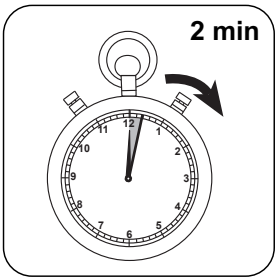
通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。



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。

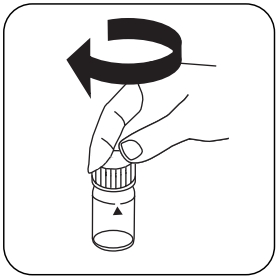
进行测定 铜，片剂差异化测量

选择设备中的方法。

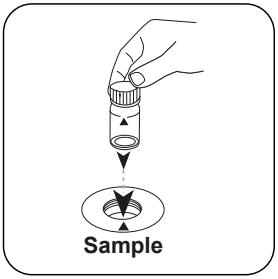
另外选择测定：结合铜

对于此方法，不必每次都在以下设备上进行零测量：XD 7000, XD 7500

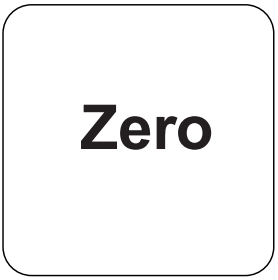
用 **10 mL 样本**填充 24 mm 比色杯。



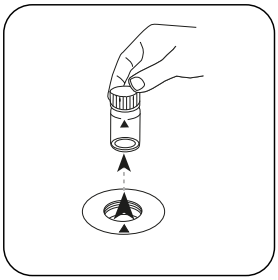
密封比色杯。



将**样本比色杯**放入测量轴中。注意定位。

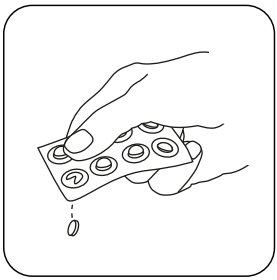


按下 **ZERO** 按钮。

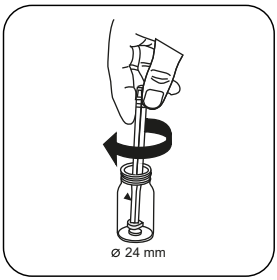


从测量轴上取下比色杯。

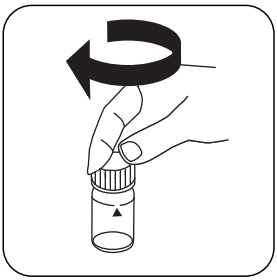
对于**不需要 ZERO 测量**的设备，**从这里开始。**



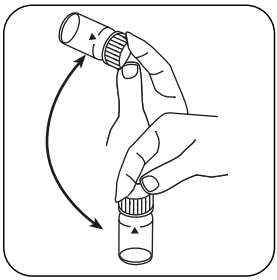
加入 **COPPER No. 1 片剂**。



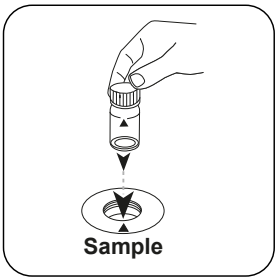
用轻微的扭转压碎片剂。



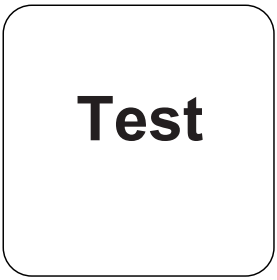
密封比色杯。



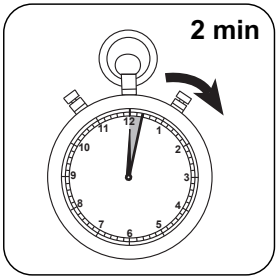
通过旋转溶解片剂。



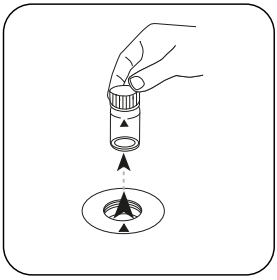
将**样本比色杯**放入测量轴中。注意定位。



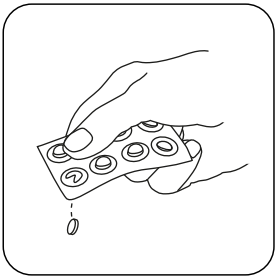
按下 **TEST** (XD: **START**) 按钮。



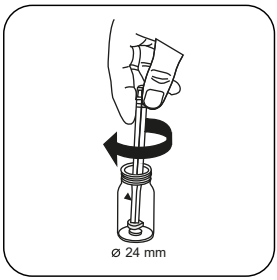
等待 **2 分钟反应时间** 。



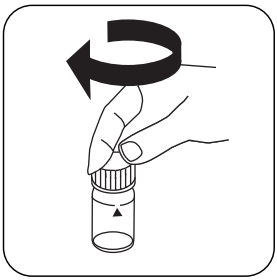
从测量轴上取下比色杯。



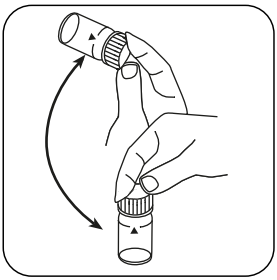
加入 **COPPER No. 2 片剂** 。



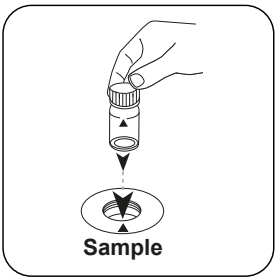
用轻微的扭转压碎片剂。

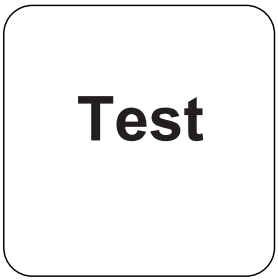


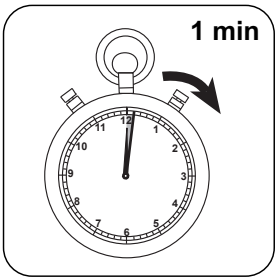
密封比色杯。



通过旋转溶解片剂。







ZH

将**样本比色杯**放入测量轴中。注意定位。

按下 **TEST** (XD: **START**) 按钮。

等待 **1 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;结合铜; 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

铜 VLR PP M152

2 - 210 µg/L Cu

Porphyrine Indicator

材料
所需材料（部分可選）：

ZH

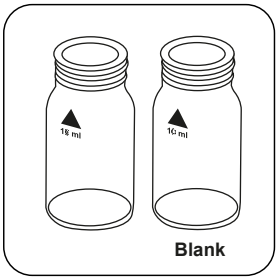
试剂	包装单位	货号
VARIO Copper，套件 F10	1 组	535140

备注

1. 为了得到最准确的结果，应该进行试剂空白测量。
2. 在开始测量之前，必须通过添加氢氧化钠溶液或盐酸使样品的pH值适应2-6的范围。

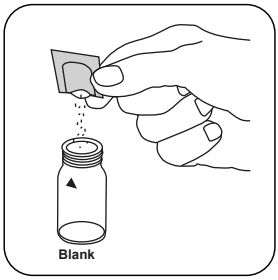
进行测定 铜 VLR 粉包

选择设备中的方法。

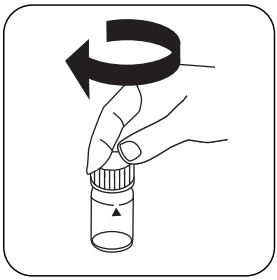


准备两个干净的 24 mm 比色杯。将一个比色杯标记为空白比色杯。

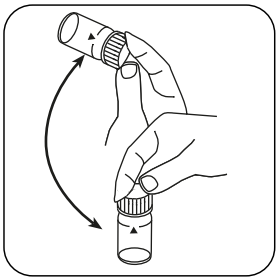
在每个比色杯中加入 **10 mL 样本**。



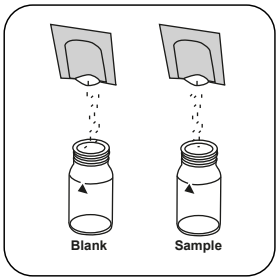
在空白处添加一个 CU3 Masking F10粉末包。



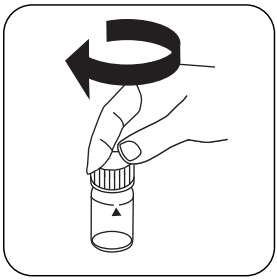
密封比色杯。



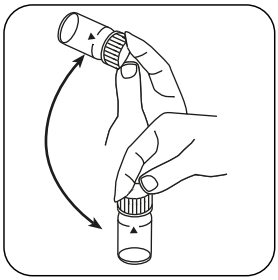
通过旋转溶解粉末。



在每个比色杯中加入一个 **CU1 Porphyrin F10 粉包** 。



密封比色杯。



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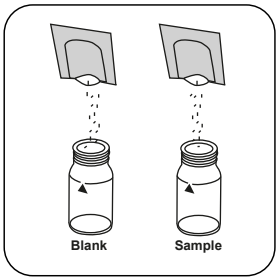
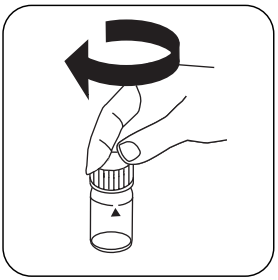
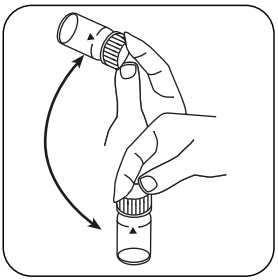


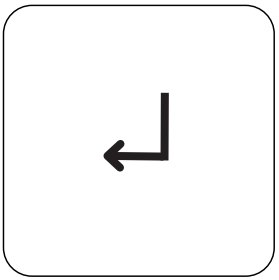
在每个比色杯中加入一个 **CU2 Porphyrin F10 粉包** 。



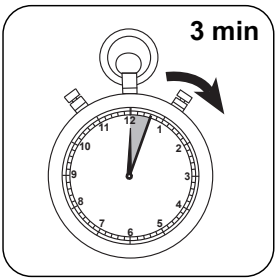
密封比色杯。



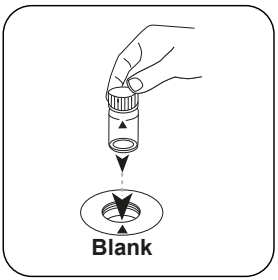
通过旋转溶解粉末。



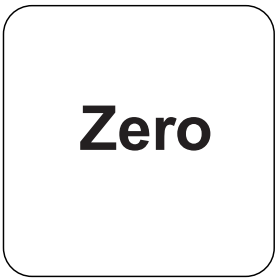
按下 **ENTER** 按钮。



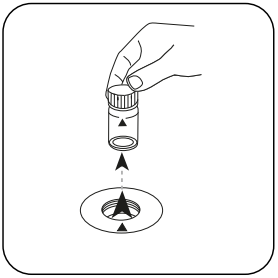
等待 **3 分钟反应时间** 。



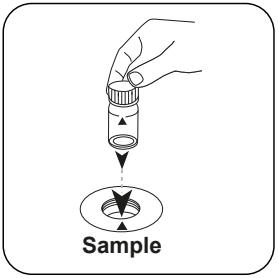
将**空白比色杯**放入测量轴中。注意定位。



按下 **ZERO** 按钮。



从测量轴上取下比色杯。



将**样本比色杯**放入测量轴中。注意定位。

按下 **TEST** 按钮。

在显示屏上显示的结果单位为 **µg/L** 铜。

化学方法

Porphyrine Indicator

干扰说明

持续干扰

1. 络合物质可以在任何浓度下进行干扰。

干擾	**從/ [mg/l]**
Al^{3+}	60
Cd^{2+}	10
Ca^{2+}	15000
Cl^{-}	90000
Cr^{6+}	110
Co^{2+}	100
F^{-}	30000
Pb^{2+}	3
Mg^{2+}	10000
Mn	140
Mo	11
Ni^{2+}	60
K^{+}	60000
Na^{+}	90000
Zn^{2+}	9
Fe	6
Hg	3

方法验证

检出限	2.6 µg/L
测定下限	7.9 µg/L
测量上限	210 µg/L
灵敏度	156 µg/L/Abs
置信范围	5.5 µg/L
标准偏差	2.3 µg/L
变异系数	2.2 %

PP 铜 M153

0.05 - 5 mg/L Cu Cu

Bicinchoninate

材料
所需材料（部分可選）：

ZH

试剂	包装单位	货号
VARIO Cu1 F10	粉剂 / 100 片	530300
VARIO Cu1 F10	粉剂 / 1000 片	530303
ValidCheck 铜 2 mg/l	1 片	48141525

准备

1. 为了测定总铁需要进行消解。
2. 在分析之前，必须将样品的pH值调整到4到6之间（用氢氧化钾溶液或硝酸）。 任何由此产生的稀释都必须在结果中加以考虑。
   注意：在 pH 值高于 6 时，铜可能会沉淀。

备注

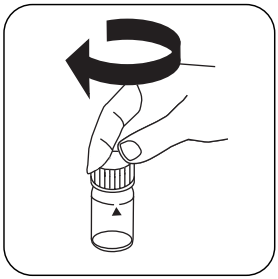
1. 准确度不受未溶解的粉末影响。

进行测定 铜，无 Vario 粉包

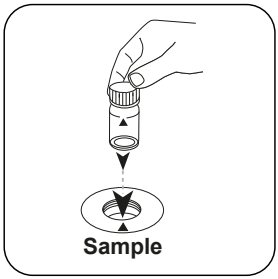
选择设备中的方法。

对于此方法，不必每次都在以下设备上进行零测量：XD 7000, XD 7500

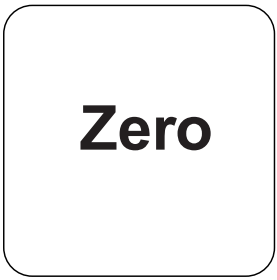
用 **10 mL 样本**填充 24 mm 比色杯。



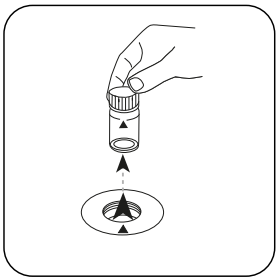
密封比色杯。



将**样本比色杯**放入测量轴中。注意定位。

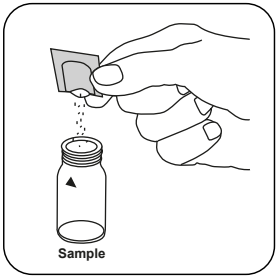


按下 **ZERO** 按钮。

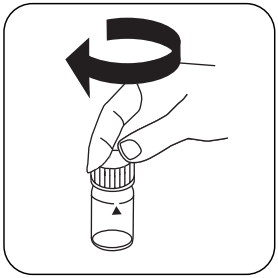


从测量轴上取下比色杯。

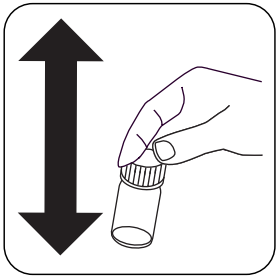
对于**不需要 ZERO 测量**的设备，**从这里开始。**



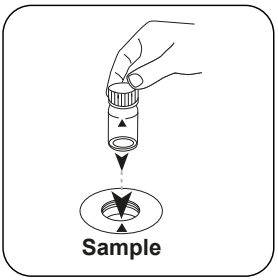
加入 **Vario Cu 1 F10 粉包。**



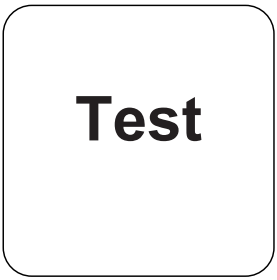
密封比色杯。



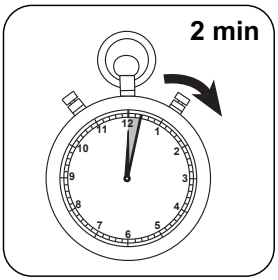
通过摇晃混合内容物。



将**样本比色杯**放入测量轴中。注意定位。



按下 **TEST** (XD: **START**) 按钮。



等待 **2 分钟反应时间** 。

反应时间结束后，自动进行测量。

结果在显示屏上显示为 mg / l 铜。

化学方法

Bicinchoninate

附錄

干扰说明

持续干扰

硬度、铝和铁化物产生较低的测试结果。

可消除干扰

1. 氰化物，CN^-：氰化物防止完全颜色变化。
   氰化物的干扰按如下消除：将 10 ml 样本和 0.2 ml 甲醛混合，等待 4 分钟反应时间。（氰化物被掩盖）。然后按照描述进行测试。将结果乘以 1.02，以考虑稀释含甲醛的样本。
2. 银，Ag^+: 银可能导致现有的浑浊变黑。将 10 滴饱和氯化钾溶液加入到 75 ml 样本中，随后通过精密的过滤器过滤。使用 10 ml 的过滤样本进行。

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	3.77 mg/L / Abs
置信范围	0.064 mg/L
标准偏差	0.027 mg/L
变异系数	1.07 %

参考文献

S. Nakano, Y. Zasshi, 82 486 - 491 (1962) [Chemical Abstracts, 58 3390e (1963)]

源于

APHA 方法 3500Cu

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