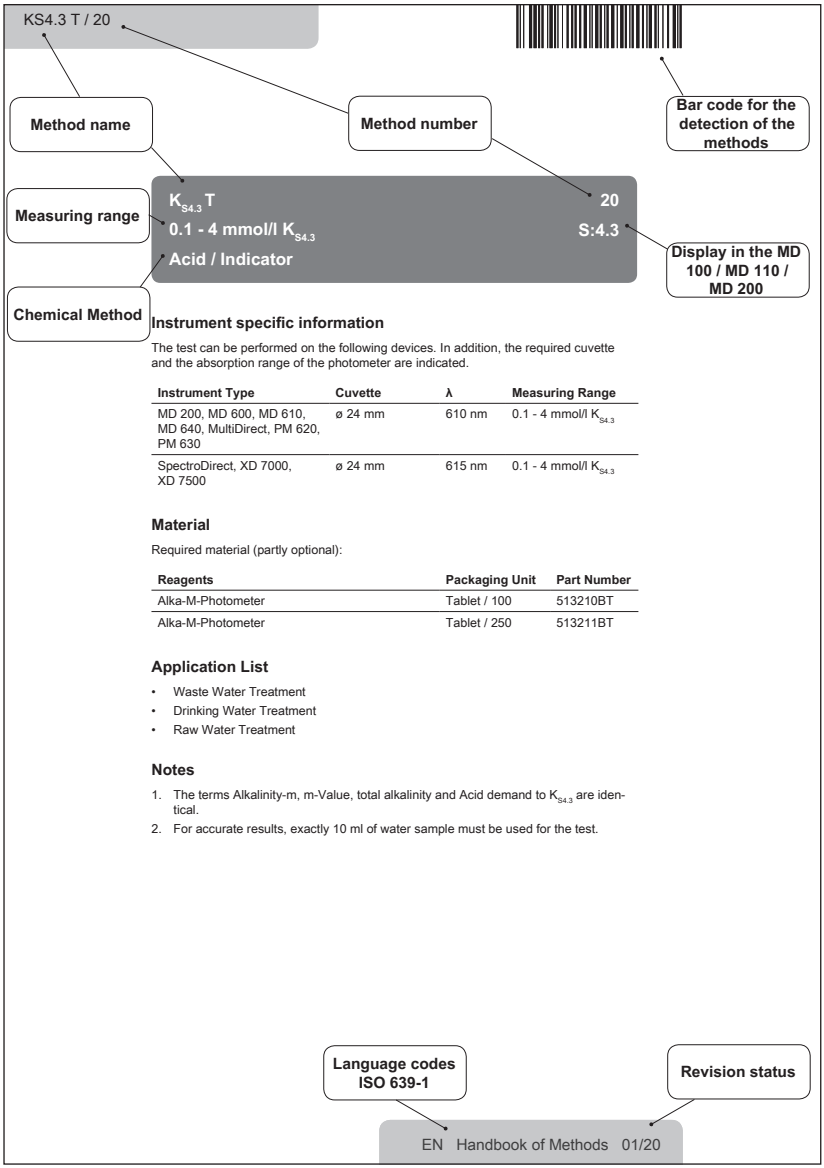
Lovibond® Water Testing

Tintometer® Group

Manual of Methods

MD 100 • MD 110 • MD 200

Copper | pH



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

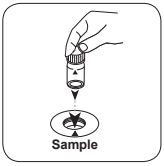
Implementation of the provision Acid capacity $K_{S4.3}$ with Tablet

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**.

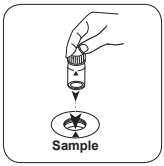
Close vial(s).



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

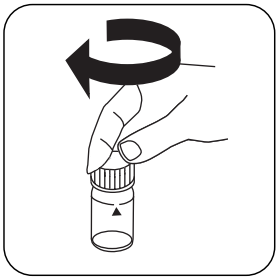
1. Strong alkaline or acidic water samples must be adjusted to pH 4 to 6 before analysis.

Determination of Copper, free with tablet

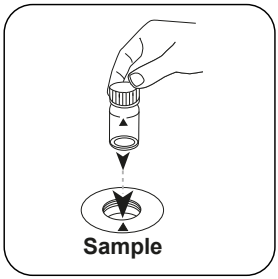
Select the method on the device.

In addition, choose the test: free

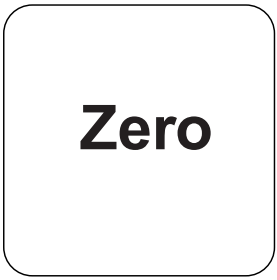
Fill 24 mm vial with **10 mL sample**.



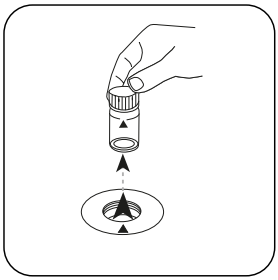
Close vial(s).



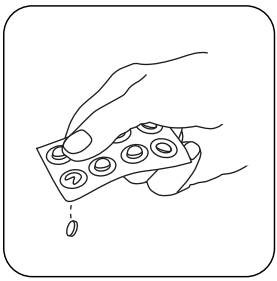
Place **sample vial** in the sample chamber. Pay attention to the positioning.



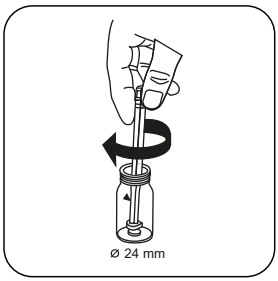
Press the **ZERO** button.



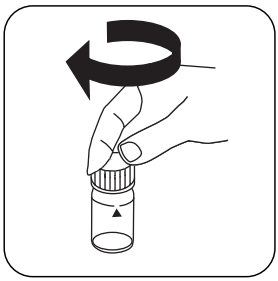
Remove the vial from the sample chamber.



Add **COPPER No. 1 tablet** .

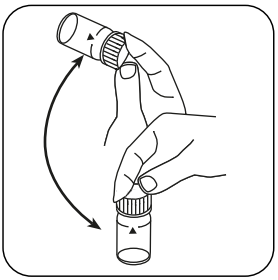


Crush tablet(s) by rotating slightly.

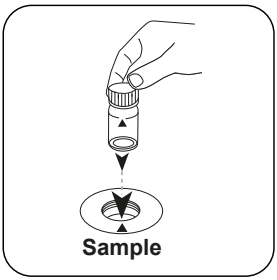


Close vial(s).

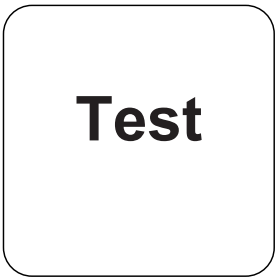
EN



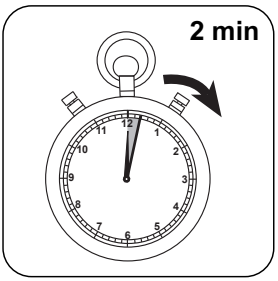
Dissolve tablet(s) by inverting.



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.

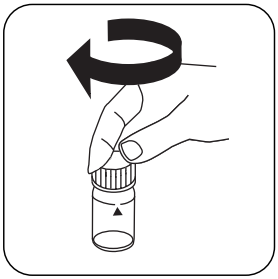
The result in mg/L free Copper appears on the display.

Determination of Copper, total with tablet

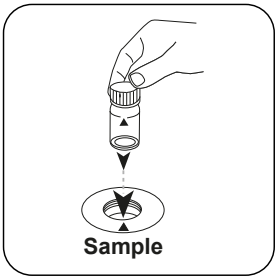
Select the method on the device.

In addition, choose the test: total

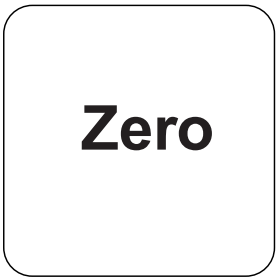
Fill 24 mm vial with **10 mL sample**.



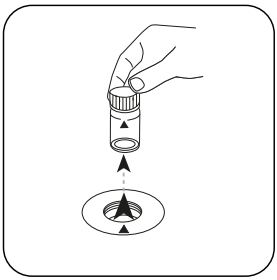
Close vial(s).



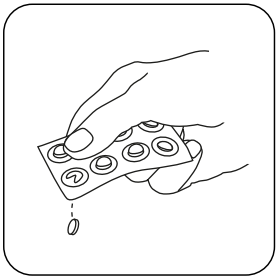
Place **sample vial** in the sample chamber. Pay attention to the positioning.



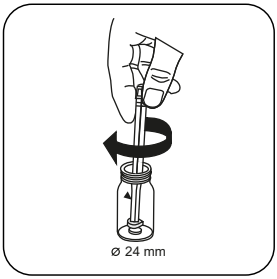
Press the **ZERO** button.



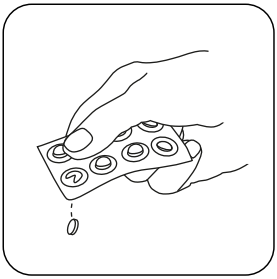
Remove the vial from the sample chamber.



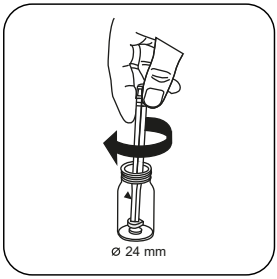
Add **COPPER No. 1 tablet** .



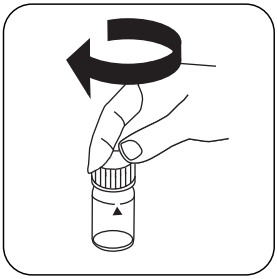
Crush tablet(s) by rotating slightly and dissolve.



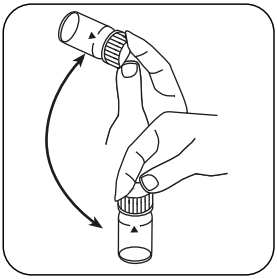
Add **COPPER No. 2 tablet** .



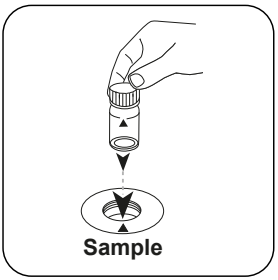
Crush tablet(s) by rotating slightly.

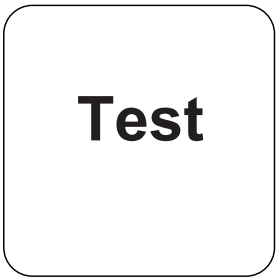


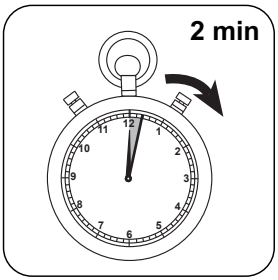
Close vial(s).



Dissolve tablet(s) by inverting.







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 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

pH-value T M330

6.5 - 8.4 pH PH

Phenol Red

EN

Material

Required material (partly optional):

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

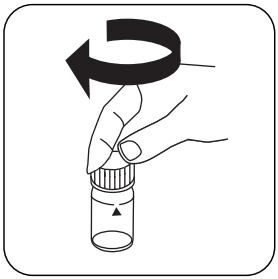
Notes

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

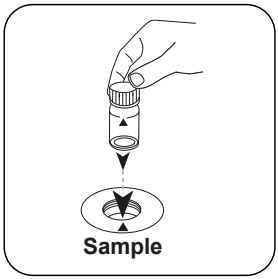
Determination of pH-value with Tablet

Select the method on the device.

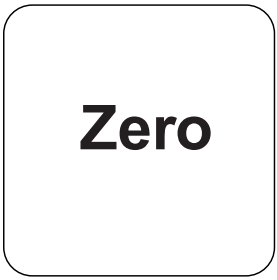
Fill 24 mm vial with **10 mL sample**.



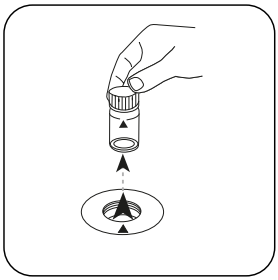
Close vial(s).



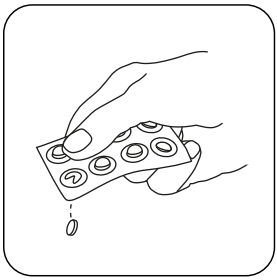
Place **sample vial** in the sample chamber. Pay attention to the positioning.



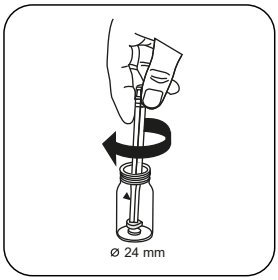
Press the **ZERO** button.



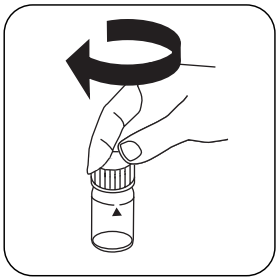
Remove the vial from the sample chamber.



Add **PHENOL RED PHOTOMETER tablet**.



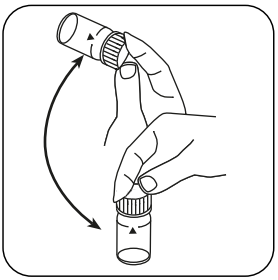
Crush tablet(s) by rotating slightly.



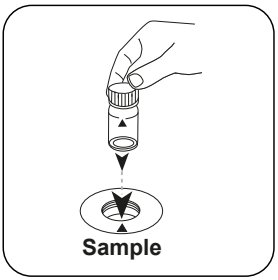
Close vial(s).

EN

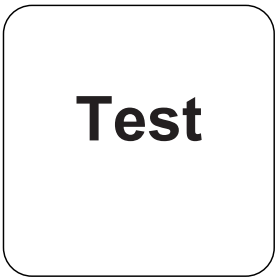
EN



Dissolve tablet(s) by inverting.



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



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

The result in pH value appears on the display.

Chemical Method

Phenol Red

Appendix

Interferences

Persistant Interferences

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

Removeable Interferences

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

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

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

Bibliography

Colorimetric Chemical Analytical Methods, 9th Edition, London

pH value L M331

6.5 - 8.4 pH PH

Phenol Red

EN

Material

Required material (partly optional):

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

Preparation

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

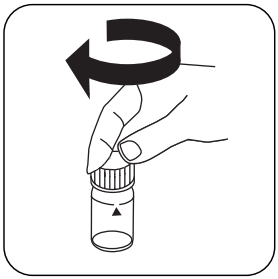
Notes

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

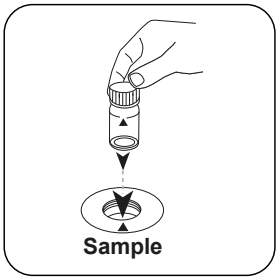
Determination of pH-value with liquid reagent

Select the method on the device.

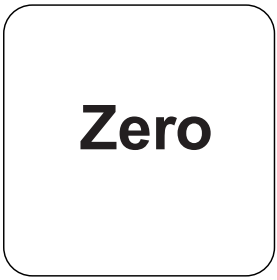
Fill 24 mm vial with **10 mL sample**.



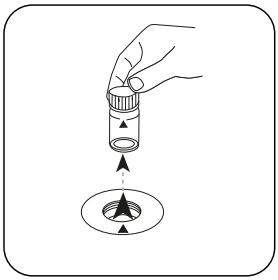
Close vial(s).



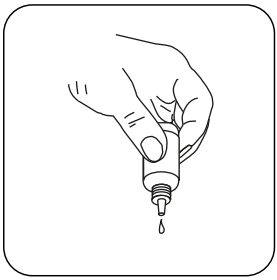
Place **sample vial** in the sample chamber. Pay attention to the positioning.



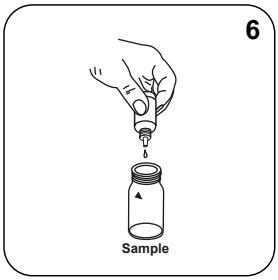
Press the **ZERO** button.



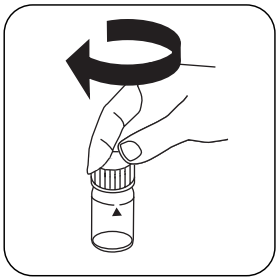
Remove the vial from the sample chamber.



Hold cuvettes vertically and add equal drops by pressing slowly.

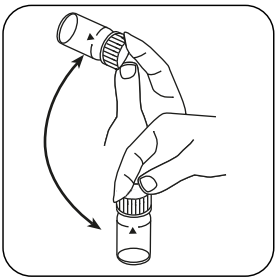


Add **6 drops PHENOL Red-Lösung** to the **sample vial**.

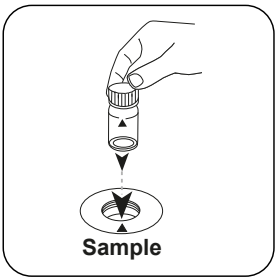


Close vial(s).

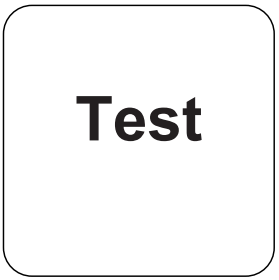
EN



Invert several times to mix the contents.



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



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

The result in pH value appears on the display.

Chemical Method

Phenol Red

Appendix

Interferences

Removeable Interferences

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

2.

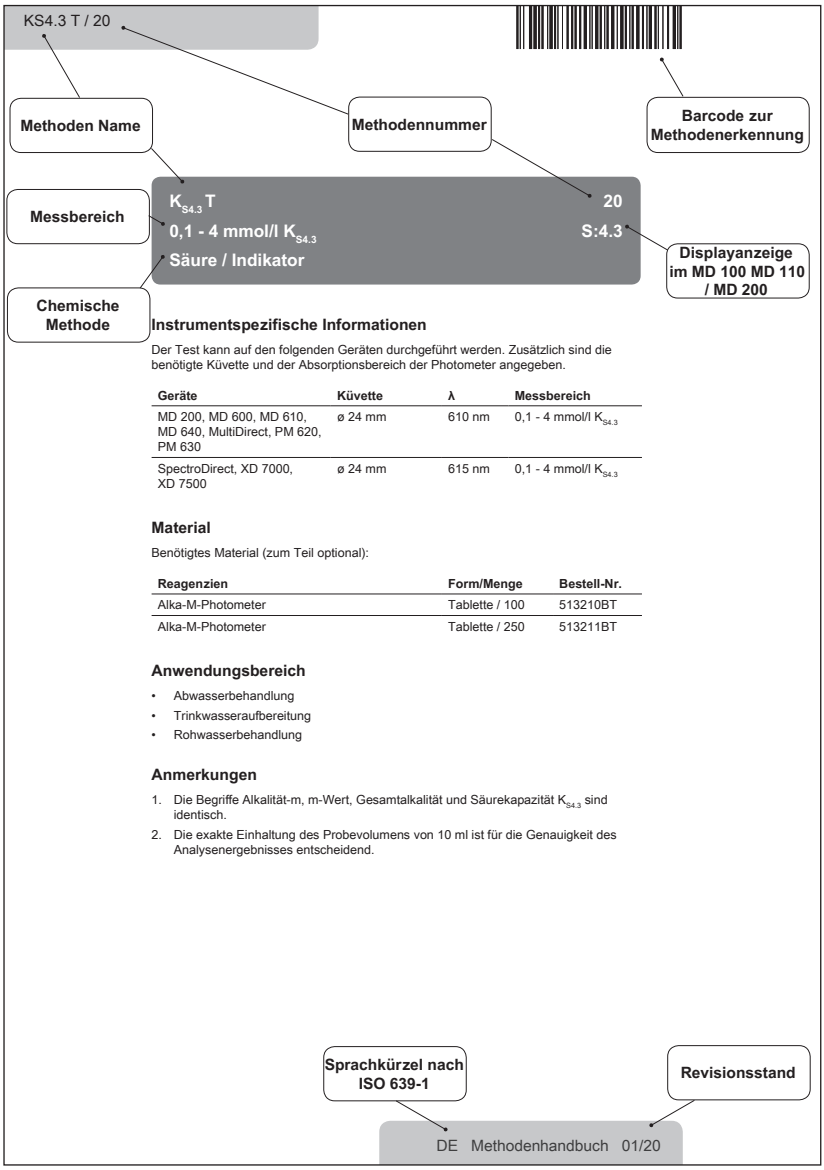
Salt content of the sample	Correction
30 g/L (seawater)	-0.15 [1)]
60 g/L	-0.21 [2)]
120 g/L	-0.26 [2)]
180 g/L	-0.29 [2)]
[1)] according to Kolthoff (1922)	[2)] according to Parson and Douglas (1926)

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

Bibliography

Colorimetric Chemical Analytical Methods, 9th Edition, London

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

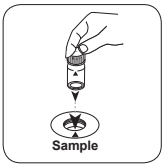
Durchführung der Bestimmung Säurekapazität $K_{S4.3}$ mit Tablette

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.

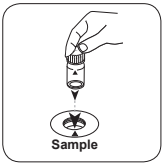
Küvette(n) verschließen.



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

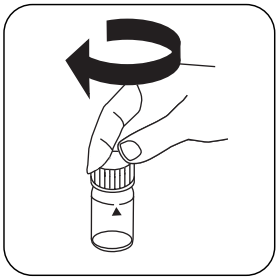
1. Stark alkalische oder saure Wässer sollten vor der Analyse auf einen pH-Wert von 4 bis 6 eingestellt werden.

Durchführung der Bestimmung Kupfer, frei mit Tablette

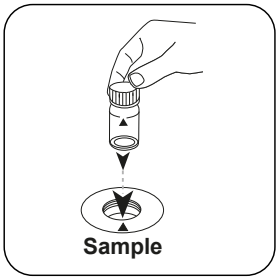
Die Methode im Gerät auswählen.

Wählen Sie zudem die Bestimmung: frei

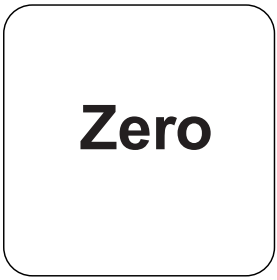
24-mm-Küvette mit **10 mL Probe** füllen.



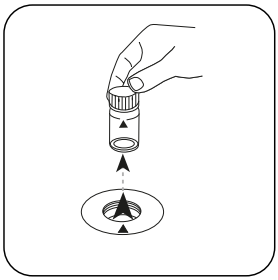
Küvette(n) verschließen.



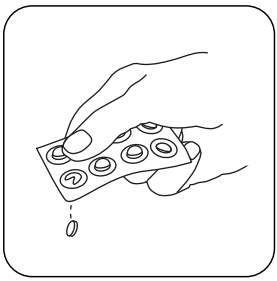
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



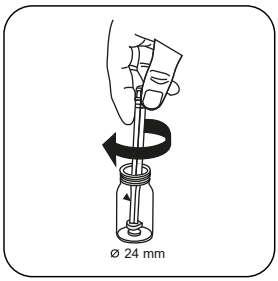
Taste **ZERO** drücken.



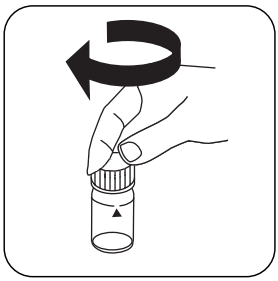
Küvette aus dem Messschacht nehmen.



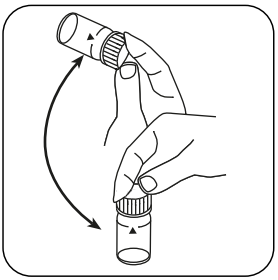
Eine **COPPER No. 1 Tablette** zugeben.



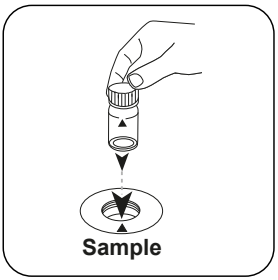
Tablette(n) unter leichter Drehung zerdrücken.



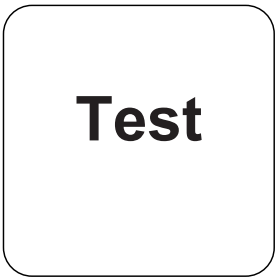
Küvette(n) verschließen.



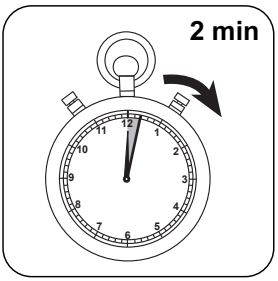
Tablette(n) durch Umschwenken lösen.



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



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



2 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

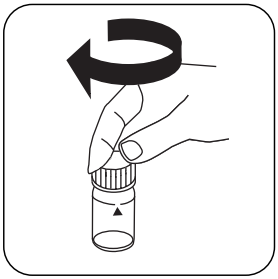
In der Anzeige erscheint das Ergebnis in mg/L freies Kupfer.

Durchführung der Bestimmung Kupfer, gesamt mit Tablette

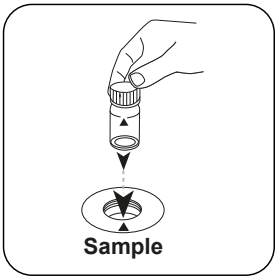
Die Methode im Gerät auswählen.

Wählen Sie zudem die Bestimmung: gesamt

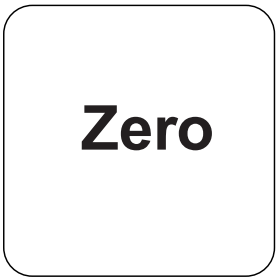
24-mm-Küvette mit **10 mL Probe** füllen.



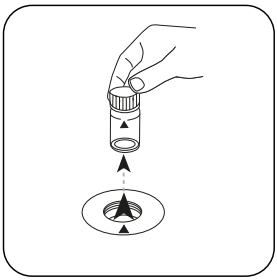
Küvette(n) verschließen.



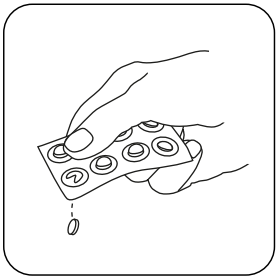
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



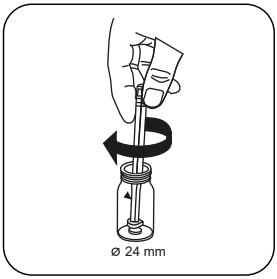
Taste **ZERO** drücken.



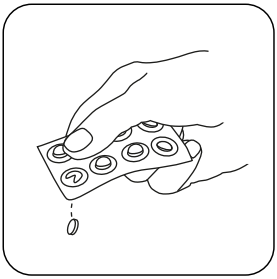
Küvette aus dem Messschacht nehmen.



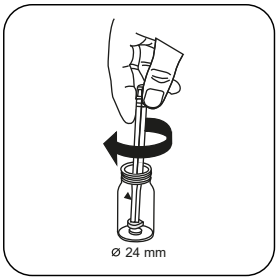
Eine **COPPER No. 1 Tablette** zugeben.



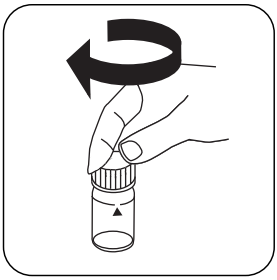
Die Tablette(n) unter leichter Drehung zerdrücken und lösen.



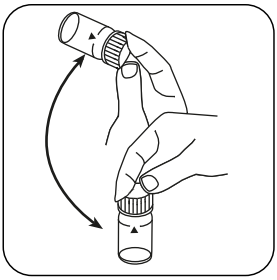
Eine **COPPER No. 2 Tablette** zugeben.



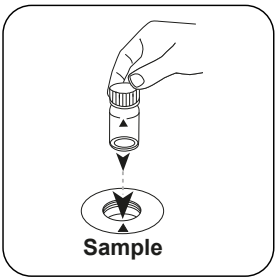
Tablette(n) unter leichter Drehung zerdrücken.



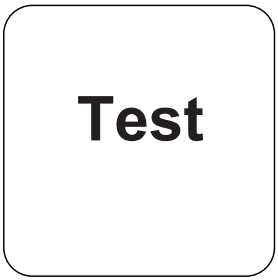
Küvette(n) verschließen.



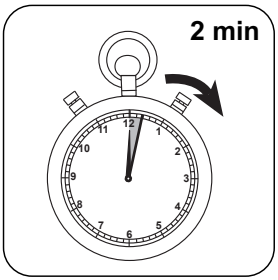
Tablette(n) durch Umschwenken lösen.



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



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



2 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

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

Chemische Methode

Biquinolin

Appendix

Störungen

Permanente Störungen

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

Methodenvalidierung

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

Literaturverweise

Photometrische Analyse, Lange/Vedjelek, Verlag Chemie 1980

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

pH-Wert T **M330**

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

Phenolrot

DE

Material

Benötigtes Material (zum Teil optional):

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

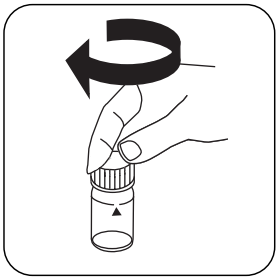
Anmerkungen

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

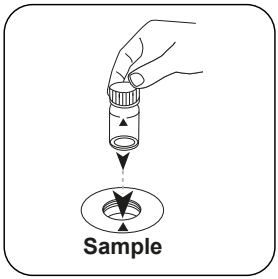
Durchführung der Bestimmung pH-Wert mit Tablette

Die Methode im Gerät auswählen.

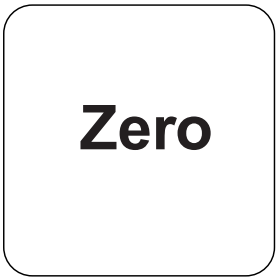
24-mm-Küvette mit **10 mL Probe** füllen.



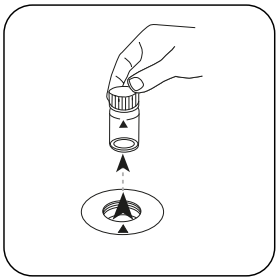
Küvette(n) verschließen.



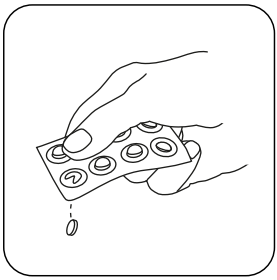
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



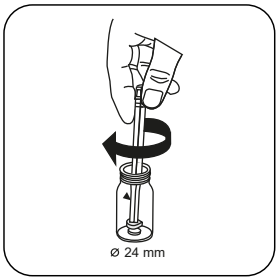
Taste **ZERO** drücken.



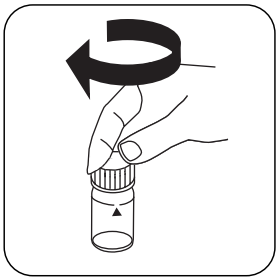
Küvette aus dem Messschacht nehmen.



Eine **PHENOL RED PHOTOMETER Tablette** zugeben.

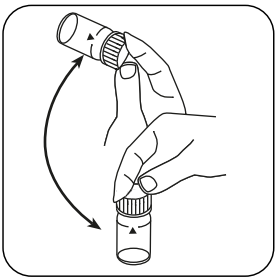


Tablette(n) unter leichter Drehung zerdrücken.

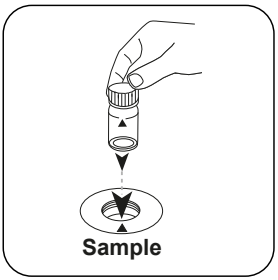


Küvette(n) verschließen.

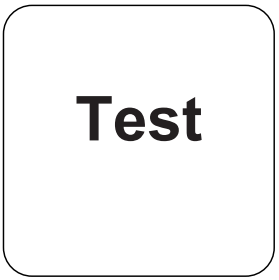
DE



Tablette(n) durch Umschwenken lösen.



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



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

In der Anzeige erscheint das Ergebnis als pH-Wert.

Chemische Methode

Phenolrot

Appendix

Störungen

Permanente Störungen

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

Ausschließbare Störungen

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

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

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

Literaturverweise

Colorimetric Chemical Analytical Methods, 9th Edition, London

pH-Wert L M331

6,5 - 8,4 pH PH

Phenolrot

DE

Material

Benötigtes Material (zum Teil optional):

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

Vorbereitung

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

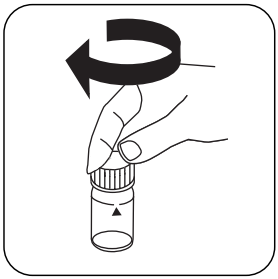
Anmerkungen

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

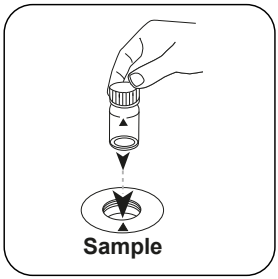
Durchführung der Bestimmung pH-Wert mit Flüssigreagenz

Die Methode im Gerät auswählen.

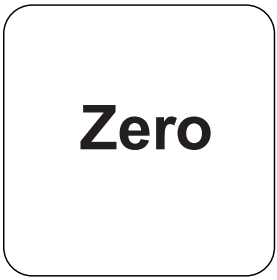
24-mm-Küvette mit **10 mL Probe** füllen.



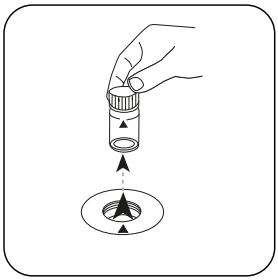
Küvette(n) verschließen.



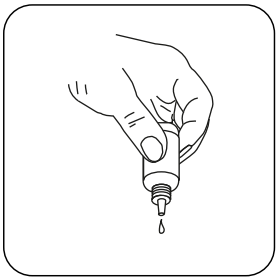
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



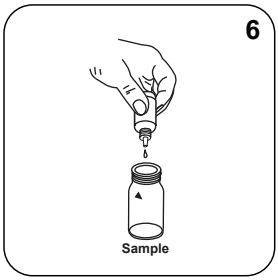
Taste **ZERO** drücken.



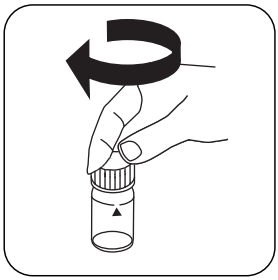
Küvette aus dem Messschacht nehmen.



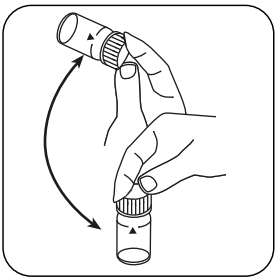
Die Tropfflaschen senkrecht halten und durch langsames Drücken gleich große Tropfen zugeben.



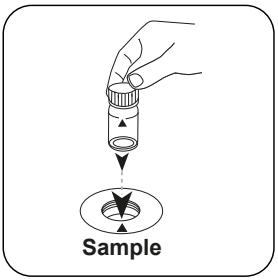
6 Tropfen PHENOL Red-Lösung in die **Probenküvette** geben.



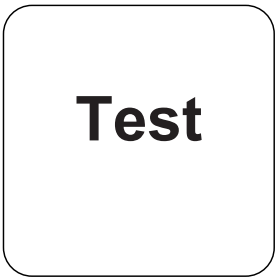
Küvette(n) verschließen.



Inhalt durch Umschwenken mischen.



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



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

In der Anzeige erscheint das Ergebnis als pH-Wert.

Chemische Methode

Phenolrot

Appendix

Störungen

Ausschließbare Störungen

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

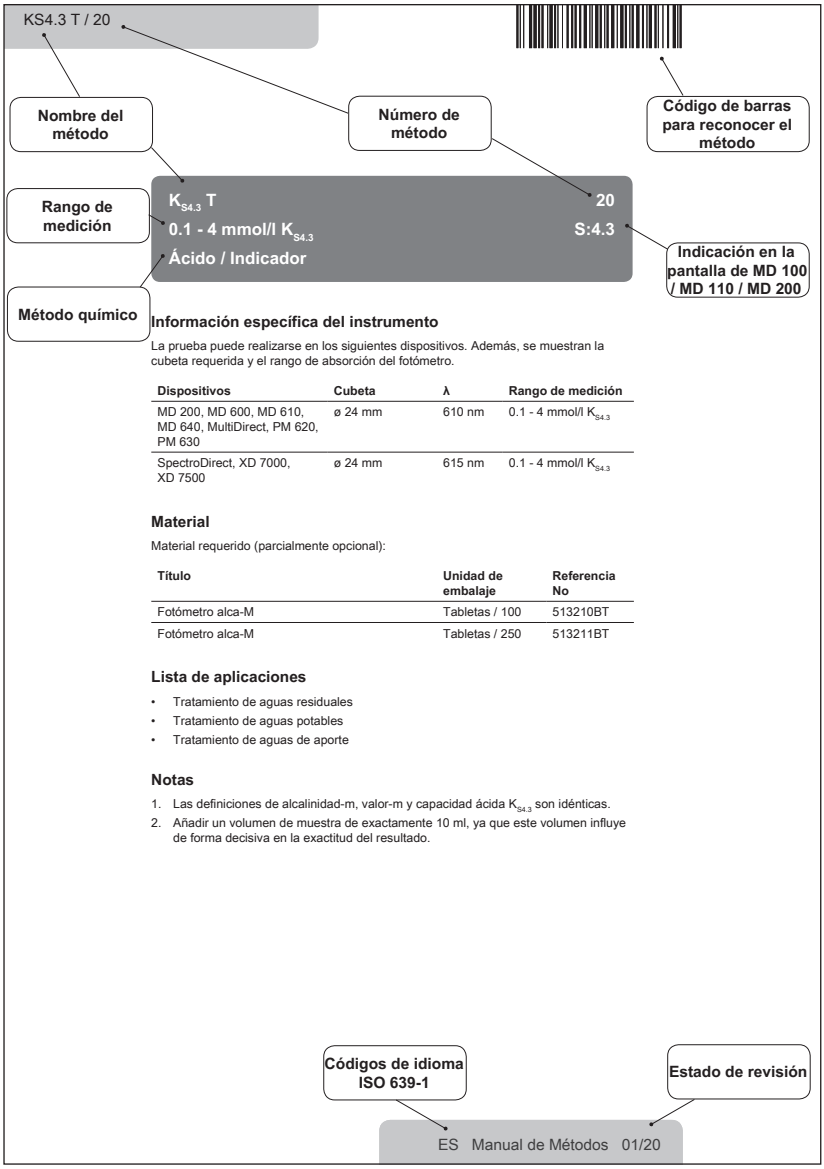
2.

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

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

Literaturverweise

Colorimetric Chemical Analytical Methods, 9th Edition, London



Información específica del instrumento

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

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

Material

Material requerido (parcialmente opcional):

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

Lista de aplicaciones

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

Notas

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

Realización de la determinación

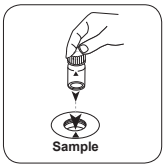
Ejecución de la determinación Capacidad ácida $K_{S4.3}$ con tableta

Seleccionar el método en el aparato.

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

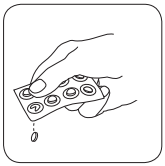
Llenar la cubeta de 24 mm con **10 ml de muestra** .

Cerrar la(s) cubeta(s).

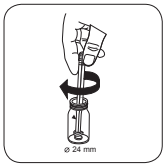


Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

• • •



Añadir **tableta ALKA-M-PHOTOMETER**.



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

Cerrar la(s) cubeta(s).

ES Manual de Métodos 01/20

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

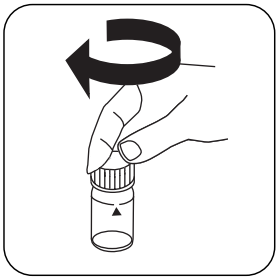
1. Las muestras acuosas muy alcalinas o muy ácidas se deberán neutralizar a un valor de pH de 4 a 6.

Ejecución de la determinación Cobre libre con tableta

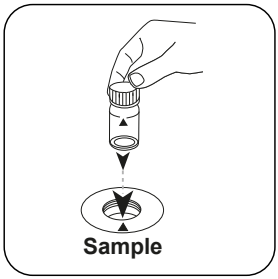
Seleccionar el método en el aparato.

Seleccione además la determinación: libre

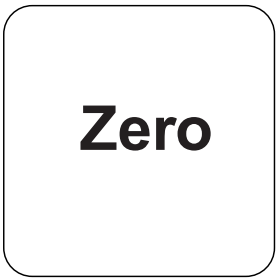
Llenar la cubeta de 24 mm con **10 mL de muestra** .



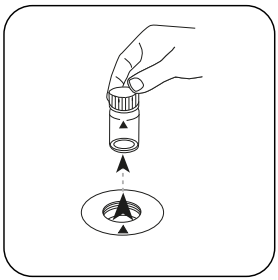
Cerrar la(s) cubeta(s).



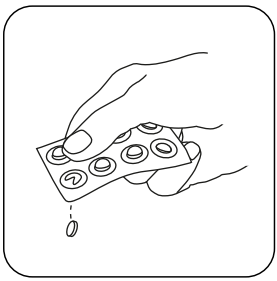
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



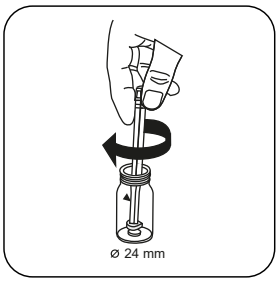
Pulsar la tecla **ZERO**.



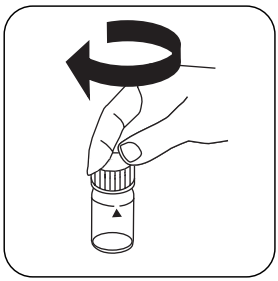
Extraer la cubeta del compartimiento de medición.



Añadir **tableta COPPER No. 1**.

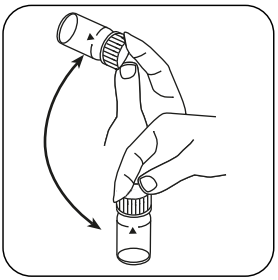


Triturar la(s) tableta(s) girando ligeramente.

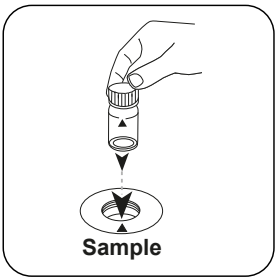


Cerrar la(s) cubeta(s).

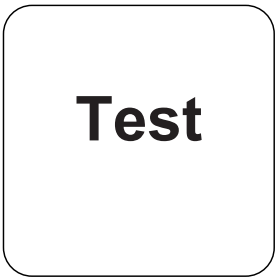
ES



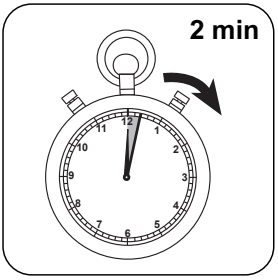
Disolver la(s) tableta(s) girando.



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.

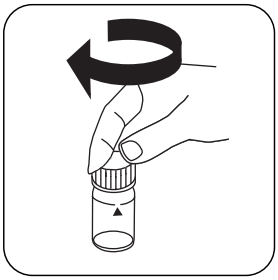
A continuación se visualizará el resultado en mg/L Cobre libre.

Ejecución de la determinación Cobre total con tableta

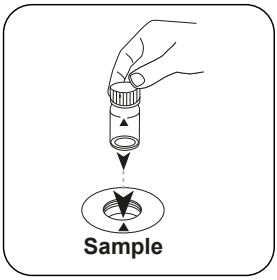
Seleccionar el método en el aparato.

Seleccione además la determinación: total

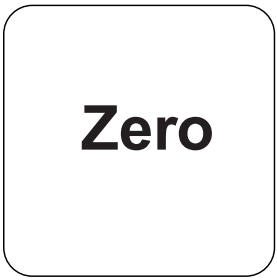
Llenar la cubeta de 24 mm con **10 mL de muestra** .



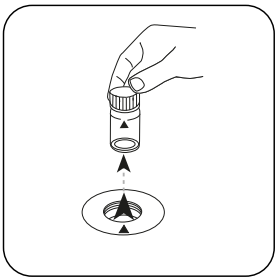
Cerrar la(s) cubeta(s).



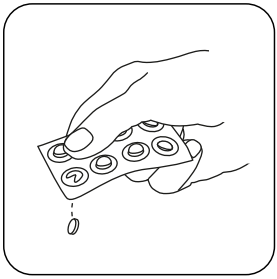
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



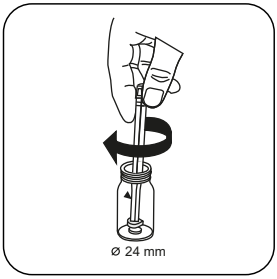
Pulsar la tecla **ZERO**.



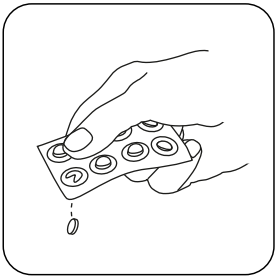
Extraer la cubeta del compartimiento de medición.



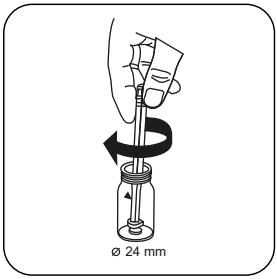
Añadir **tableta COPPER No. 1**.



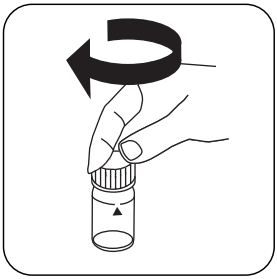
Triturar la(s) tableta(s) girando ligeramente y disolver.



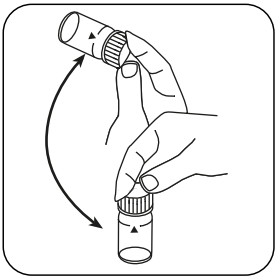
Añadir **tableta COPPER No. 2**.



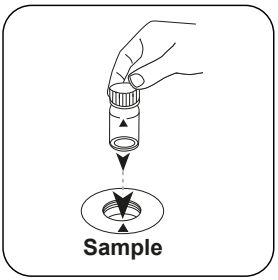
Triturar la(s) tableta(s) girando ligeramente.



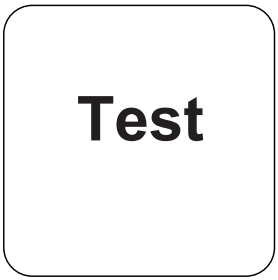
Cerrar la(s) cubeta(s).



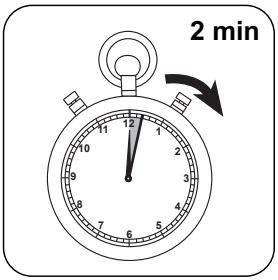
Disolver la(s) tableta(s) girando.



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



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



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

Finalizado el periodo de reacción se realizará la determinación automáticamente.

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

Método químico

Biquinolina

Apéndice

Interferencia

Interferencias persistentes

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

Validación del método

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

Bibliografía

Photometrische Analyse, Lange/Vedjelek, Verlag Chemie 1980

[a] Posible determinación de libre, combinado, total

Valor de pH T M330

6.5 - 8.4 pH PH

Rojo de fenol

ES

Material

Material requerido (parcialmente opcional):

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

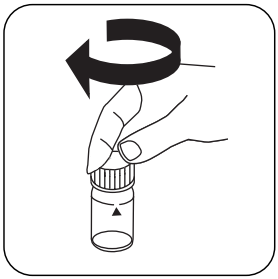
Notas

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

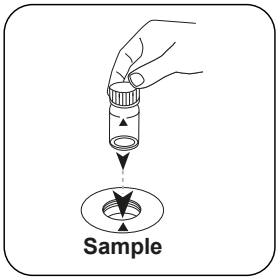
Ejecución de la determinación Valor de pH con tableta

Seleccionar el método en el aparato.

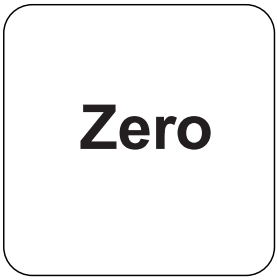
Llenar la cubeta de 24 mm con **10 mL de muestra** .



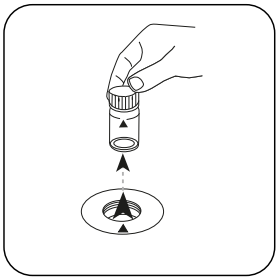
Cerrar la(s) cubeta(s).



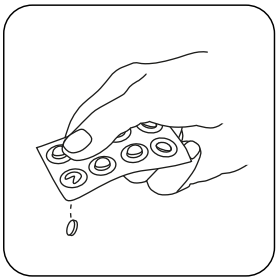
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



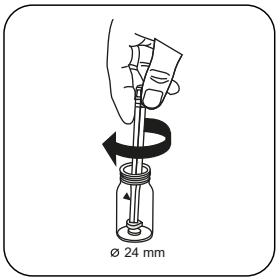
Pulsar la tecla **ZERO**.



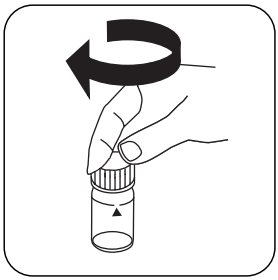
Extraer la cubeta del compartimiento de medición.



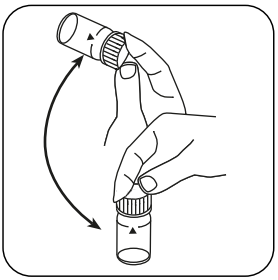
Añadir **tableta PHENOL RED PHOTOMETER**.



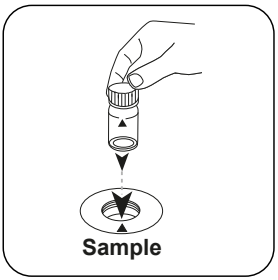
Triturar la(s) tableta(s) girando ligeramente.



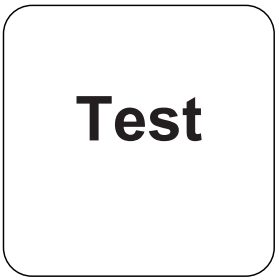
Cerrar la(s) cubeta(s).



Disolver la(s) tableta(s) girando.



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



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

A continuación se visualizará el resultado como valor de pH.

Método químico

Rojo de fenol

Apéndice

Interferencia

Interferencias persistentes

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

Interferencias extraibles

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

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

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

Bibliografía

Colorimetric Chemical Analytical Methods, 9th Edition, London

Valor de pH L M331

6.5 - 8.4 pH PH

Rojo de fenol

ES

Material

Material requerido (parcialmente opcional):

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

Preparación

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

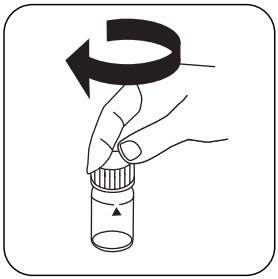
Notas

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

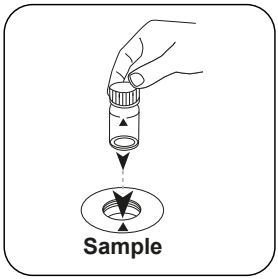
Ejecución de la determinación Valor de pH con reactivos líquidos

Seleccionar el método en el aparato.

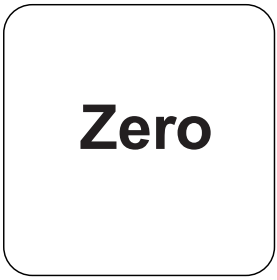
Llenar la cubeta de 24 mm con **10 mL de muestra** .



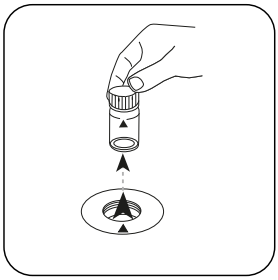
Cerrar la(s) cubeta(s).



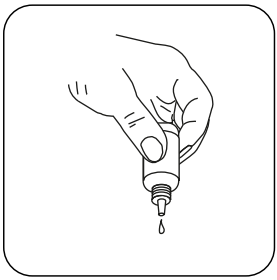
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



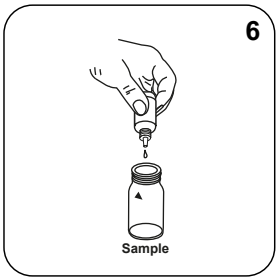
Pulsar la tecla **ZERO**.



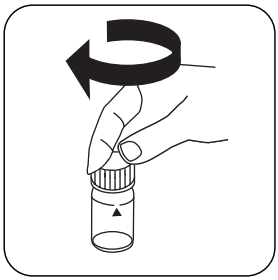
Extraer la cubeta del compartimiento de medición.



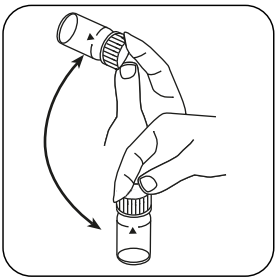
Mantener la botella cuentagotas vertical y añadir gotas del mismo tamaño presionando lentamente.



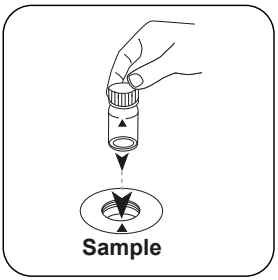
Añadir **6 gotas de PHENOL Red-Lösung** en la cubeta con la muestra.



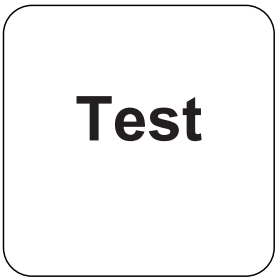
Cerrar la(s) cubeta(s).



Mezclar el contenido girando.



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



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

A continuación se visualizará el resultado como valor de pH.

Método químico

Rojo de fenol

Apéndice

Interferencia

Interferencias extraibles

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

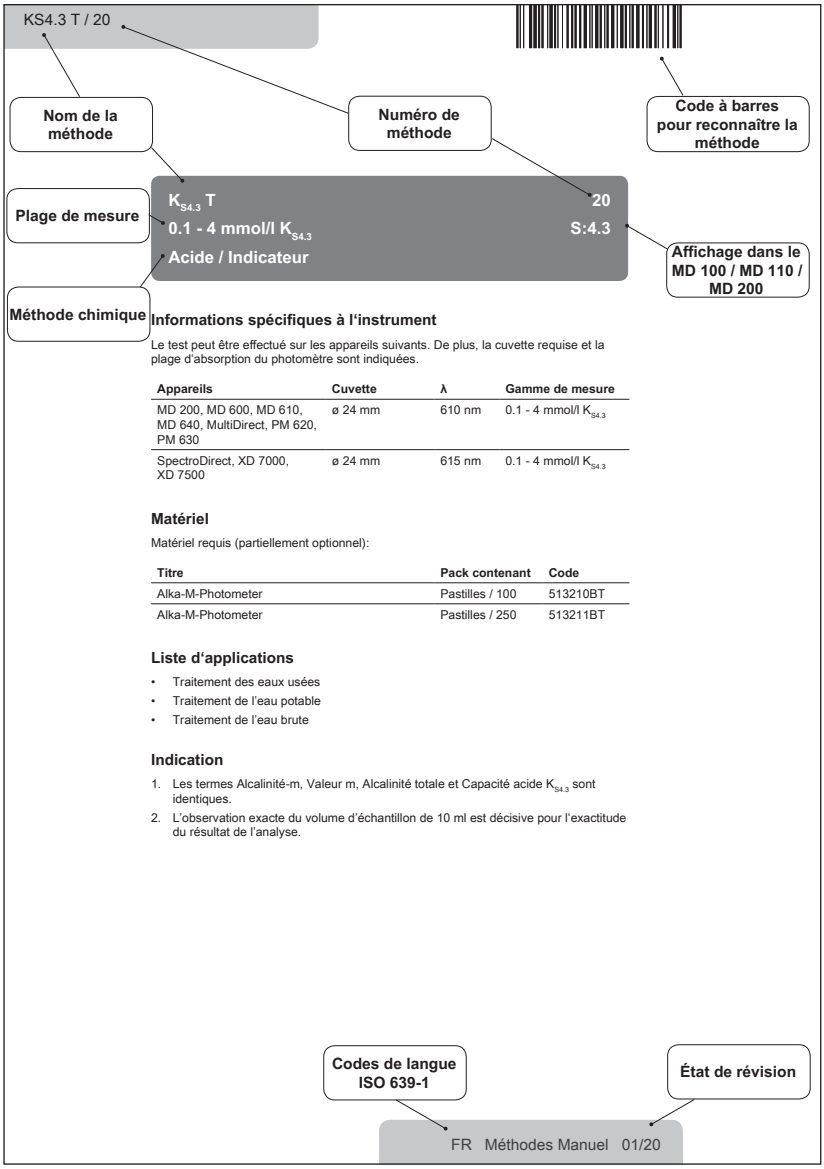
2.

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

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

Bibliografía

Colorimetric Chemical Analytical Methods, 9th Edition, London


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

Procédure du test

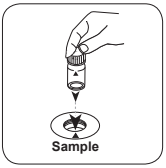
Réalisation de la quantification Capacité acide $K_{S4.3}$ avec pastille

Sélectionnez la méthode sur l'appareil.

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

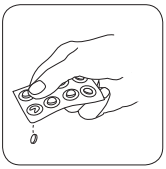
Remplissez une cuvette de 24 mm de **10 ml d'échantillon**.

Fermez la(les) cuvette(s).

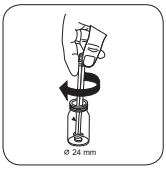


Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.

• • •



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



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

Fermez la(les) cuvette(s).

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

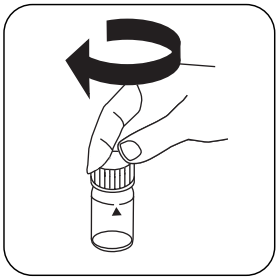
1. Avant l’analyse, les eaux fortement alcalines ou acides devraient être ajustées sur un pH 4 à 6.

Réalisation de la quantification Cuivre, libre avec pastille

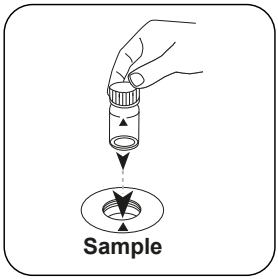
Sélectionnez la méthode sur l'appareil.

Sélectionnez également la quantification : libre

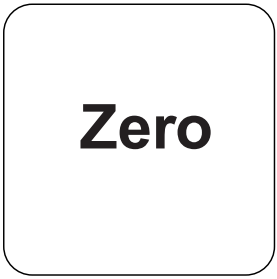
Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



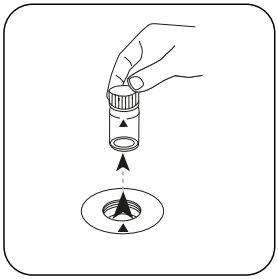
Fermez la(les) cuvette(s).



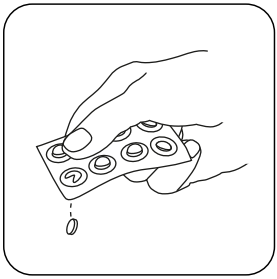
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



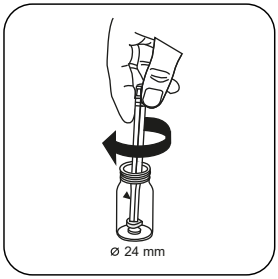
Appuyez sur la touche **ZERO**.



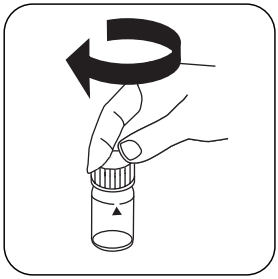
Retirez la cuvette de la chambre de mesure.



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

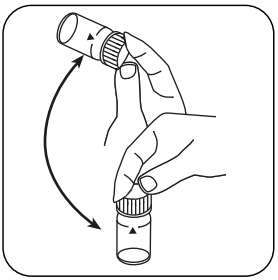


Écrasez la(les) pastille(s) en la(les) tournant un peu.

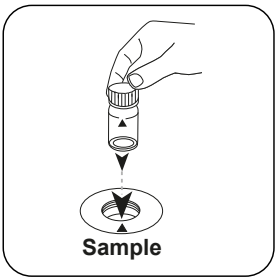


Fermez la(les) cuvette(s).

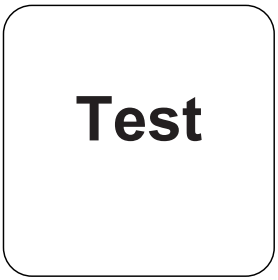
FR



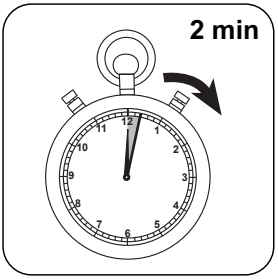
Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



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.

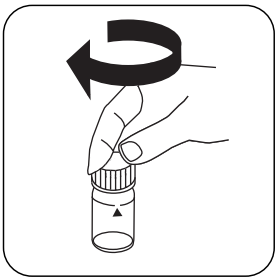
Le résultat s'affiche à l'écran en mg/L Cuivre, libre.

Réalisation de la quantification Cuivre, total avec pastille

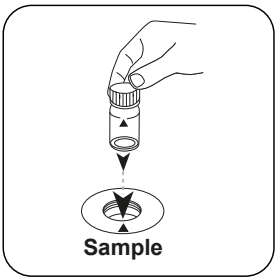
Sélectionnez la méthode sur l'appareil.

Sélectionnez également la quantification : total

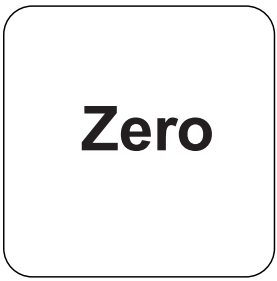
Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



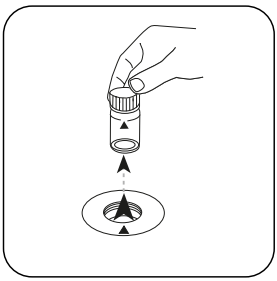
Fermez la(les) cuvette(s).



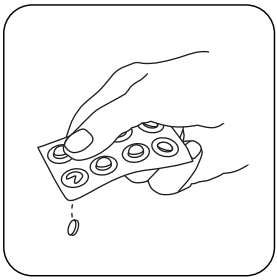
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



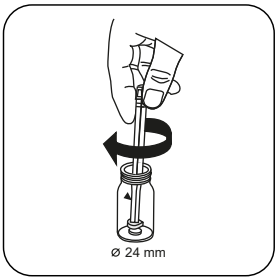
Appuyez sur la touche **ZERO**.



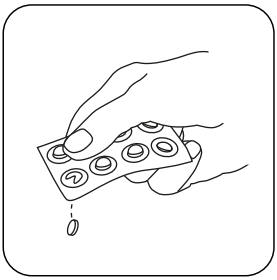
Retirez la cuvette de la chambre de mesure.



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

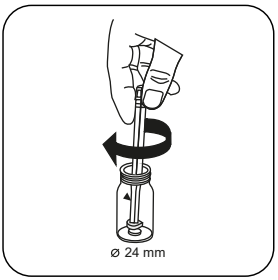


Écrasez et dissolvez la(les) pastille(s) en la(les) tournant un peu.

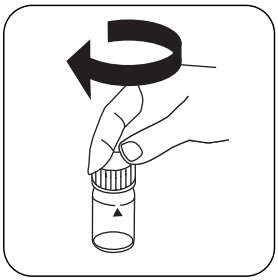


Ajoutez une **pastille de COPPER No. 2**.

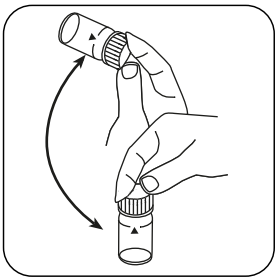
FR



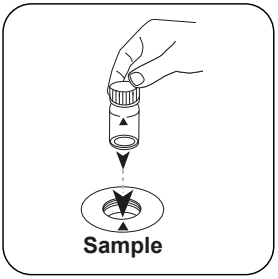
Écrasez la(les) pastille(s) en la(les) tournant un peu.



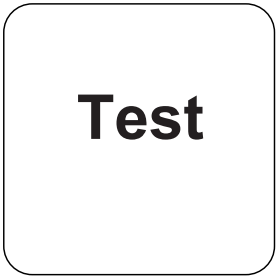
Fermez la(les) cuvette(s).



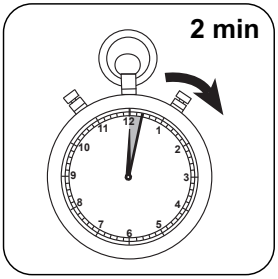
Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



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.

Méthode chimique

Biquinoline

Appendice

Interférences

Interférences persistantes

1. Cyanure CN^- et Argent Ag^+ perturbent la quantification.

Méthode Validation

Limite de détection	0.05 mg/L
Limite de détermination	0.15 mg/L
Fin de la gamme de mesure	5 mg/L
Sensibilité	3.8 mg/L / Abs
Intervalle de confiance	0.026 mg/L
Déviation standard	0.011 mg/L
Coefficient de variation	0.42 %

Bibliographie

Photometrische Analyse, Lange/Vedjelek, Verlag Chemie 1980

[a]Détermination du libre, combiné et total | [3]# agitateur inclus

Valeur du pH T M330

6.5 - 8.4 pH PH

Rouge de phénol

FR

Matériel

Matériel requis (partiellement optionnel):

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

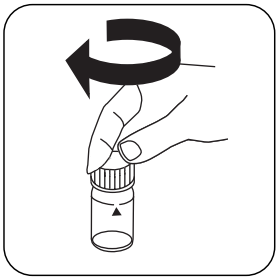
Indication

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

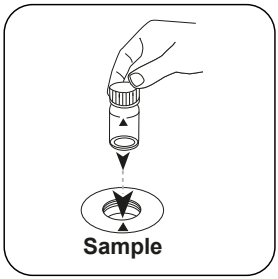
Réalisation de la quantification Valeur du pH avec pastille

Sélectionnez la méthode sur l'appareil.

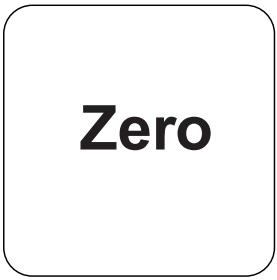
Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



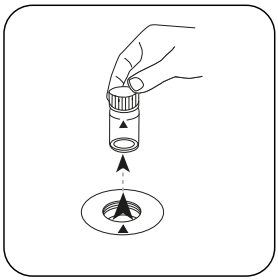
Fermez la(les) cuvette(s).



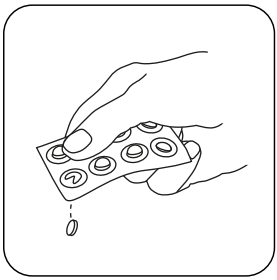
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



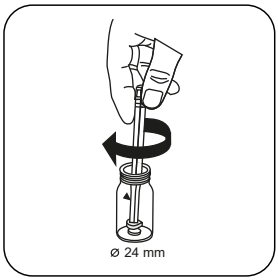
Appuyez sur la touche **ZERO**.



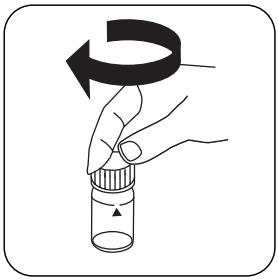
Retirez la cuvette de la chambre de mesure.



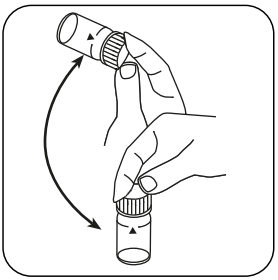
Ajoutez une **pastille de PHENOL RED PHOTOMETER**.



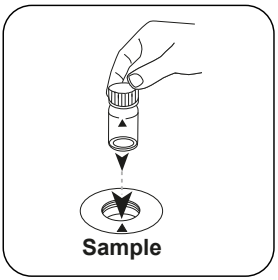
Écrasez la(les) pastille(s) en la(les) tournant un peu.



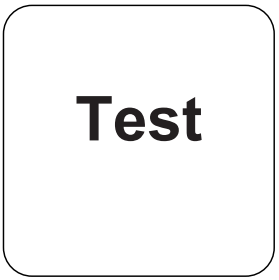
Fermez la(les) cuvette(s).



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



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



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

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

Méthode chimique

Rouge de phénol

Appendice

Interférences

Interférences persistantes

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

Interférences exclues

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

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

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

Bibliographie

Colorimetric Chemical Analytical Methods, 9th Edition, London

Valeur du pH L M331

6.5 - 8.4 pH PH

Rouge de phénol

FR

Matériel

Matériel requis (partiellement optionnel):

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

Préparation

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

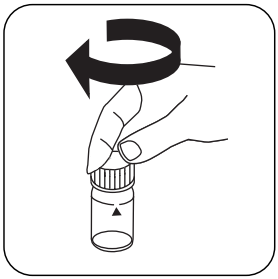
Indication

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

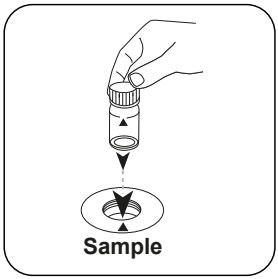
Réalisation de la quantification Valeur du pH avec réactif liquide

Sélectionnez la méthode sur l'appareil.

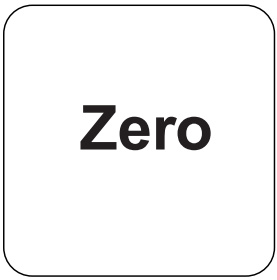
Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



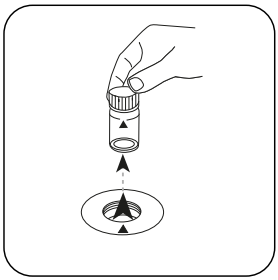
Fermez la(les) cuvette(s).



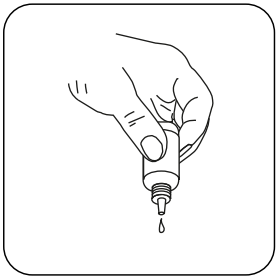
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



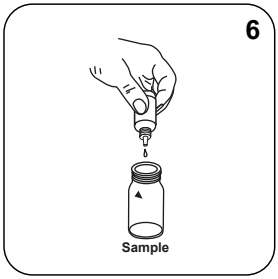
Appuyez sur la touche **ZERO**.



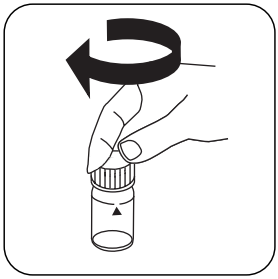
Retirez la cuvette de la chambre de mesure.



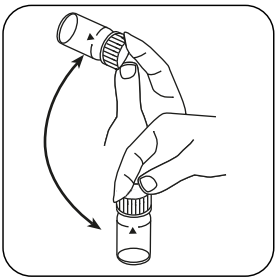
Tenez les flacons compte-goutte à la verticale et ajoutez des gouttes uniformes en appuyant lentement.



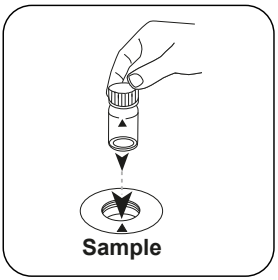
Ajoutez **6 gouttes de PHENOL Red-Lösung** dans la cuvette réservée à l'échantillon.



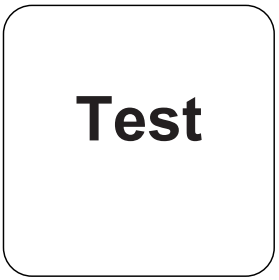
Fermez la(les) cuvette(s).



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



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



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

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

Méthode chimique

Rouge de phénol

Appendice

Interférences

Interférences exclues

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

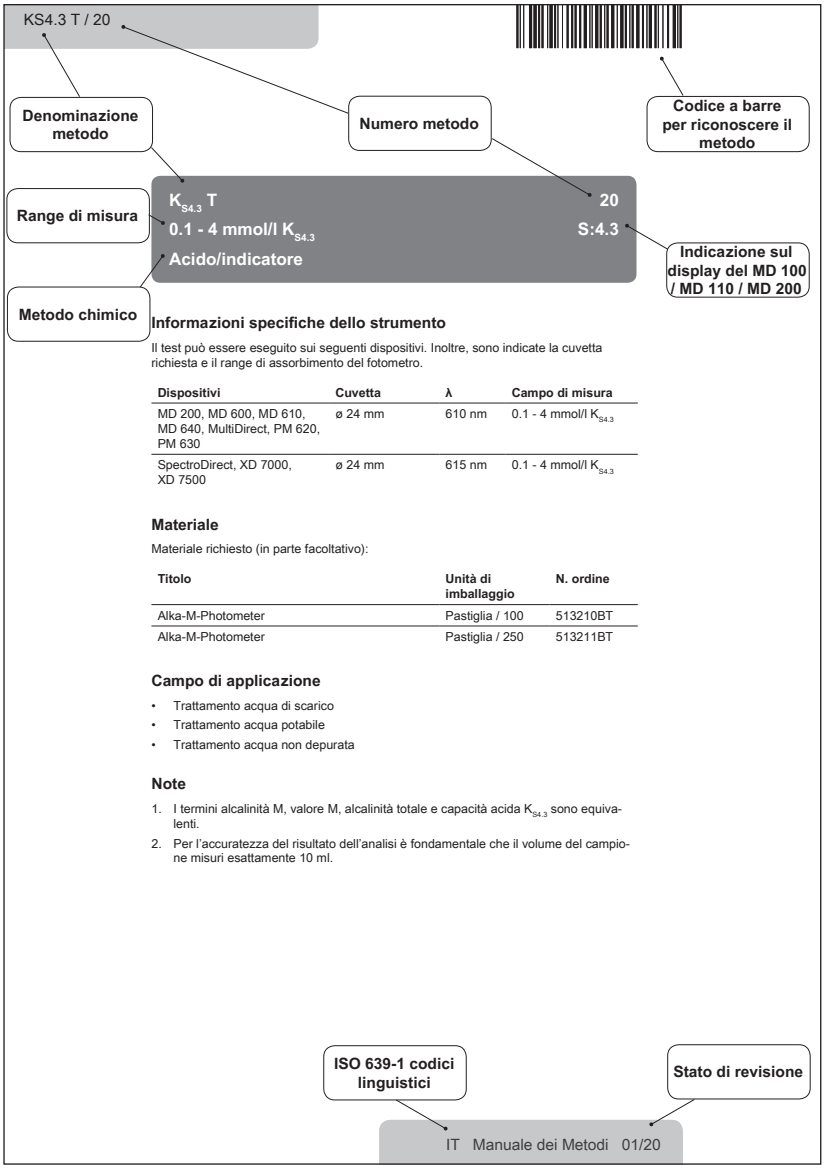
2.

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

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

Bibliographie

Colorimetric Chemical Analytical Methods, 9th Edition, London



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.

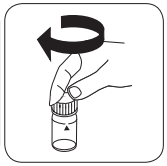
Svolgimento della misurazione

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

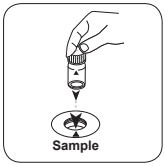
Selezionare il metodo nel dispositivo.

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**.



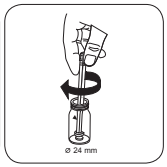
Chiudere la/e cuvetta/e.



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

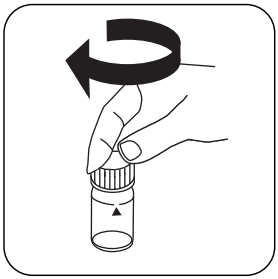
1. Le acque fortemente alcaline o acide dovrebbero essere regolate prima dell'analisi su un valore di pH da 4 a 6.

Esecuzione della rilevazione Rame, libero con pastiglia

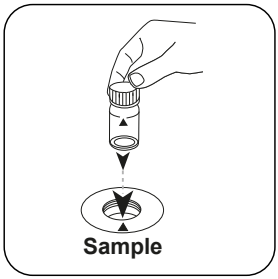
Selezionare il metodo nel dispositivo.

Selezionare inoltre la determinazione: libero

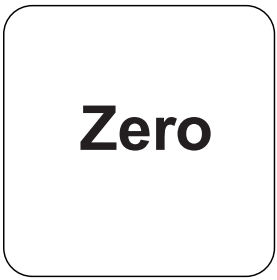
Riempire una cuvetta da 24 mm con **10 mL di campione**.



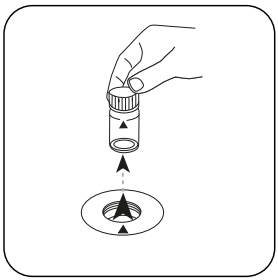
Chiudere la/e cuvetta/e.



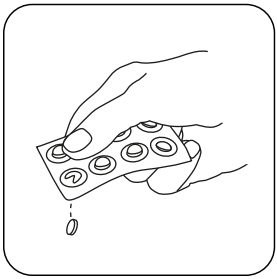
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



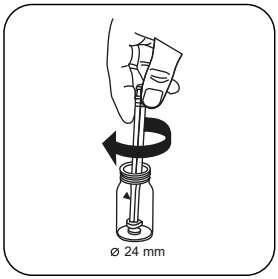
Premere il tasto **ZERO**.



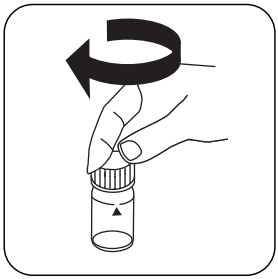
Prelevare la cuvetta dal vano di misurazione.



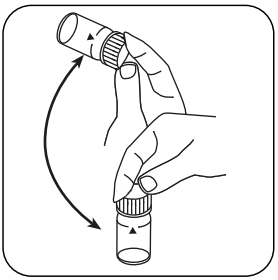
Aggiungere **una pastiglia COPPER No. 1**.



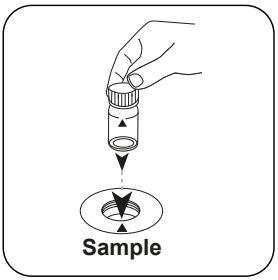
Frantumare la/e pastiglia/e con una leggera rotazione.



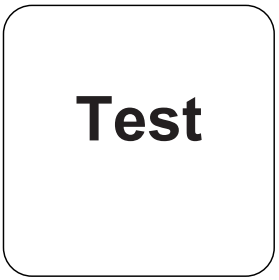
Chiudere la/e cuvetta/e.



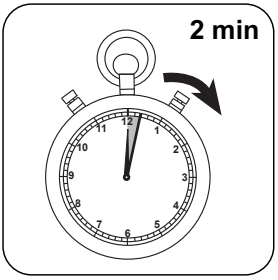
Far sciogliere la/e pastiglia/e agitando.



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



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



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

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

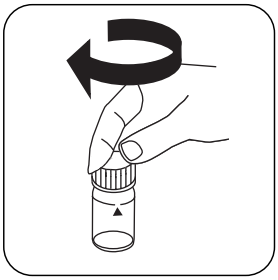
Sul display compare il risultato in mg/L di Rame libero.

Esecuzione della rilevazione Rame, totale con pastiglia

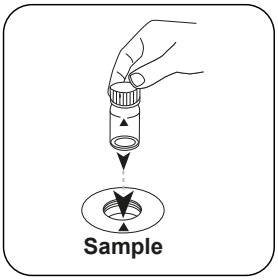
Selezionare il metodo nel dispositivo.

Selezionare inoltre la determinazione: totale

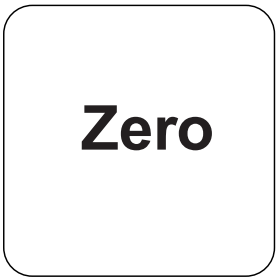
Riempire una cuvetta da 24 mm con **10 mL di campione**.



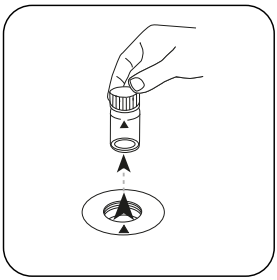
Chiudere la/e cuvetta/e.



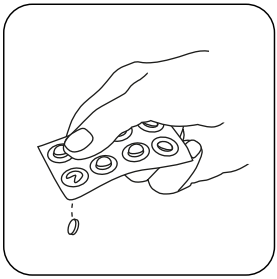
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



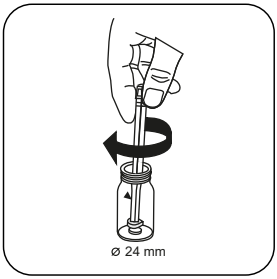
Premere il tasto **ZERO**.



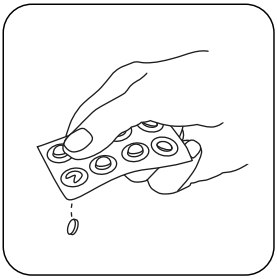
Prelevare la cuvetta dal vano di misurazione.



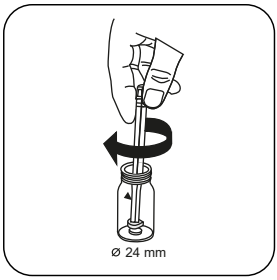
Aggiungere **una pastiglia COPPER No. 1**.



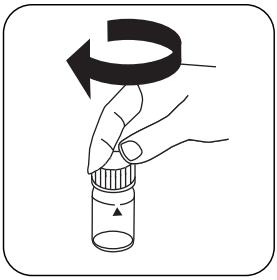
Frantumare e far sciogliere la/e pastiglia/e con una leggera rotazione.



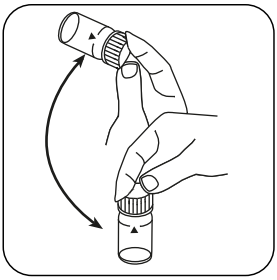
Aggiungere **una pastiglia COPPER No. 2**.



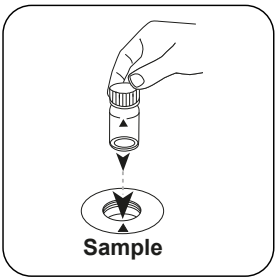
Frantumare la/e pastiglia/e con una leggera rotazione.

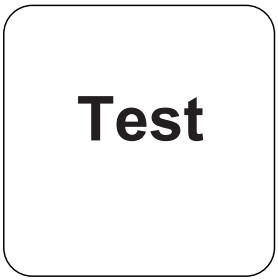


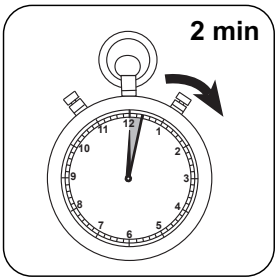
Chiudere la/e cuvetta/e.



Far sciogliere la/e pastiglia/e agitando.







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 totale.

Metodo chimico

Bichinolina

Appendice

Interferenze

Interferenze permanenti

1. Cianuro CN^- e Argento Ag^+ interferiscono con la rilevazione.

Validazione metodo

Limite di rilevabilità	0.05 mg/L
Limite di quantificazione	0.15 mg/L
Estremità campo di misura	5 mg/L
Sensibilità	3.8 mg/L / Abs
Intervallo di confidenza	0.026 mg/L
Deviazione standard della procedura	0.011 mg/L
Coefficiente di variazione della procedura	0.42 %

Riferimenti bibliografici

Photometrische Analyse, Lange/Vedjelek, Verlag Chemie 1980

[a)]Determinazione di libero, vincolato, totale possibile | [j)#]Bacchetta compresa

Valore pH T M330

6.5 - 8.4 pH PH

Rosso fenolo

IT

Materiale

Materiale richiesto (in parte facoltativo):

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

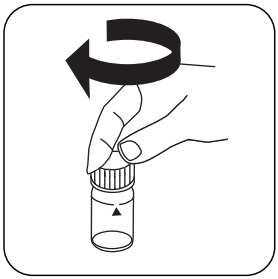
Note

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

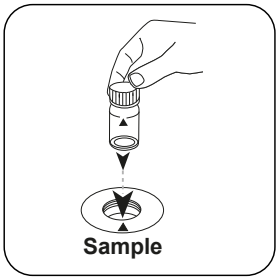
Esecuzione della rilevazione Valore pH con pastiglia

Selezionare il metodo nel dispositivo.

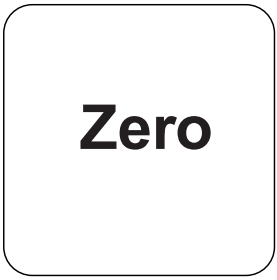
Riempire una cuvetta da 24 mm con **10 mL di campione**.



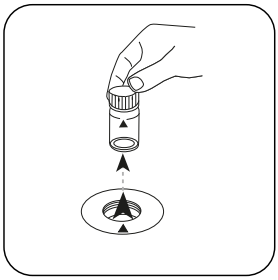
Chiudere la/e cuvetta/e.



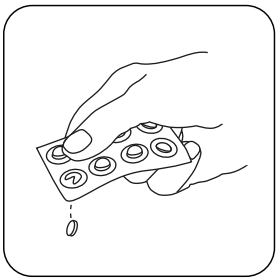
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



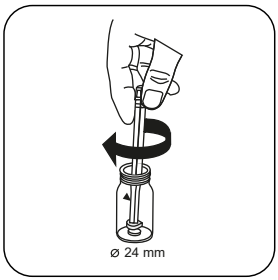
Premere il tasto **ZERO**.



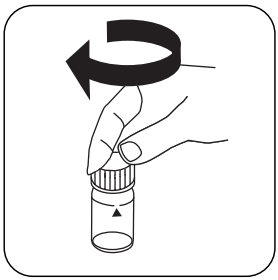
Prelevare la cuvetta dal vano di misurazione.



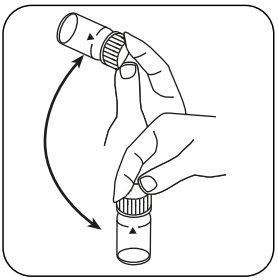
Aggiungere **una pastiglia PHENOL RED PHOTOMETER**.



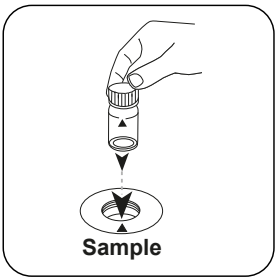
Frantumare la/e pastiglia/e con una leggera rotazione.



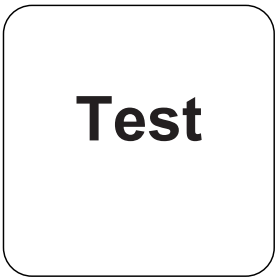
Chiudere la/e cuvetta/e.



Far sciogliere la/e pastiglia/e agitando.



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



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

Sul display compare il risultato come valore pH.

Metodo chimico

Rosso fenolo

Appendice

Interferenze

Interferenze permanenti

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

Interferenze escludibili

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

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

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

Riferimenti bibliografici

Colorimetric Chemical Analytical Methods, 9th Edition, London

Valore pH L M331

6.5 - 8.4 pH PH

Rosso fenolo

IT

Materiale

Materiale richiesto (in parte facoltativo):

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

Preparazione

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

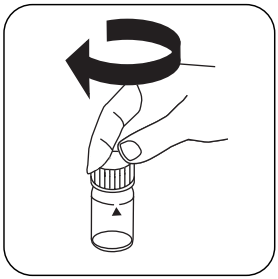
Note

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

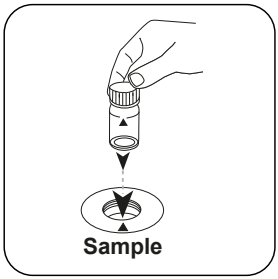
Esecuzione della rilevazione Valore pH con reagente liquido

Selezionare il metodo nel dispositivo.

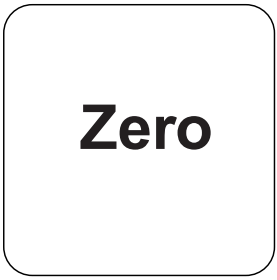
Riempire una cuvetta da 24 mm con **10 mL di campione**.



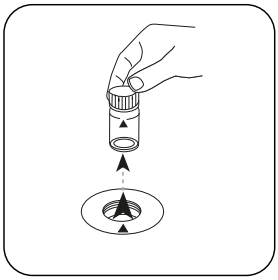
Chiudere la/e cuvetta/e.



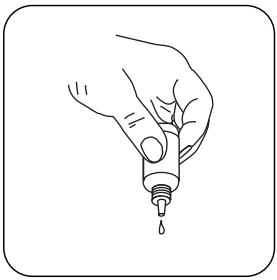
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



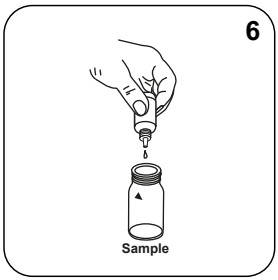
Premere il tasto **ZERO**.



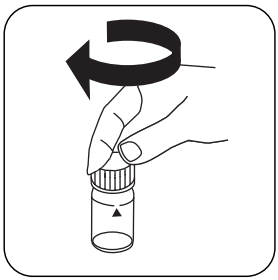
Prelevare la cuvetta dal vano di misurazione.



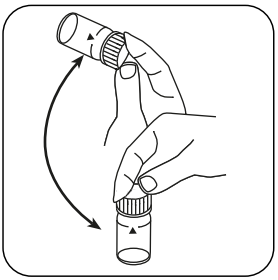
Tenere le boccette contagocce in posizione verticale e introdurre, premendo lentamente, gocce della stessa dimensione nella cuvetta.



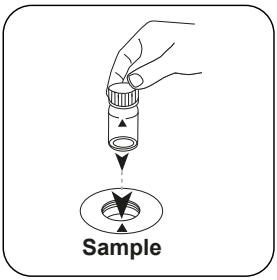
Introdurre **6 gocce di PHENOL Red-Lösung** nella cuvetta del campione.



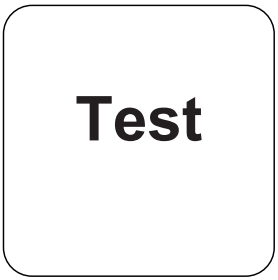
Chiudere la/e cuvetta/e.



Miscelare il contenuto capovolgendo.



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



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

Sul display compare il risultato come valore pH.

Metodo chimico

Rosso fenolo

Appendice

Interferenze

Interferenze escludibili

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

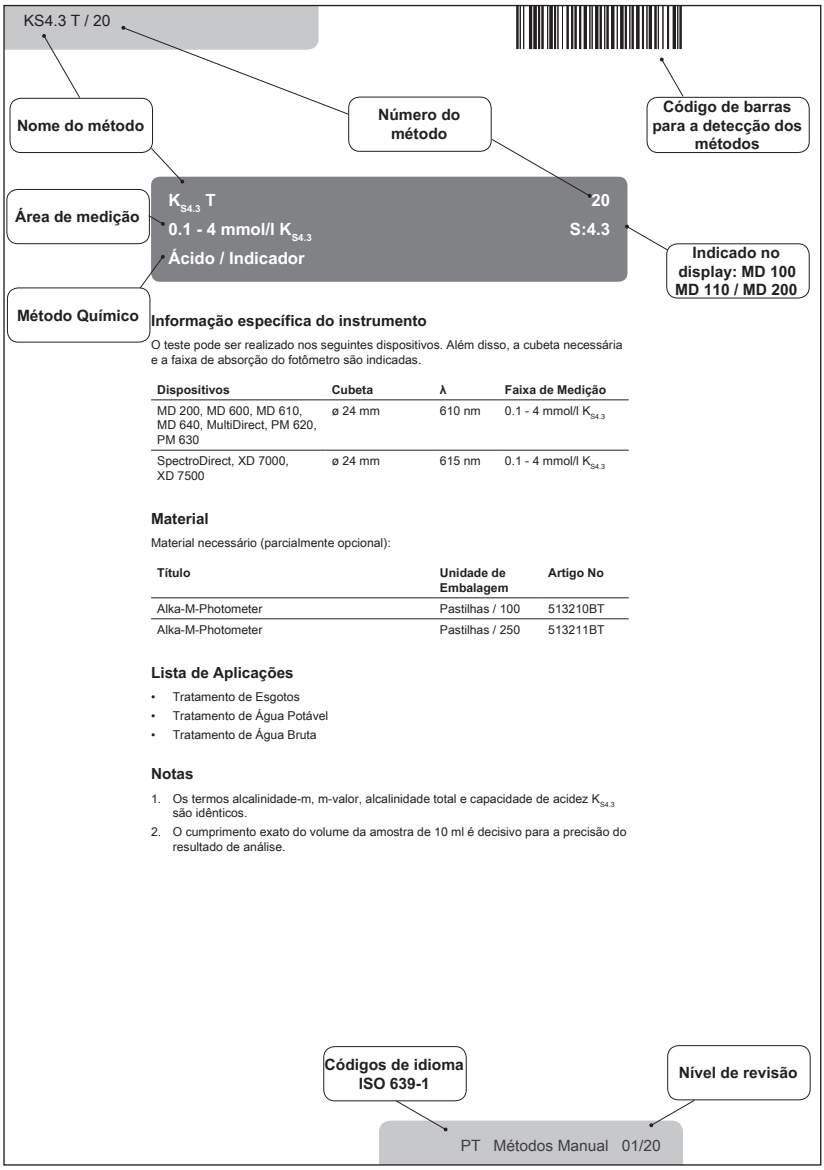
2.

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

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

Riferimenti bibliografici

Colorimetric Chemical Analytical Methods, 9th Edition, London


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

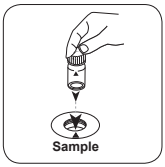
Realização da determinação Capacidade de acidez $K_{S4.3}$ com pastilha

Escolher o método no equipamento.

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

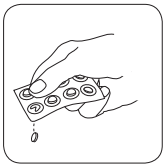
Encher a célula de 24 mm com **10 ml de amostra** .

Fechar a(s) célula(s).

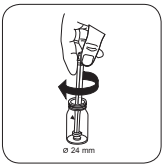


Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

• • •



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

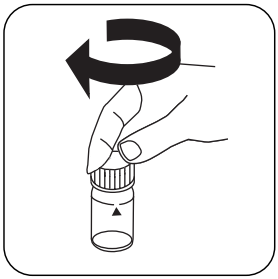
1. As águas fortemente alcalinas ou ácidas deviam, antes da análise, ser ajustadas para um valor pH de 4 a 6.

Realização da determinação Cobre, livre com pastilha

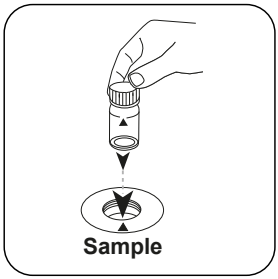
Escolher o método no equipamento.

Escolha ainda a determinação: livre

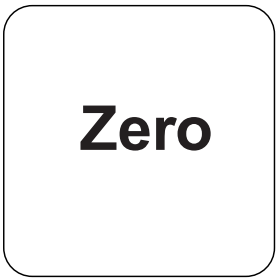
Encher a célula de 24 mm com **10 mL de amostra** .



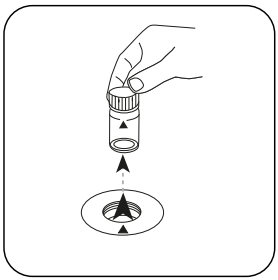
Fechar a(s) célula(s).



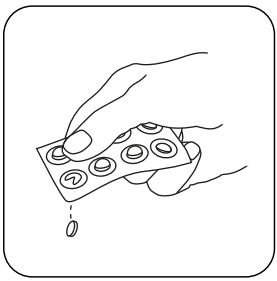
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



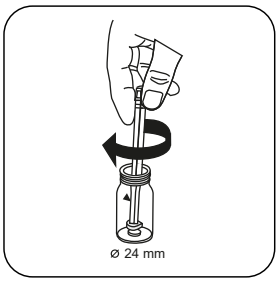
Premir a tecla **ZERO**.



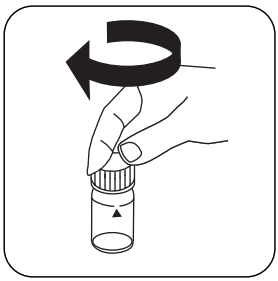
Retirar a célula do compartimento de medição.



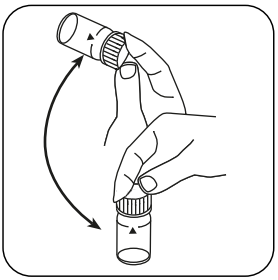
Pastilha COPPER No. 1.



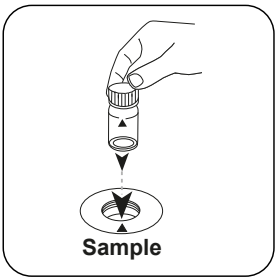
Esmagar a(s) pastilha(s) rodando ligeiramente.



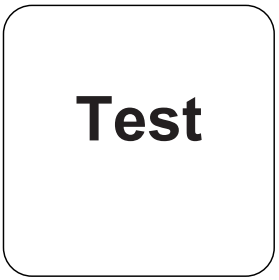
Fechar a(s) célula(s).



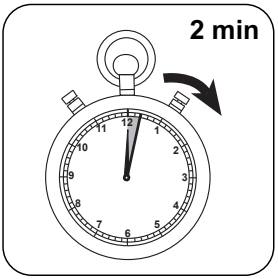
Dissolver a(s) pastilha(s) girando.



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



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



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

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

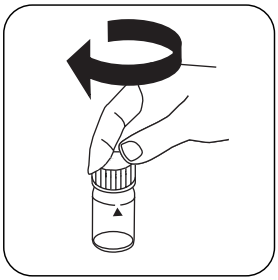
No visor aparece o resultado em mg/L Cobre livre.

Realização da determinação Cobre, total com pastilha

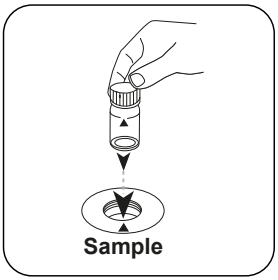
Escolher o método no equipamento.

Escolha ainda a determinação: total

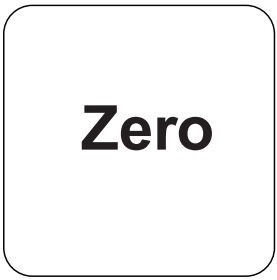
Encher a célula de 24 mm com **10 mL de amostra** .



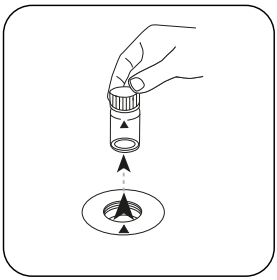
Fechar a(s) célula(s).



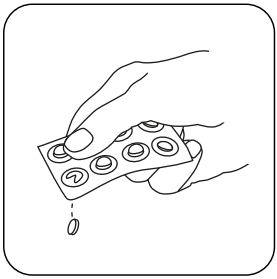
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



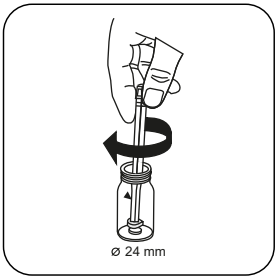
Premir a tecla **ZERO**.



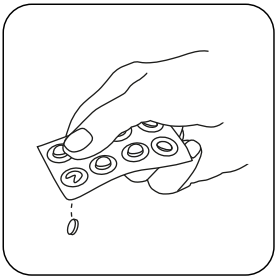
Retirar a célula do compartimento de medição.



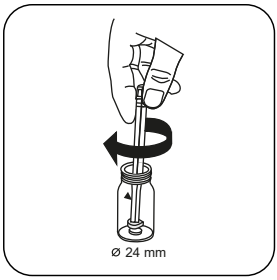
Pastilha COPPER No. 1.



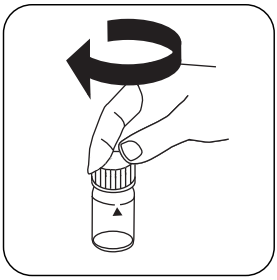
Esmagar a(s) pastilha(s) rodando ligeiramente e dissolver.



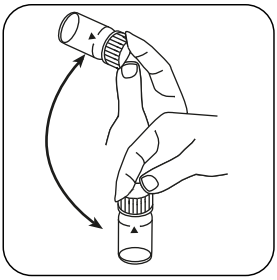
Pastilha COPPER No. 2.



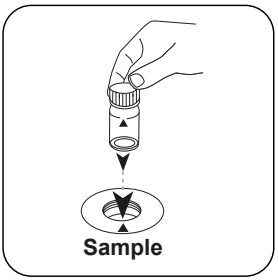
Esmagar a(s) pastilha(s) rodando ligeiramente.



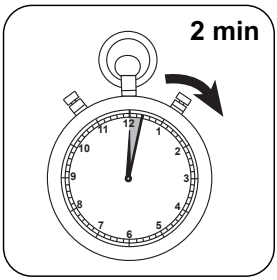
Fechar a(s) célula(s).



Dissolver a(s) pastilha(s) girando.



Test



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 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

Valor pH T M330

6.5 - 8.4 pH PH

Phenol Red

PT

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
Fotómetro Fenol Vermelho	Pastilhas / 100	511770BT
Fotómetro Fenol Vermelho	Pastilhas / 250	511771BT
Fotómetro Fenol Vermelho	Pastilhas / 500	511772BT

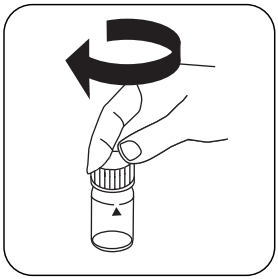
Notas

1. Para a determinação fotométrica do valor pH deve usar somente pastilhas PHENOL RED com impressão de película preta, que estão identificadas com o termo PHOTOMETER.

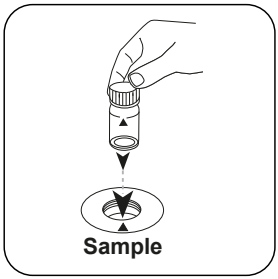
Realização da determinação Valor pH com pastilha

Escolher o método no equipamento.

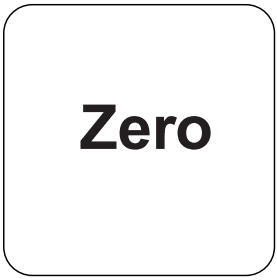
Encher a célula de 24 mm com **10 mL de amostra** .



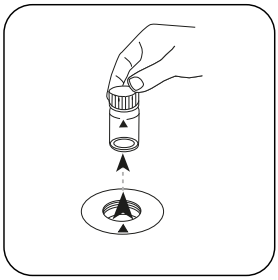
Fechar a(s) célula(s).



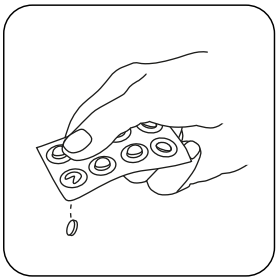
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



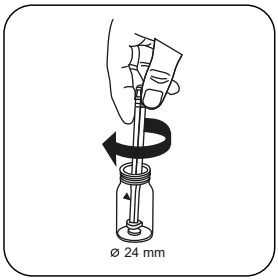
Premir a tecla **ZERO**.



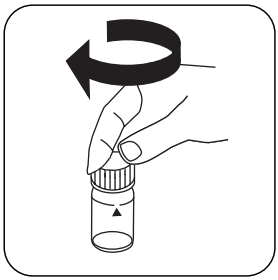
Retirar a célula do compartimento de medição.



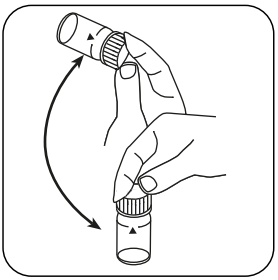
Pastilha PHENOL RED PHOTOMETER.



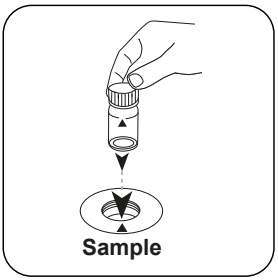
Esmagar a(s) pastilha(s) rodando ligeiramente.



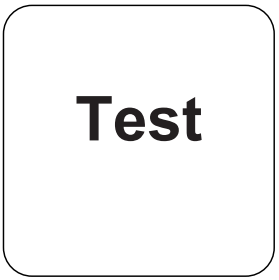
Fechar a(s) célula(s).



Dissolver a(s) pastilha(s) girando.



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



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

No visor aparece o resultado como valor pH.

Método Químico

Phenol Red

Apêndice

Texto de Interferências

Interferências Pesistentes

1. As amostras de água com baixa dureza de carbonato* podem obter valores pH incorretos.
   *$K_{S4,3}$ < 0,7 mmol/l ≙ Alcalinidade total < 35 mg/L $CaCO_3$.

Interferências Removíveis

1. Os valores pH inferiores a 6,5 e superiores a 8,4 podem causar resultados dentro da área de medição. Recomenda-se um teste de plausibilidade (medidor de pH).
2. Erro de sal:
   No caso de teores de sal até 2 g/L não é expectável nenhum erro de sal significativo devido ao teor de sal da pastilha de reagente. No caso de teores de sal superiores, deve corrigir os valores de medição do seguinte modo:

Teor de sal da amostra emg/L	30 (água do mar)	60	120	180
Correção	-0,15[1)]	-0,21[2)]	-0,26[2)]	-0,29[2)]

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

Bibliografia

Colorimetric Chemical Analytical Methods, 9th Edition, London

Valor pH L M331

6.5 - 8.4 pH PH

Phenol Red

PT

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
Solução de vermelho fenol	15 mL	471040
Solução de vermelho fenol	100 mL	471041
Solução de vermelho fenol em embalagem de -6	1 pc.	471046

Preparação

1. Devido aos diferentes tamanhos de gotas, o resultado de medição pode apresentar desvios maiores do que ao utilizar pastilhas.
   Se utilizar uma pipeta (0,18 ml corresponde a 6 gotas) pode reduzir este desvio.

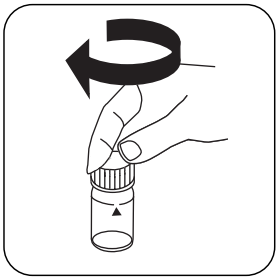
Notas

1. Depois de usado, o frasco conta-gotas deve ser novamente fechado com a respetiva tampa de enroscar à cor.
2. Guardar o reagente em local fresco entre +6 °C e +10 °C.

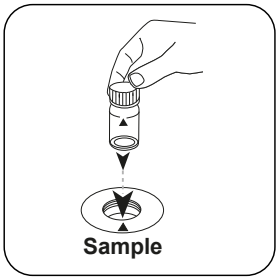
Realização da determinação Valor pH com reagente líquido

Escolher o método no equipamento.

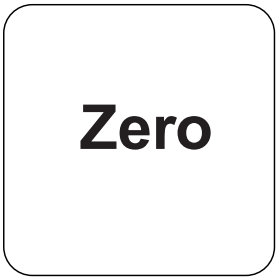
Encher a célula de 24 mm com **10 mL de amostra** .



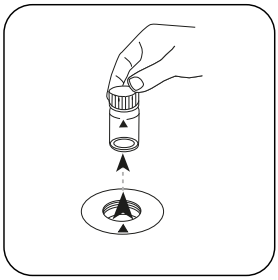
Fechar a(s) célula(s).



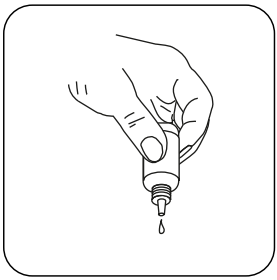
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



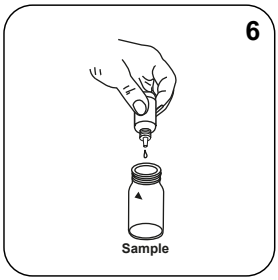
Premir a tecla **ZERO**.



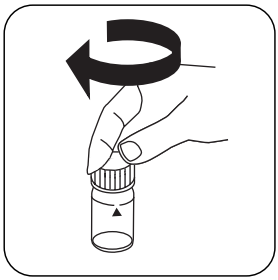
Retirar a célula do compartimento de medição.



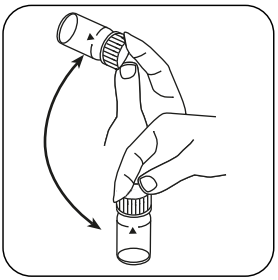
Manter os frascos conta gotas na vertical e pressionar lentamente para adicionar gotas de igual dimensão.



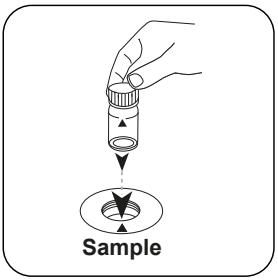
Adicionar **6 gotas PHENOL Red-Lösung** à célula de amostra.



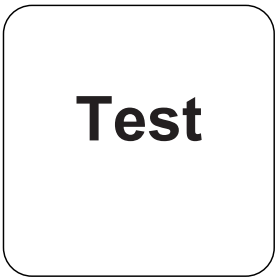
Fechar a(s) célula(s).



Misturar o conteúdo girando.



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



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

No visor aparece o resultado como valor pH.

Método Químico

Phenol Red

Apêndice

Texto de Interferências

Interferências Removíveis

1. Erro de sal: Correção do valor de medição (valores médios) para amostras com um teor de sal de:

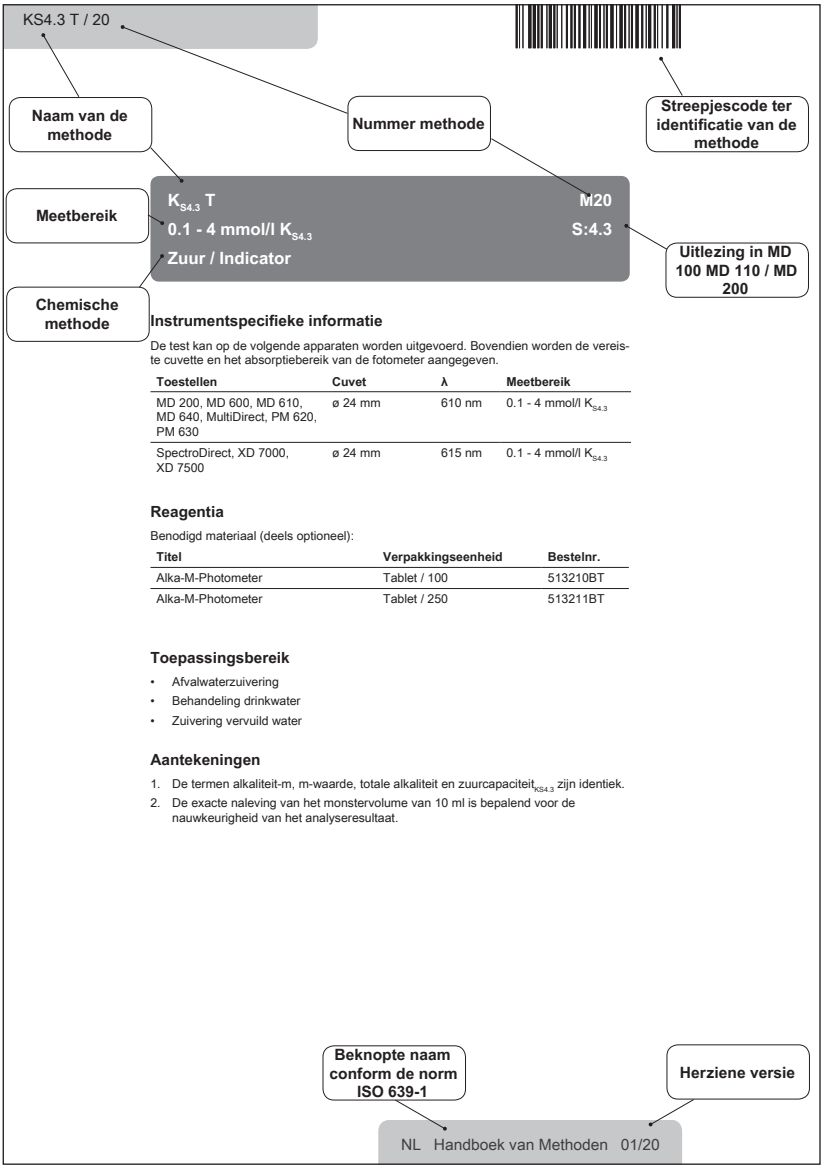
2.

Teor de sal da amostra	Correção
30 g/L (água do mar)	-0,15[1)]
60 g/L	-0,21[2)]
120 g/L	-0,26[2)]
180 g/L	-0,29[2)]
[1)] segundo Kolthoff (1922)	[2)] segundo Parson e Douglas (1926)

3. Na análise de água clorada, o teor de cloro residual existente pode influenciar a reação de cor do reagente líquido. Isto é evitado, na medida em que se insere um pequeno cristal de tiossulfato de sódio ($Na_2S_2O_3 \cdot 5\ H_2O$) na solução de amostra antes de ser adicionada a solução PHENOL RED.

Bibliografia

Colorimetric Chemical Analytical Methods, 9th Edition, London


KS4.3 T / 20
Naam van de methode
Nummer methode
Streepjescode ter identificatie van de methode
Meetbereik
Chemische methode
Uitlezing in MD 100 MD 110 / MD 200
K S4.3 T
M20
0.1 - 4 mmol/l K S4.3
S:4.3
Zuur / Indicator
Instrumentspecifieke informatie
De test kan op de volgende apparaten worden uitgevoerd. Bovendien worden de vereiste cuvette en het absorptiebereik van de fotometer aangegeven.
Toestellen
Cuvet
λ
Meetbereik
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630
ø 24 mm
610 nm
0.1 - 4 mmol/l K S4.3
SpectroDirect, XD 7000, XD 7500
ø 24 mm
615 nm
0.1 - 4 mmol/l K S4.3
Reagentia
Benodigd materiaal (deels optioneel):
Titel
Verpakkingseenheid
Bestelnr.
Alka-M-Photometer
Tablet / 100
513210BT
Alka-M-Photometer
Tablet / 250
513211BT
Toepassingsbereik
• Afvalwaterzuivering
• Behandeling drinkwater
• Zuivering vervuild water
Aantekeningen
1. De termen alkaliteit-m, m-waarde, totale alkaliteit en zuurcapaciteit KS4.3 zijn identiek.
2. De exacte naleving van het monstervolume van 10 ml is bepalend voor de nauwkeurigheid van het analyseresultaat.
Beknopte naam conform de norm ISO 639-1
Herziene versie
NL Handboek van Methoden 01/20

Uitvoering van de meting

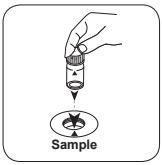
Uitvoering van de bepaling Zuurcapaciteit $K_{S4.3}$ met tablet

De methode in het apparaat selecteren.

Voor deze methode moet bij de volgende apparaten geen nulmeting worden uitgevoerd: XD 7000, XD 7500

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

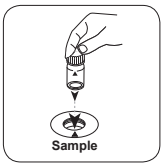
De spoelbakjes afsluiten.



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

• • •

Tabletten oplossen door om te draaien



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

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

De display toont het resultaat als Zuurcapaciteit $K_{S4.3}$.

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

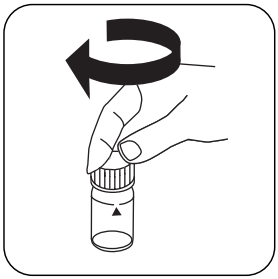
1. Sterk alkalisch of zuur water moet vóór de analyse op een pH-waarde van 4 tot 6 worden ingesteld.

Uitvoering van de bepaling Koper, vrij met tablet

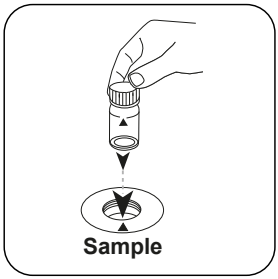
De methode in het apparaat selecteren.

Selecteer bovendien de bepaling: vrij

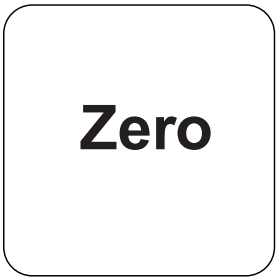
Spoelbakje van 24 mm met **10 mL staal** vullen.



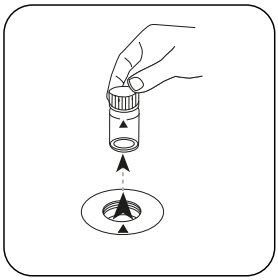
De spoelbakjes afsluiten.



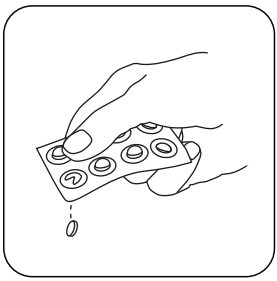
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



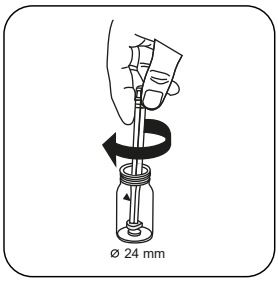
De toets **NUL** indrukken.



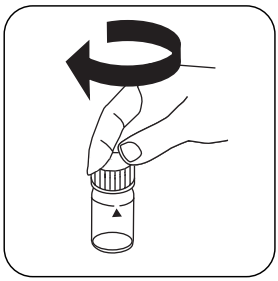
Het spoelbakje uit de meetschacht nemen.



Een COPPER Nr. 1 tablet toevoegen.

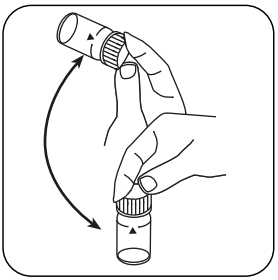


De tabletten onder lichte rotatie verpletteren.

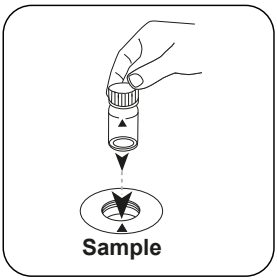


De spoelbakjes afsluiten.

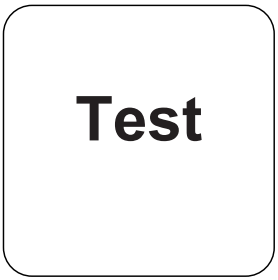
NL



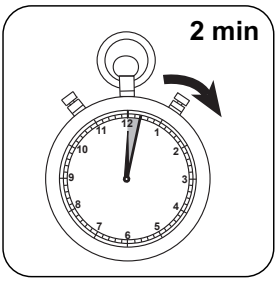
Tabletten oplossen door om te draaien



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.

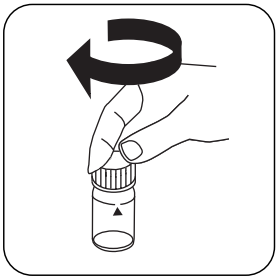
De display toont het resultaat in mg/L vrij koper.

Uitvoering van de bepaling Koper, totaal met tablet

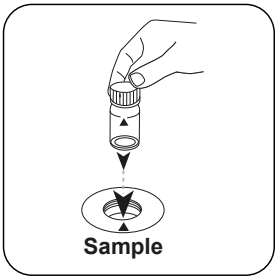
De methode in het apparaat selecteren.

Selecteer bovendien de bepaling: totaal

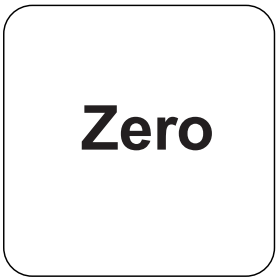
Spoelbakje van 24 mm met **10 mL staal** vullen.



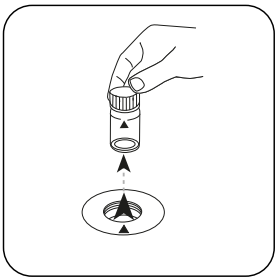
De spoelbakjes afsluiten.



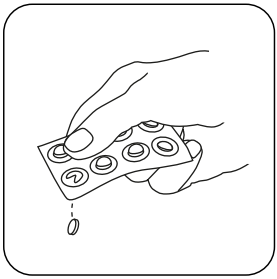
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



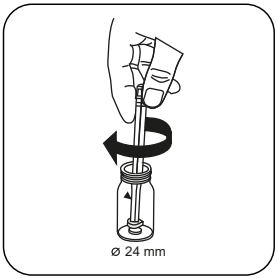
De toets **NUL** indrukken.



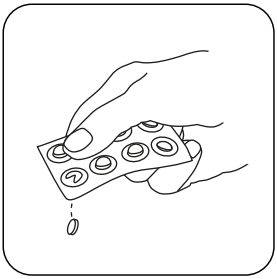
Het spoelbakje uit de meetschacht nemen.



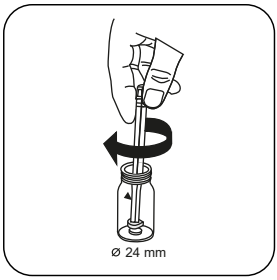
Een COPPER Nr. 1 tablet toevoegen.



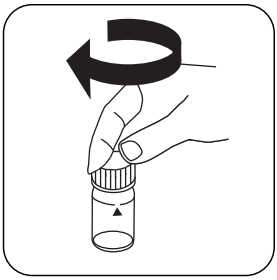
De tabletten onder lichte rotatie verpletteren en oplossen.



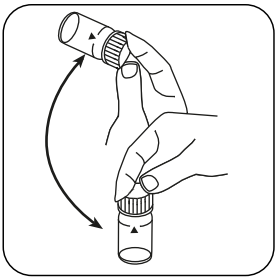
Een COPPER Nr. 2 tablet toevoegen.



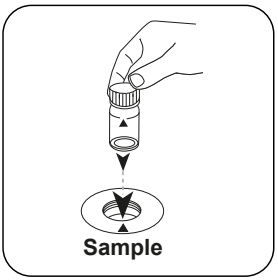
De tabletten onder lichte rotatie verpletteren.

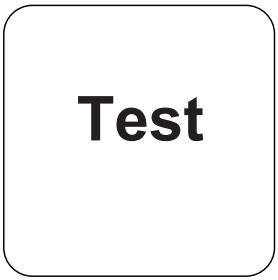


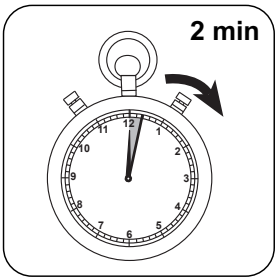
De spoelbakjes afsluiten.



Tabletten oplossen door om te draaien







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 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

pH-waarde T M330

6.5 - 8.4 pH PH

Fenolrood

NL

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
Fenolrood fotometer	Tablet / 100	511770BT
Fenolrood fotometer	Tablet / 250	511771BT
Fenolrood fotometer	Tablet / 500	511772BT

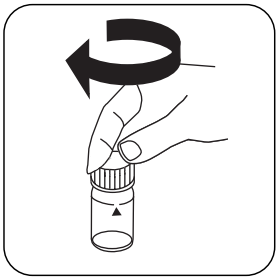
Aantekeningen

1. Voor de fotometrische pH-bepaling mogen alleen PHENOL RED-tabletten met een zwarte foliedruk en de term PHOTOMETER worden gebruikt.

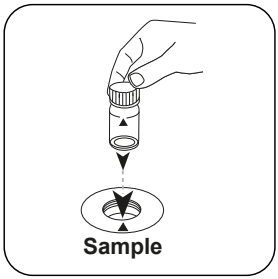
Uitvoering van de bepaling pH-waarde met tablet

De methode in het apparaat selecteren.

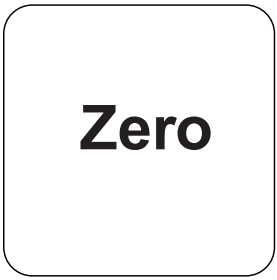
Spoelbakje van 24 mm met **10 mL staal** vullen.



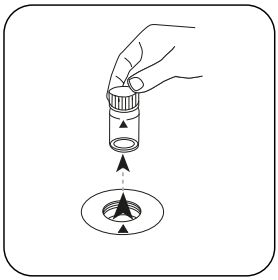
De spoelbakjes afsluiten.



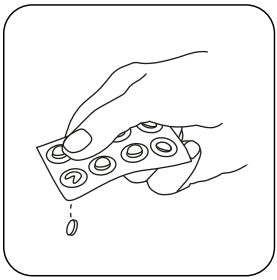
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



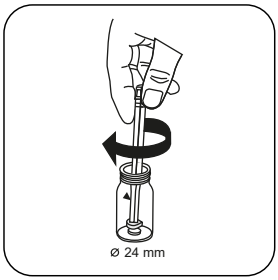
De toets **NUL** indrukken.



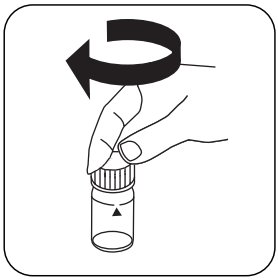
Het spoelbakje uit de meetschacht nemen.



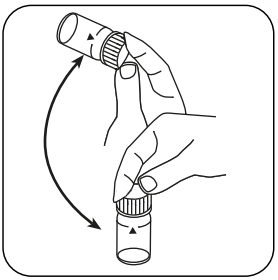
Een FENOLROOD FOTOMETER tablet toevoegen.



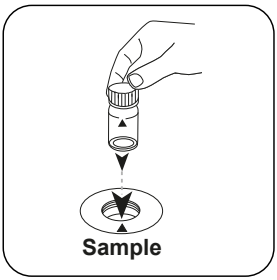
De tabletten onder lichte rotatie verpletteren.



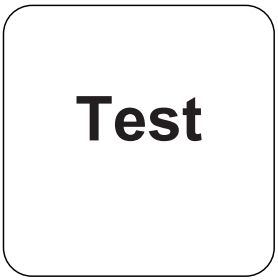
De spoelbakjes afsluiten.



Tabletten oplossen door om te draaien



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



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

De display toont het resultaat als pH-waarde.

Chemische methode

Fenolrood

Aanhangsel

Verstoringen

Permanente verstoringen

1. Watermonsters met een lage carbonaathardheid* kunnen leiden tot onjuiste pH-waarden.
   $*_{KS4,3}$ < 0,7 mmol/l ≙ Totale alkaliteit < 35 mg/L $CaCO_3$.

Uit te sluiten verstoringen

1. pH-waarden onder 6,5 en boven 8,4 kunnen leiden tot resultaten binnen het meetbereik. Een plausibiliteitstest (pH-meter) wordt aanbevolen.
2. Zoutgebrek:
   Voor zoutgehalten tot 2 g/L kan geen significante zoutfout worden verwacht als gevolg van het zoutgehalte van het reagenstablet. Indien het zoutgehalte hoger is, worden de gemeten waarden als volgt gecorrigeerd:

zoutgehalte van het monster (in g/L)	30 (zeewater)	60	120	180
Correctie	-0,15[1)]	-0,21[2)]	-0,26[2)]	-0,29[2)]

[1)] na Kolthoff (1922)
[2)] na Parson en Douglas (1926)

Literatuurverwijzing

Colorimetric Chemical Analytical Methods, 9th Edition, London

pH-waarde L M331

6.5 - 8.4 pH PH

Fenolrood

NL

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
Fenolrood oplossing	15 mL	471040
Fenolrood oplossing	100 mL	471041
Fenolrood oplossing in verpakking van 6 stuks	1 St.	471046

Voorbereiding

1. Door de verschillende druppelgroottes kan het meetresultaat grotere afwijkingen vertonen dan bij gebruik van tabletten.
   Bij gebruik van een pipet (0,18 ml komt overeen met 6 druppels) kan deze afwijking worden geminimaliseerd.

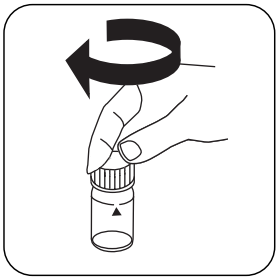
Aantekeningen

1. Na gebruik moet de druppelfles meteen onmiddellijk worden gesloten met de schroefdop van dezelfde kleur.
2. Bewaar het reagens bij +6 °C tot +10 °C op een koele plaats.

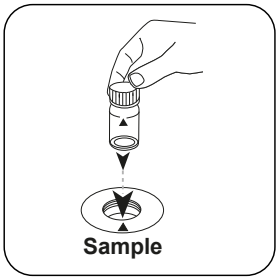
Uitvoering van de bepaling pH-waarde met vloeibaar reagens

De methode in het apparaat selecteren.

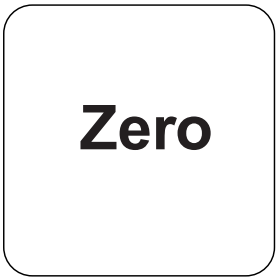
Spoelbakje van 24 mm met **10 mL staal** vullen.



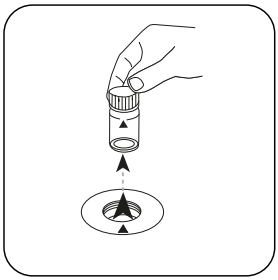
De spoelbakjes afsluiten.



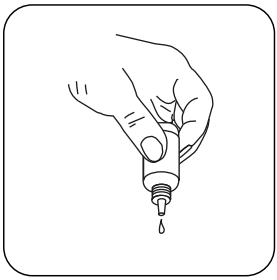
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



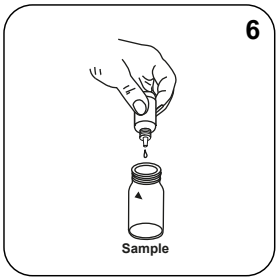
De toets **NUL** indrukken.



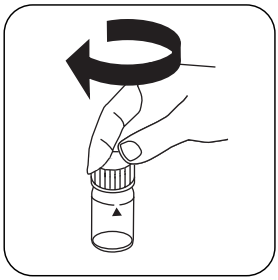
Het spoelbakje uit de meetschacht nemen.



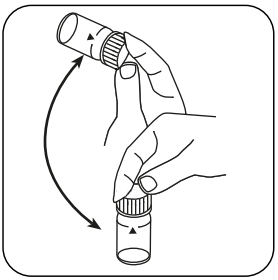
De druppelflessen verticaal houden en even grote druppels toevoegen door langzaam te drukken.



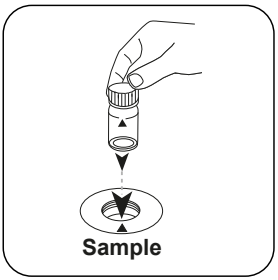
6 druppels FENOLROOD-oplossing in het staalspoelbakje doen.



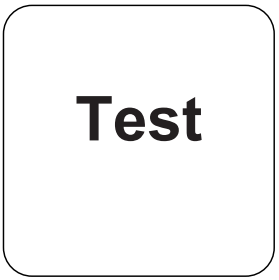
De spoelbakjes afsluiten.



De inhoud mengen door om te draaien.



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



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

De display toont het resultaat als pH-waarde.

Chemische methode

Fenolrood

Aanhangsel

Verstoringen

Uit te sluiten verstoringen

1. Zoutgebrek: correctie van de gemeten waarde (gemiddelde waarden) voor monsters met een zoutgehalte van:

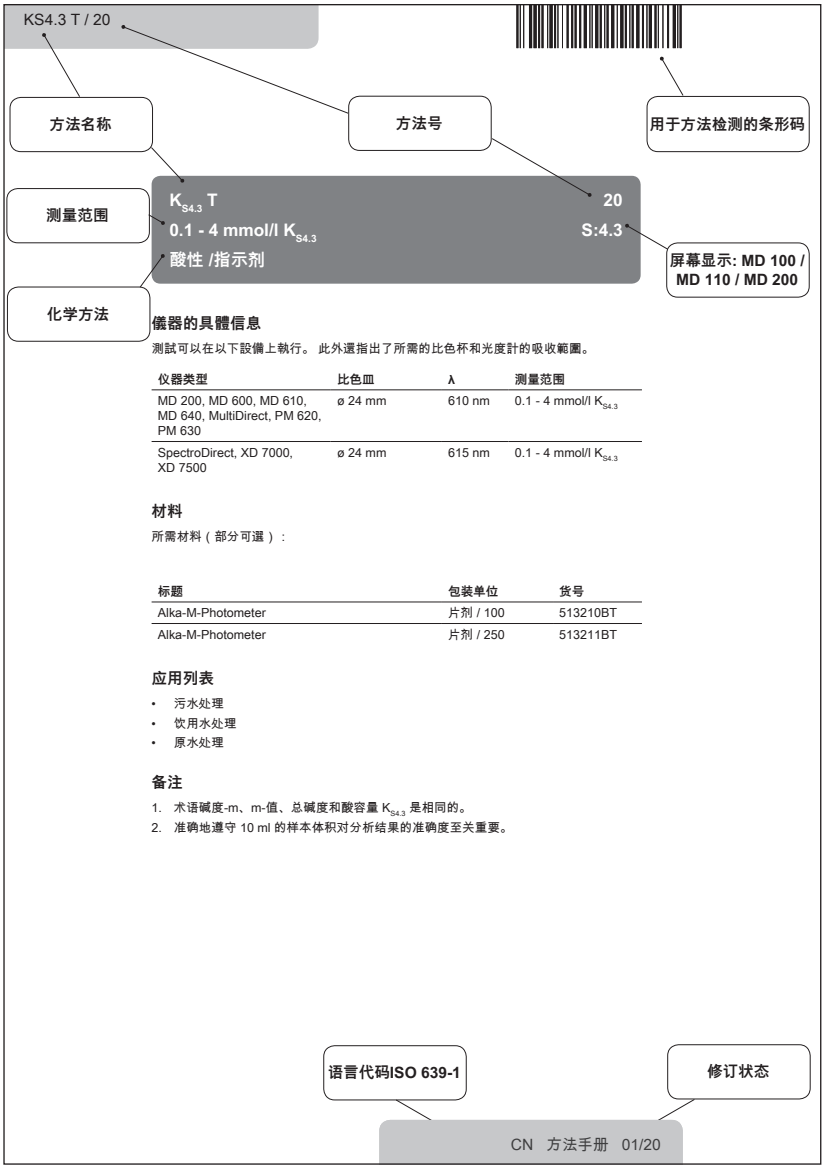
2.

Zoutgehalte van het monster	Correctie
30 g/L (zeewater)	-0,15[1)]
60 g/L	-0,21[2)]
120 g/L	-0,26[2)]
180 g/L	-0,29[2)]
[1)] na Kolthoff (1922)	[2)] na Parson en Douglas (1926)

3. Bij het testen van gechloreerd water kan het aanwezige chloorgehalte de kleurreactie van het vloeibare reagens beïnvloeden. Dit wordt voorkomen door een klein kristal natriumthiosulfaat ($Na_2S_2O_3$ 5 H_2O) aan de monsteroplossing toe te voegen voordat de PHENOL RED-oplossing wordt toegevoegd.

Literatuurverwijzing

Colorimetric Chemical Analytical Methods, 9th Edition, London



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。

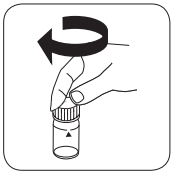
开始测量

进行测定 $K_{S4.3}$ 片剂酸容量

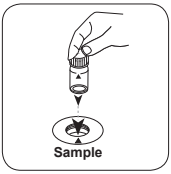
选择设备中的方法。

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。

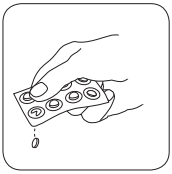


密封比色杯。

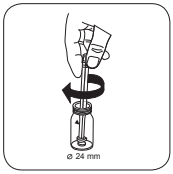


将样本比色杯放入测量轴中。注意定位。

• • •



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

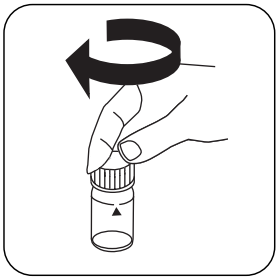
1. 在分析前应将强碱性或酸性水的 pH 从4到6 左右。

进行测定 余铜 片剂法

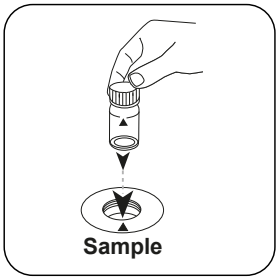
选择设备中的方法。

另外选择测定：余铜

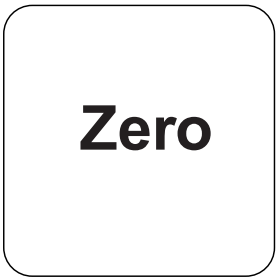
用 **10 mL 样本**填充 24 mm 比色杯。



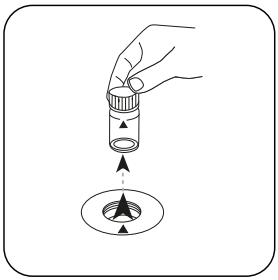
密封比色杯。



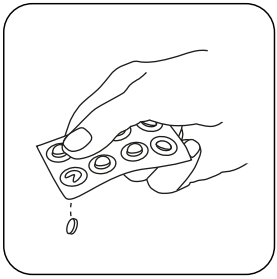
将**样本比色杯**放入测量轴中。注意定位。



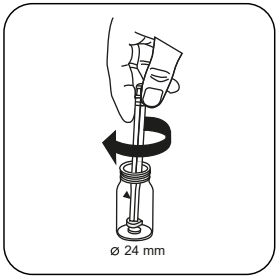
按下 **ZERO** 按钮。



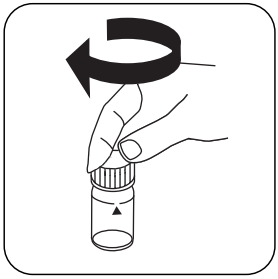
从测量轴上取下比色杯。



加入 **COPPER No. 1 片剂**。

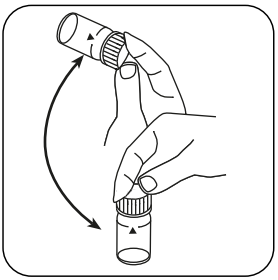


用轻微的扭转压碎片剂。

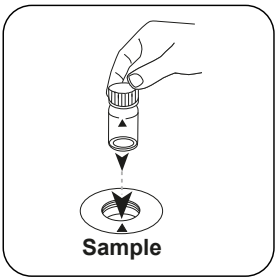


密封比色杯。

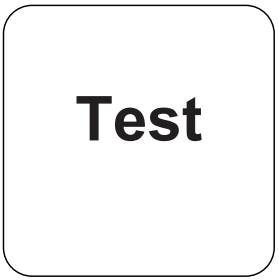
ZH



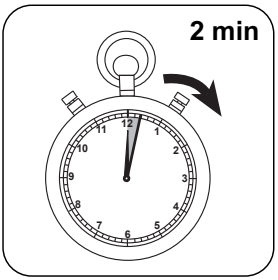
通过旋转溶解片剂。



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。

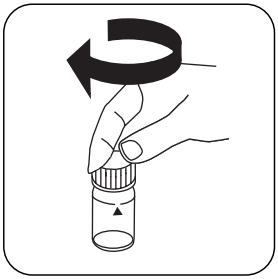
结果在显示屏上显示为 mg / l 余铜。

进行测定 总铜 片剂法

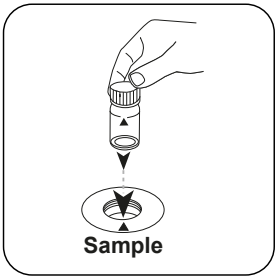
选择设备中的方法。

另外选择测定：总铜

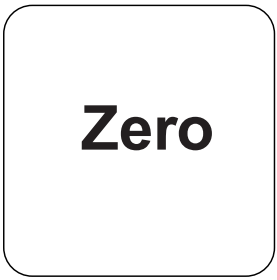
用 **10 mL 样本**填充 24 mm 比色杯。



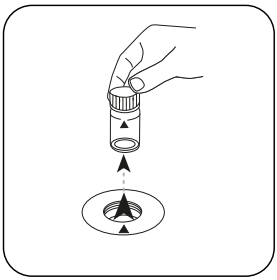
密封比色杯。



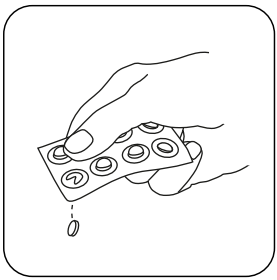
将**样本比色杯**放入测量轴中。注意定位。



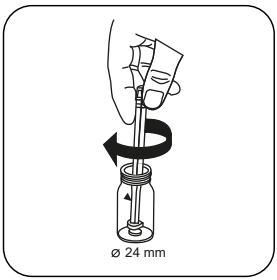
按下 **ZERO** 按钮。



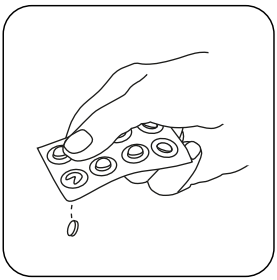
从测量轴上取下比色杯。



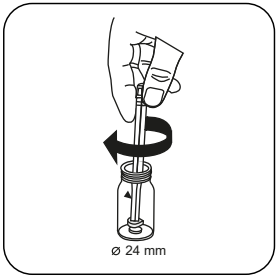
加入 **COPPER No. 1 片剂**。



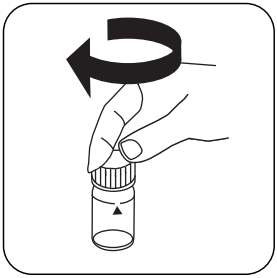
用轻微的扭转压碎片剂并溶解。



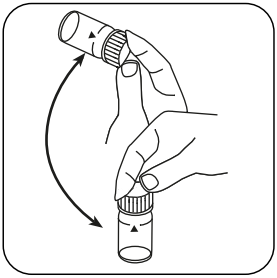
加入 **COPPER No. 2 片剂** 。



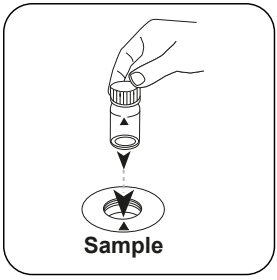
用轻微的扭转压碎片剂。



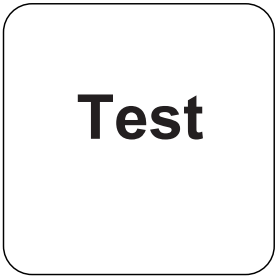
密封比色杯。



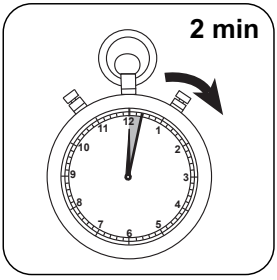
通过旋转溶解片剂。



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。

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

T pH 值 M330

6.5 - 8.4 pH PH

苯酚红

材料
所需材料（部分可選）：

ZH

试剂	包装单位	货号
酚红光度计	片剂 / 100	511770BT
酚红光度计	片剂 / 250	511771BT
酚红光度计	片剂 / 500	511772BT

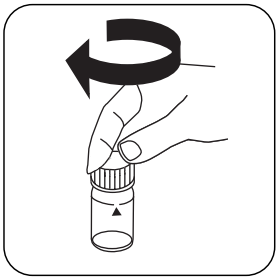
备注

1. 对于光度 pH 值测定，只应使用标有 PHOTOMETER 的带有黑色烫印的 PHENOL RED 片剂。

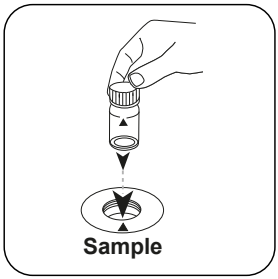
进行测定 pH 值片剂

选择设备中的方法。

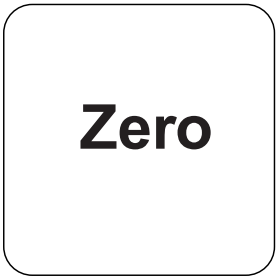
用 **10 mL 样本**填充 24 mm 比色杯。



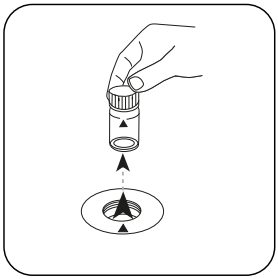
密封比色杯。



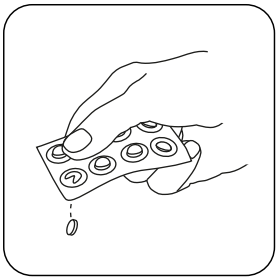
将**样本比色杯**放入测量轴中。注意定位。



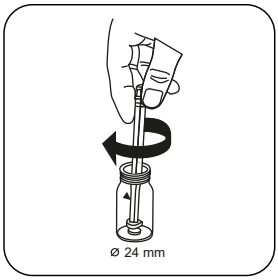
按下 **ZERO** 按钮。



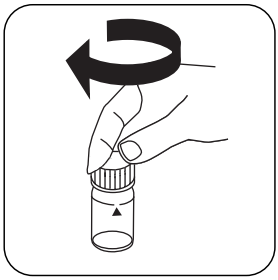
从测量轴上取下比色杯。



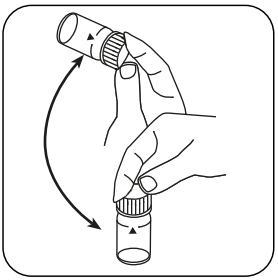
加入 **PHENOL RED PHOTOMETER 片剂。**



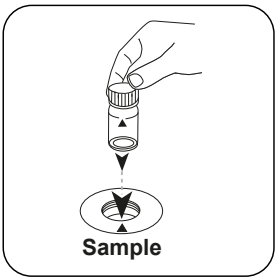
用轻微的扭转压碎片剂。



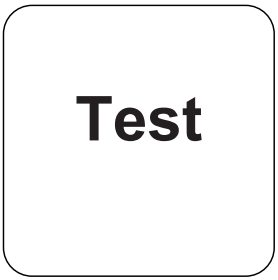
密封比色杯。



通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。



按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 pH 值。

化学方法

苯酚红

附錄

干扰说明

持续干扰

1. 碳酸盐硬度*低的水样可能会得出错误的 pH 值。
   *$K_{S4,3}$ < 0,7 mmol/l ≙ 总碱度 < 35 mg/L $CaCO_3$.

可消除干扰

1. pH 值低于 6.5 和高于 8.4 可导致测量范围内的结果。建议使用可信度测试（pH 计）。
2. 盐误差：
   对于盐含量高达 2 g/L，试剂片的盐含量不会引起明显的盐误差。对于较高的盐含量，测量值应进行如下校正：

样本的盐含量以 g/L 为单位	30（海水）	60	120	180
校正	-0,15[1)]	-0,21[2)]	-0,26[2)]	-0,29[2)]

[1)] 根据 Kolthoff (1922)
[2)] 根据 Parson 和 Douglas (1926)

参考文献

Colorimetric Chemical Analytical Methods, 9th Edition, London

L pH 值 M331

6.5 - 8.4 pH PH

苯酚红

材料
所需材料（部分可選）：

ZH

试剂	包装单位	货号
酚红溶液	15 mL	471040
酚红溶液	100 mL	471041
酚红溶液 6 件装	1 片	471046

准备

1. 由于液滴大小不同，测量结果可能会比使用片剂时有更大的偏差。
   使用移液管（0.18 ml 相当于 6 滴）时这种偏差可以最小化。

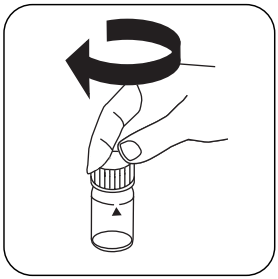
备注

1. 使用后滴瓶必须立即用相同颜色的瓶盖重新密封。
2. 将试剂冷藏在 +6 °C 至 + 10 °C。

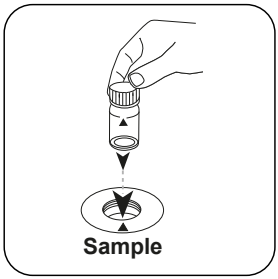
进行测定 pH 值液剂

选择设备中的方法。

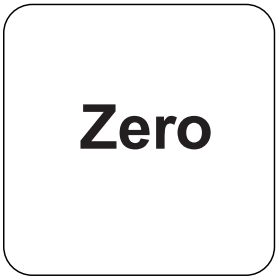
用 **10 mL 样本**填充 24 mm 比色杯。



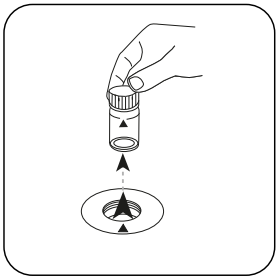
密封比色杯。



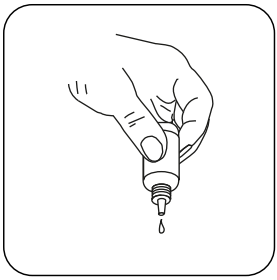
将**样本比色杯**放入测量轴中。注意定位。



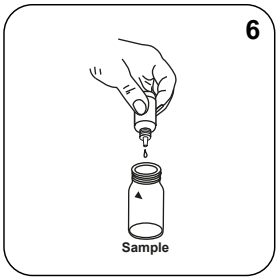
按下 **ZERO** 按钮。



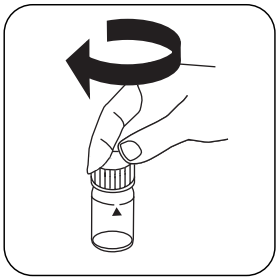
从测量轴上取下比色杯。



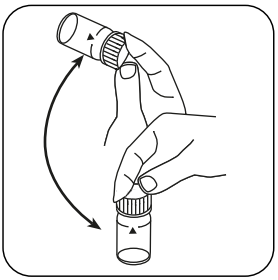
垂直握住滴瓶，慢慢加入相同大小的滴剂。



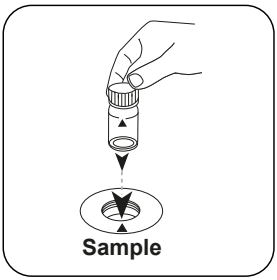
将 **6 滴 PHENOL Red-Lösung** 添加到样本比色杯中。



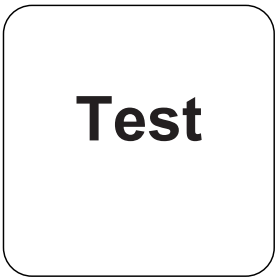
密封比色杯。



通过旋转混合内容物。



将**样本比色杯**放入测量轴中。注意定位。



按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 pH 值。

化学方法

苯酚红

附錄

干扰说明

可消除干扰

1. 盐误差：通过盐含量校正样本的测量值（平均值）：
2.

样本盐含量	校正
30 g/L （海水）	-0,15[1)]
60 g/L	-0,21[2)]
120 g/L	-0,26[2)]
180 g/L	-0,29[2)]

[1)] 根据 Kolthoff (1922)　[2)] 根据 Parson 和 Douglas (1926)

3. 分析氯化水时存在的残余氯含量会影响液体试剂的显色反应。在添加 PHENOL RED 溶液之前，向样本溶液中加入一小块硫代硫酸钠晶体（$Na_2S_2O_3 \cdot 5\ H_2O$）来防止这种情况。

参考文献

Colorimetric Chemical Analytical Methods, 9th Edition, London

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

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

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

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

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

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

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

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

Technical changes without notice
Printed in Germany 10/24
No.: 00386463