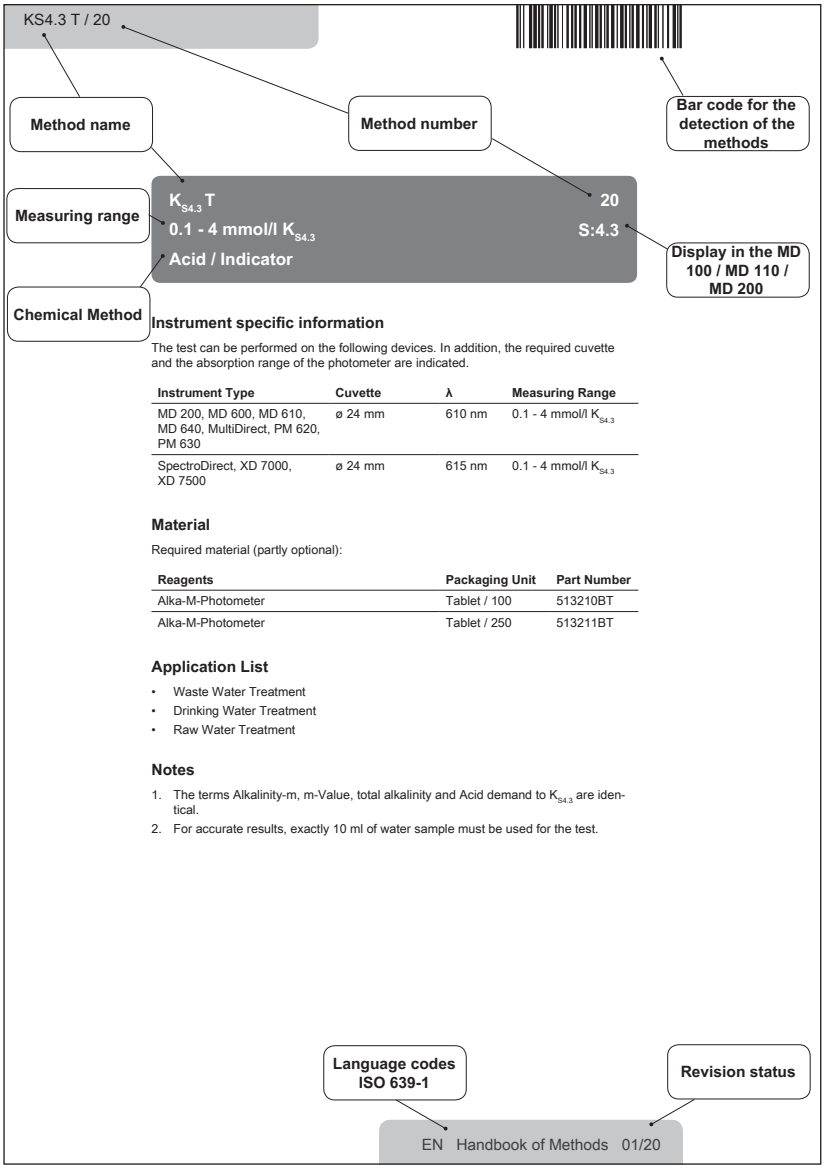
Lovibond® Water Testing

Tintometer® Group

Manual of Methods

MD 100 • MD 110 • MD 200

Chlorine



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

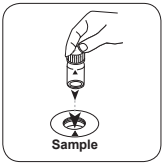
Implementation of the provision Acid capacity $K_{S4.3}$ with Tablet

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**.

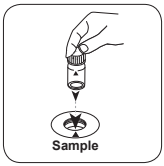
Close vial(s).



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.

Chlorine PP M110

0.02 - 2 mg/L Cl_2 [a] CL2

DPD

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Chlorine Free DPD F10	Powder / 100 pc.	530100
Chlorine Free DPD F10	Powder / 1000 pc.	530103
Chlorine Total DPD F10	Powder / 100 pc.	530120
Chlorine Total DPD F10	Powder / 1000 pc.	530123

Available Standards

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

Sampling

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

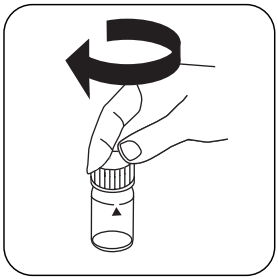
Preparation

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

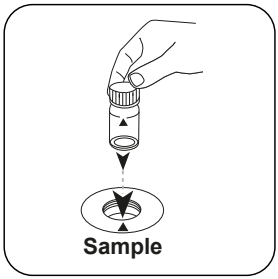
Determination of free chlorine with powder packs

Select the method on the device.

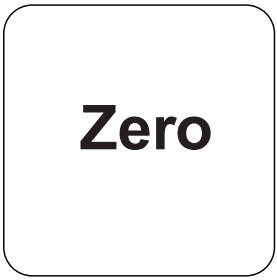
Fill 24 mm vial with **10 mL sample**.



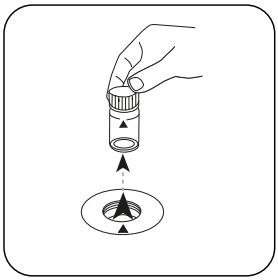
Close vial(s).



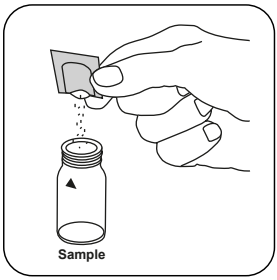
Place **sample vial** in the sample chamber. Pay attention to the positioning.



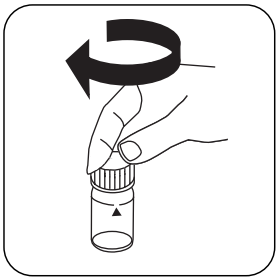
Press the **ZERO** button.



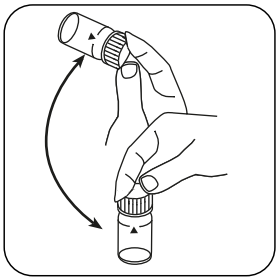
Remove the vial from the sample chamber.



Add **Chlorine FREE-DPD/ F10 powder pack**.



Close vial(s).



Invert several times to mix the contents (20 sec.).

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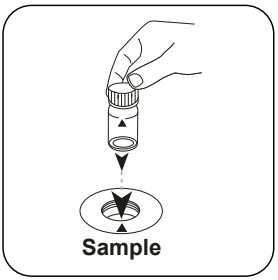
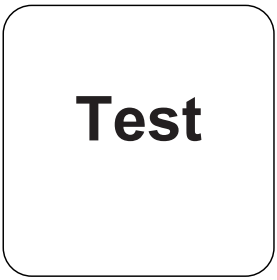


Place **sample vial** in the sample chamber. Pay attention to the positioning.



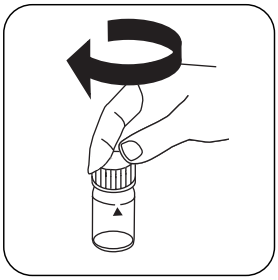
Press the **TEST** (XD: **START**)button.

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

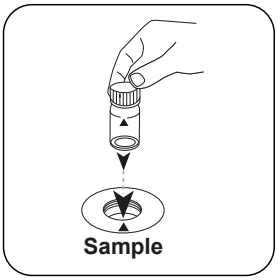
Determination of totale Chlorine with powder packs

Select the method on the device.

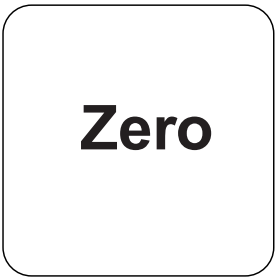
Fill 24 mm vial with **10 mL sample**.



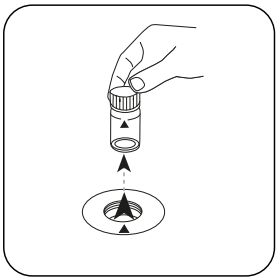
Close vial(s).



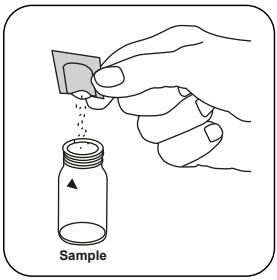
Place **sample vial** in the sample chamber. Pay attention to the positioning.



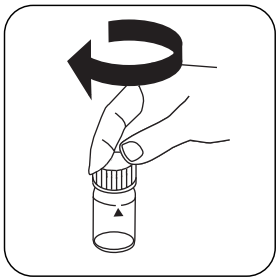
Press the **ZERO** button.



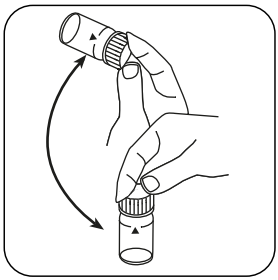
Remove the vial from the sample chamber.



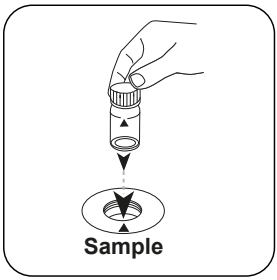
Add **Chlorine TOTAL-DPD/ F10 powder pack**.



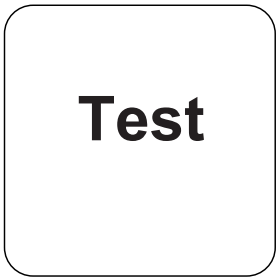
Close vial(s).



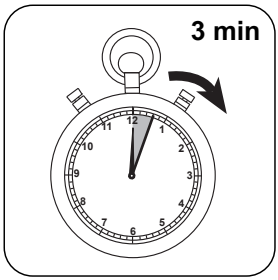
Invert several times to mix the contents (20 sec.).



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



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



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

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

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

Chemical Method

DPD

Appendix

EN

Interferences

Persistant Interferences

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

Removeable Interferences

- Interference from Copper and Iron (III) are eliminated by the addition of EDTA.
- Concentrations above 2 mg/L Chlorine, in the event of using Powder Packs, can lead to results within the measuring range of up to 0 mg/L. In this case, the sample must be diluted with chlorine-free water. 10 ml of the diluted sample should be mixed with the reagent and the measurement taken again (plausibility test).

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

Method Validation

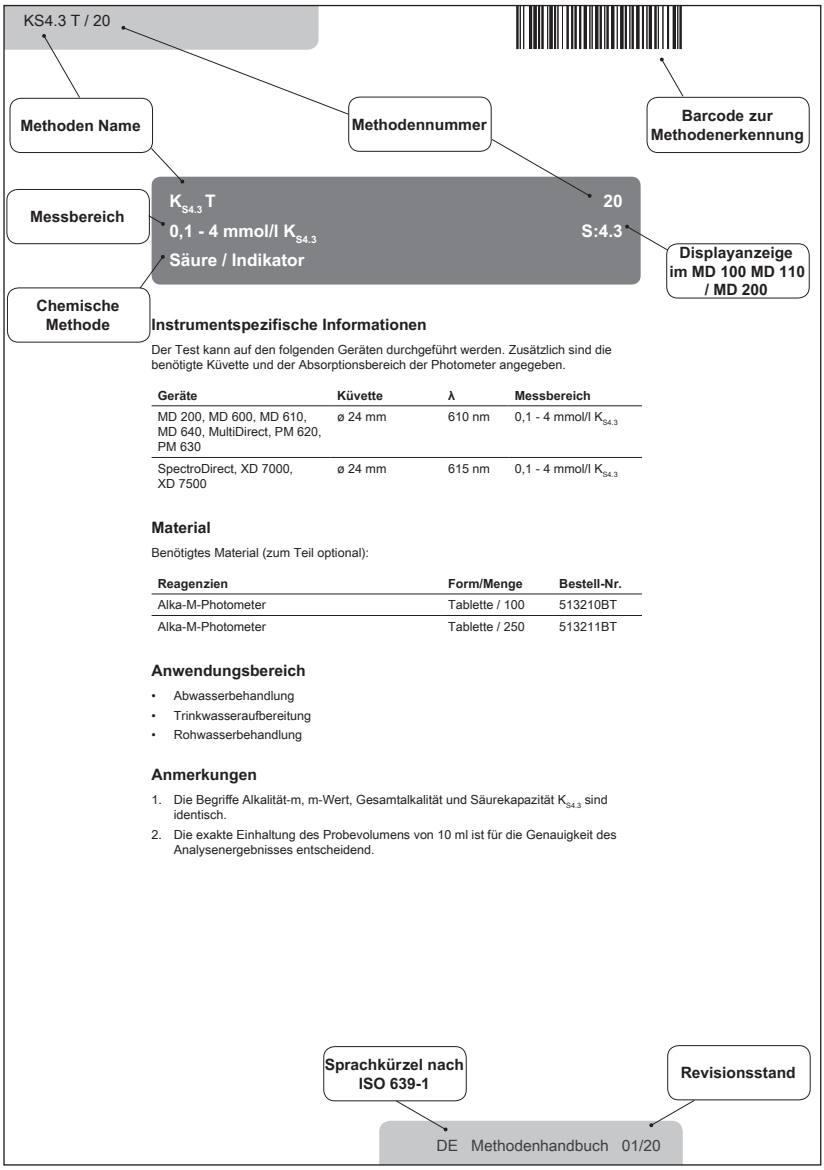
Limit of Detection	0.01 mg/L
Limit of Quantification	0.03 mg/L
End of Measuring Range	2 mg/L
Sensitivity	1.68 mg/L / Abs
Confidence Intervall	0.033 mg/L
Standard Deviation	0.014 mg/L
Variation Coefficient	1.34 %

Conformity

EN ISO 7393-2

[a] determination of free, combined and total

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

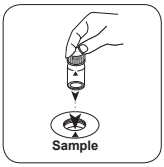
Durchführung der Bestimmung Säurekapazität $K_{S4.3}$ mit Tablette

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.

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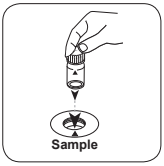
Tablette(n) durch Umschwenken lösen.



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

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

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

Chlor PP **M110**

0,02 - 2 mg/L Cl_2 [a] **CL2**

DPD

DE

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
Chlorine Free DPD F10	Pulver / 100 St.	530100
Chlorine Free DPD F10	Pulver / 1000 St.	530103
Chlorine Total DPD F10	Pulver / 100 St.	530120
Chlorine Total DPD F10	Pulver / 1000 St.	530123

Verfügbare Standards

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

Probenahme

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

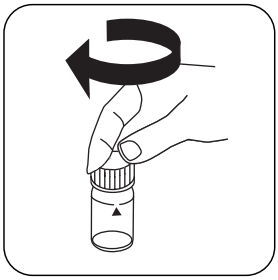
Vorbereitung

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

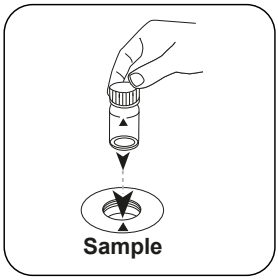
Durchführung der Bestimmung freies Chlor mit Pulverpäckchen

Die Methode im Gerät auswählen.

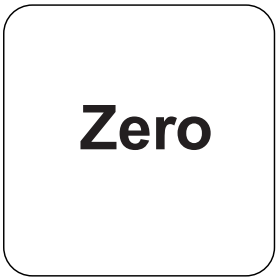
24-mm-Küvette mit **10 mL Probe** füllen.



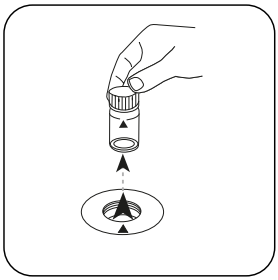
Küvette(n) verschließen.



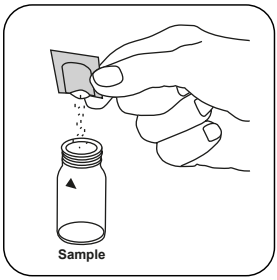
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



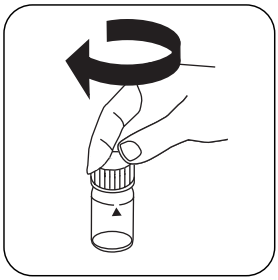
Taste **ZERO** drücken.



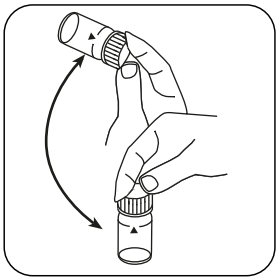
Küvette aus dem Messschacht nehmen.



Ein **Chlorine FREE-DPD/ F10 Pulverpäckchen** zugeben.

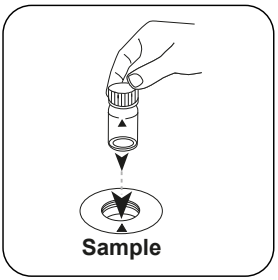


Küvette(n) verschließen.

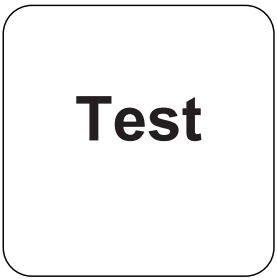


Inhalt durch Umschwenken mischen (20 Sek.).

DE



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



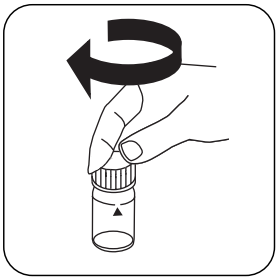
Taste **TEST** (XD: **START**) drücken.

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

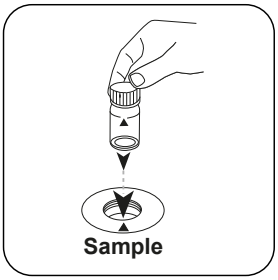
Durchführung der Bestimmung gesamtes Chlor mit Pulverpäckchen

Die Methode im Gerät auswählen.

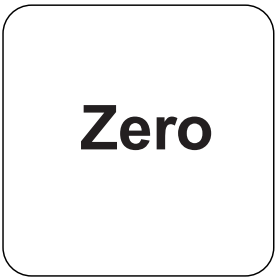
24-mm-Küvette mit **10 mL Probe** füllen.



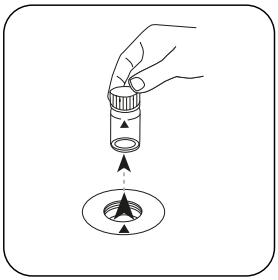
Küvette(n) verschließen.



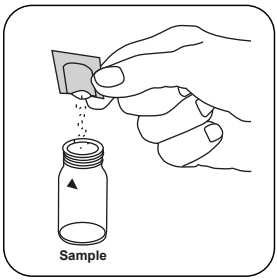
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



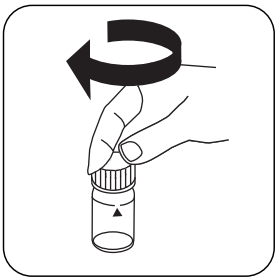
Taste **ZERO** drücken.



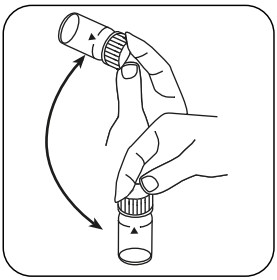
Küvette aus dem Messschacht nehmen.



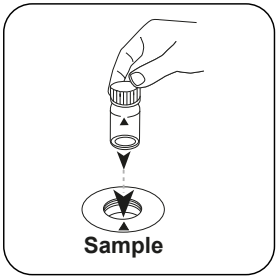
Ein **Chlorine TOTAL-DPD/ F10 Pulverpäckchen** zugeben.



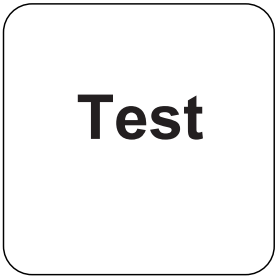
Küvette(n) verschließen.



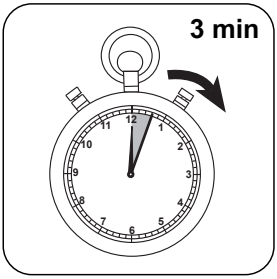
Inhalt durch Umschwenken mischen (20 Sek.).



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



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



3 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

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

Chemische Methode

DPD

Appendix

DE

Störungen

Permanente Störungen

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

Ausschließbare Störungen

- Störungen durch Kupfer und Eisen(III) sind durch EDTA zu beseitigen.
- Konzentrationen über 2 mg/L Chlor, bei Verwendung von Powder Packs, können zu Ergebnissen innerhalb des Messbereichs bis hin zu 0 mg/L führen. In diesem Fall muss die Probe mit chlorfreiem Wasser verdünnt werden. 10 ml der verdünnten Probe werden mit Reagenz versetzt und die Messung wiederholt (Plausibilitätstest).

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

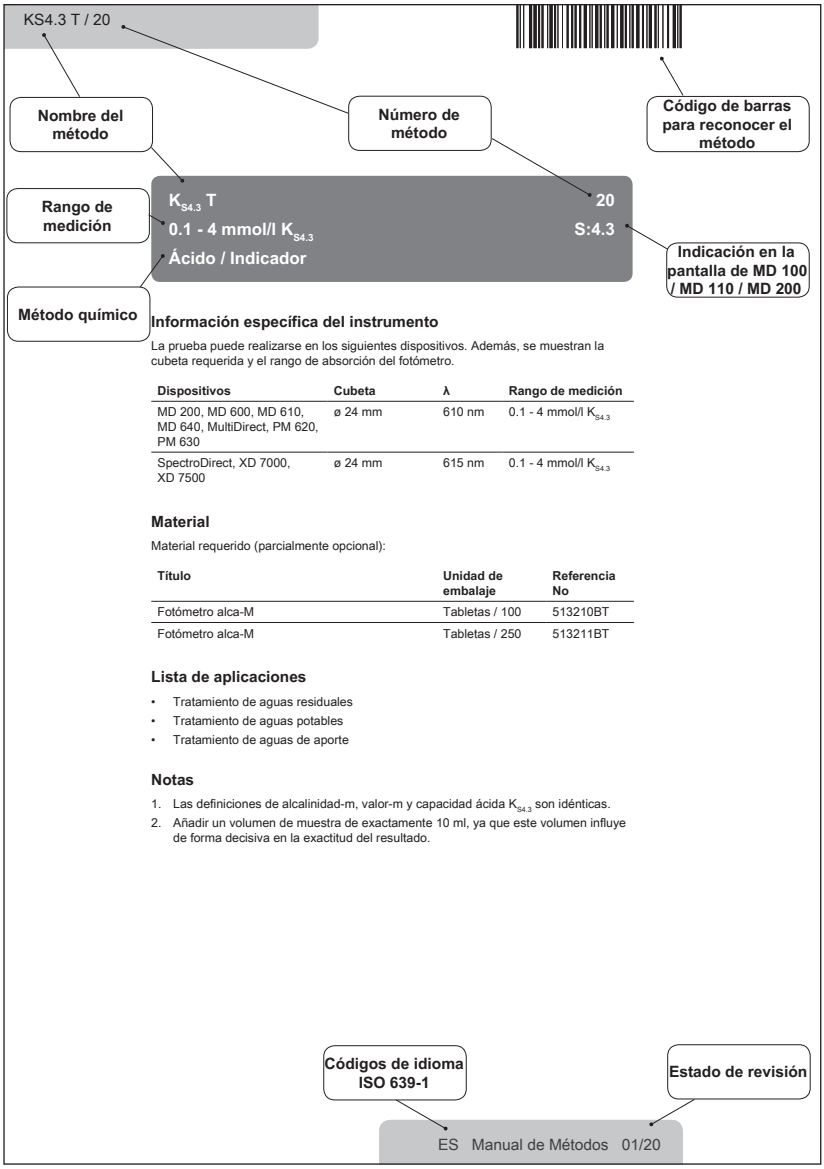
Methodenvalidierung

Nachweisgrenze	0.01 mg/L
Bestimmungsgrenze	0.03 mg/L
Messbereichsende	2 mg/L
Empfindlichkeit	1.68 mg/L / Abs
Vertrauensbereich	0.033 mg/L
Verfahrensstandardabweichung	0.014 mg/L
Verfahrensvariationskoeffizient	1.34 %

Konform

EN ISO 7393-2

[a] Bestimmung von frei, gebunden, gesamt möglich


KS4.3 T / 20
Nombre del método
Número de método
Código de barras para reconocer el método
Rango de medición
$K_{S4.3}$ T
20
0.1 - 4 mmol/l $K_{S4.3}$
S:4.3
Ácido / Indicador
Indicación en la pantalla de MD 100 / MD 110 / MD 200
Método químico
Información específica del instrumento
La prueba puede realizarse en los siguientes dispositivos. Además, se muestran la cubeta requerida y el rango de absorción del fotómetro.
Dispositivos | Cubeta | λ | Rango de medición
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630 | ø 24 mm | 610 nm | 0.1 - 4 mmol/l $K_{S4.3}$
SpectroDirect, XD 7000, XD 7500 | ø 24 mm | 615 nm | 0.1 - 4 mmol/l $K_{S4.3}$
Material
Material requerido (parcialmente opcional):
Título | Unidad de embalaje | Referencia No
Fotómetro alca-M | Tabletas / 100 | 513210BT
Fotómetro alca-M | Tabletas / 250 | 513211BT
Lista de aplicaciones
• Tratamiento de aguas residuales
• Tratamiento de aguas potables
• Tratamiento de aguas de aporte
Notas
1. Las definiciones de alcalinidad-m, valor-m y capacidad ácida $K_{S4.3}$ son idénticas.
2. Añadir un volumen de muestra de exactamente 10 ml, ya que este volumen influye de forma decisiva en la exactitud del resultado.
Códigos de idioma ISO 639-1
Estado de revisión
ES Manual de Métodos 01/20

Realización de la determinación

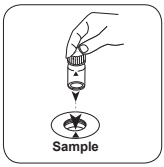
Ejecución de la determinación Capacidad ácida $K_{S4.3}$ con tableta

Seleccionar el método en el aparato.

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

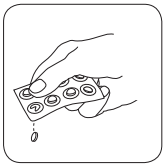
Llenar la cubeta de 24 mm con **10 ml de muestra** .

Cerrar la(s) cubeta(s).

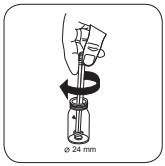


Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

• • •



Añadir **tableta ALKA-M-PHOTOMETER**.



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

Cerrar la(s) cubeta(s).

Cloro PP M110

0.02 - 2 mg/L Cl_2 [a] CL2

DPD

ES

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Cloro libre DPD F10	Polvos / 100 Cantidad	530100
Cloro libre DPD F10	Polvos / 1000 Cantidad	530103
Cloro total DPD F10	Polvos / 100 Cantidad	530120
Cloro total DPD F10	Polvos / 1000 Cantidad	530123

Standards disponibles

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

Muestreo

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

Preparación

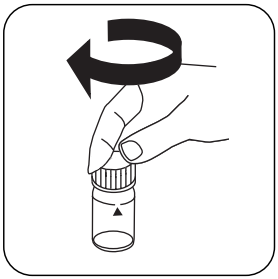
1. Limpieza de las cubetas:
   Muchos productos de limpieza (p. ej., detergentes de lavavajillas) poseen componentes reductores, que pueden reducir los resultados en la determinación del cloro. Para evitar estas alteraciones, los aparatos de vidrio deben estar exentos de componentes corrosivos al cloro.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

ES

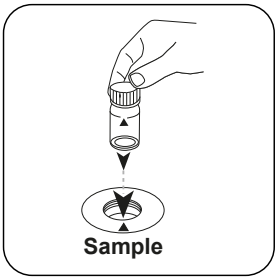
Ejecución de la determinación cloro libre con reactivo Powder Pack

Seleccionar el método en el aparato.

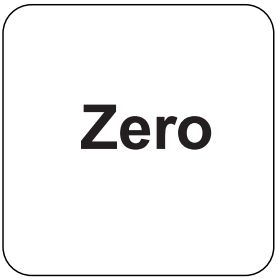
Llenar la cubeta de 24 mm con **10 mL de muestra** .



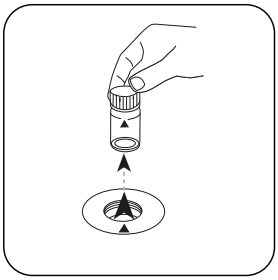
Cerrar la(s) cubeta(s).



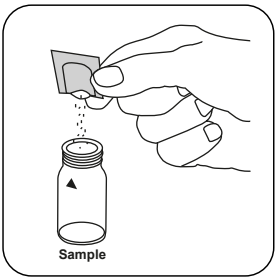
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



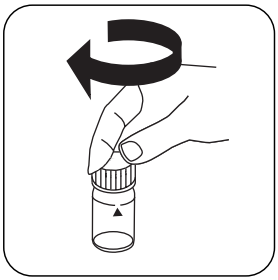
Pulsar la tecla **ZERO**.



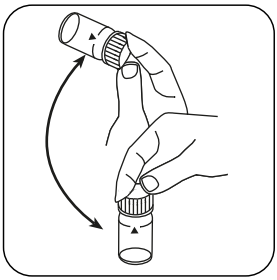
Extraer la cubeta del compartimiento de medición.



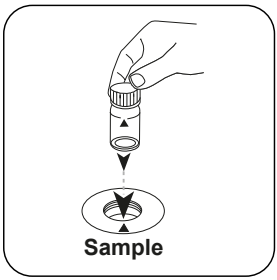
Añadir un **sobre de polvos Chlorine FREE-DPD/ F10** .



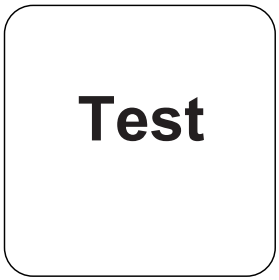
Cerrar la(s) cubeta(s).



Mezclar el contenido girando (20 sec.).



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



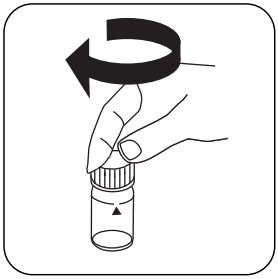
Pulsar la tecla **TEST** (XD: **START**).

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

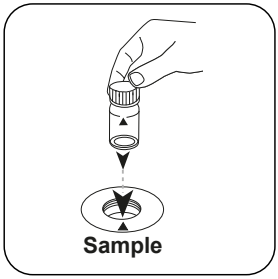
Ejecución de la determinación cloro total con reactivo Powder Pack

Seleccionar el método en el aparato.

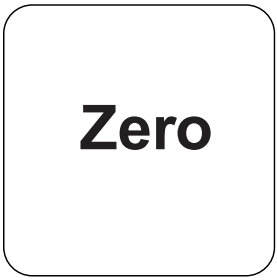
Llenar la cubeta de 24 mm con **10 mL de muestra** .



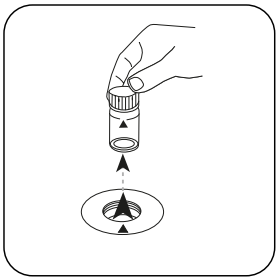
Cerrar la(s) cubeta(s).



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

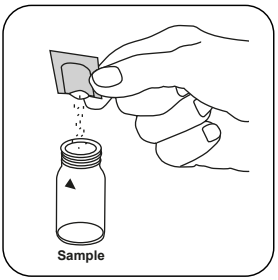


Pulsar la tecla **ZERO**.

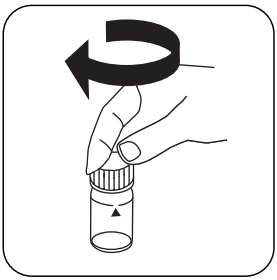


Extraer la cubeta del compartimiento de medición.

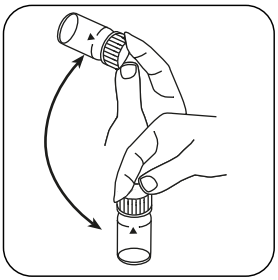
ES



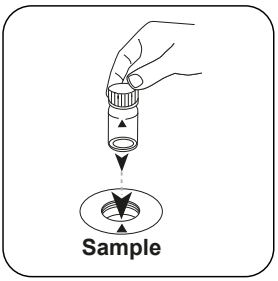
Añadir un **sobre de polvos Chlorine TOTAL-DPD/ F10** .



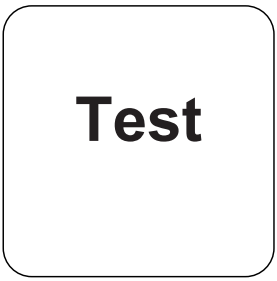
Cerrar la(s) cubeta(s).



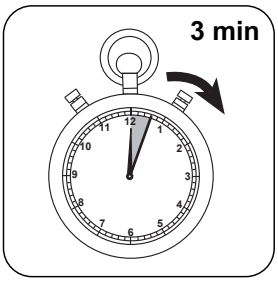
Mezclar el contenido girando (20 sec.).



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



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



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

Finalizado el periodo de reacción se realizará la determinación automáticamente.

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

Método químico

DPD

Apéndice

ES

Interferencia

Interferencias persistentes

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

Interferencias extraibles

- Las perturbaciones debido a cobre y hierro (III) deben suprimirse mediante EDTA.
- Las concentraciones de cloro mayores a 2 mg/L, cuando se usan sobres de polvos pueden conducir a resultados de dentro del campo de medición hasta 0 mg/L. En este caso, se deberá diluir la muestra con agua sin cloro. Se mezclan 10 ml de muestra diluida con reactivo y se repite la medición (prueba de plausibilidad).

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

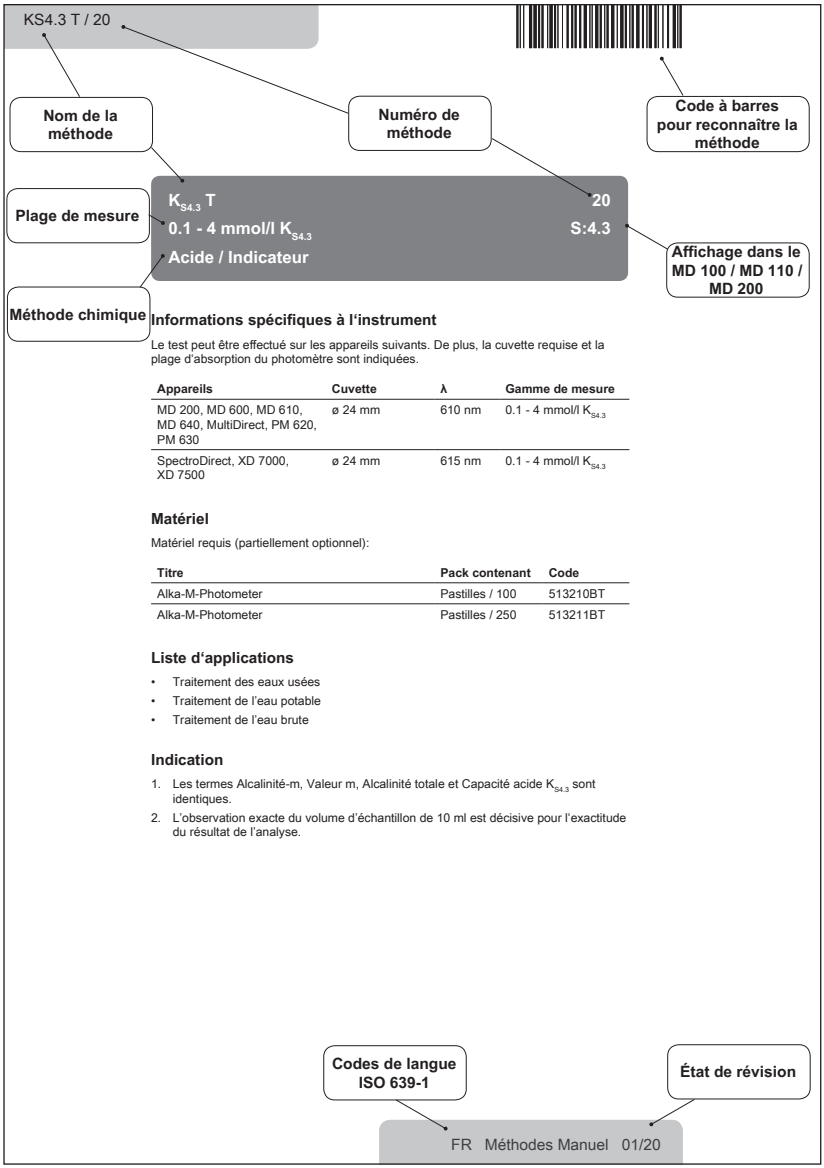
Validación del método

Límite de detección	0.01 mg/L
Límite de determinación	0.03 mg/L
Límite del rango de medición	2 mg/L
Sensibilidad	1.68 mg/L / Abs
Intervalo de confianza	0.033 mg/L
Desviación estándar	0.014 mg/L
Coeficiente de variación	1.34 %

Conforme a

EN ISO 7393-2

[a] Posible determinación de libre, combinado, total



Informations spécifiques à l'instrument

Le test peut être effectué sur les appareils suivants. De plus, la cuvette requise et la plage d'absorption du photomètre sont indiquées.

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

Matériel

Matériel requis (partiellement optionnel):

Titre	Pack contenant	Code
Alka-M-Photometer	Pastilles / 100	513210BT
Alka-M-Photometer	Pastilles / 250	513211BT

Liste d'applications

- Traitement des eaux usées
- Traitement de l'eau potable
- Traitement de l'eau brute

Indication

1. Les termes Alcalinité-m, Valeur m, Alcalinité totale et Capacité acide $K_{S4.3}$ sont identiques.
2. L'observation exacte du volume d'échantillon de 10 ml est décisive pour l'exactitude du résultat de l'analyse.

Procédure du test

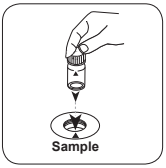
Réalisation de la quantification Capacité acide $K_{S4.3}$ avec pastille

Sélectionnez la méthode sur l'appareil.

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

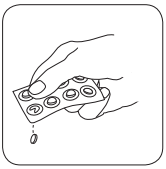
Remplissez une cuvette de 24 mm de **10 ml d'échantillon**.

Fermez la(les) cuvette(s).

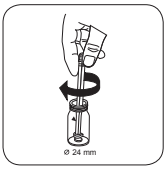


Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.

• • •



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



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

Fermez la(les) cuvette(s).

Chlore PP M110

0.02 - 2 mg/L Cl_2 [a] CL2

DPD

FR

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
Chlore libre DPD F10	Poudre / 100 Pièces	530100
Chlore libre DPD F10	Poudre / 1000 Pièces	530103
Chlore total DPD F10	Poudre / 100 Pièces	530120
Chlore total DPD F10	Poudre / 1000 Pièces	530123

Standards disponibles

Titre	Pack contenant	Code
ValidCheck Chlore 1,5 mg/l	1 Pièces	48105510

Échantillonnage

1. Lors de la préparation de l'échantillon, il faudra éviter le dégazage du chrome, par ex. par pipetage ou agitation.
2. L'analyse devra avoir lieu immédiatement après le prélèvement de l'échantillon.

Préparation

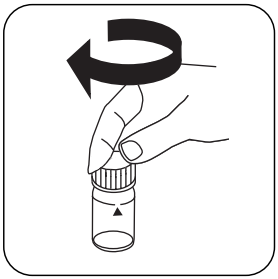
1. Nettoyage des cuvettes :
   Beaucoup de produits de nettoyage domestiques (par ex. liquide vaisselle) contenant des agents réducteurs, il est possible que lors de la quantification du chlore, les résultats soient plus bas. Pour exclure ces erreurs, les instruments en verre utilisés devraient être insensibles aux effets du chlore. Pour ce faire, il convient de laisser les instruments en verre pendant une heure dans une solution d'hypochlorite de sodium (0,1 g/L) et de bien les rincer ensuite à l'eau déminéralisée (eau entièrement dessalée).
2. Pour la quantification individuelle du chlore libre et du chlore total, il est recommandé d'utiliser à chaque fois un nouveau lot de cuvettes (voir EN ISO 7393-2, § 5.3).
3. La coloration due au DPD a lieu à un pH compris entre 6,2 et 6,5. C'est pourquoi, les réactifs contiennent un tampon pour l'ajustage du pH. Avant l'analyse, les eaux fortement alcalines ou acides devraient être cependant ajustées sur un pH compris entre 6 et 7 (avec 0,5 mol/l d'acide sulfurique ou 1 mol/l de soude caustique).

Réalisation de la quantification Chlore libre avec réactifs en sachet de poudre (PP)

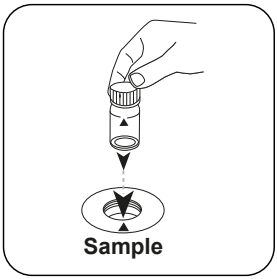
Sélectionnez la méthode sur l'appareil.

FR

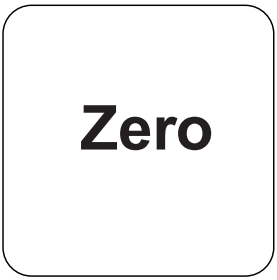
Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



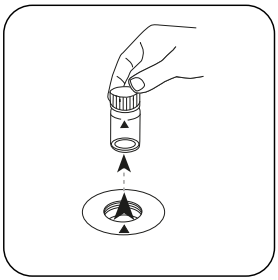
Fermez la(les) cuvette(s).



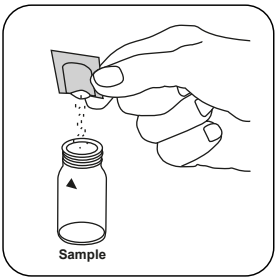
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



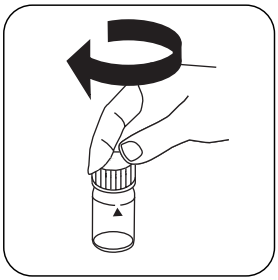
Appuyez sur la touche **ZERO**.



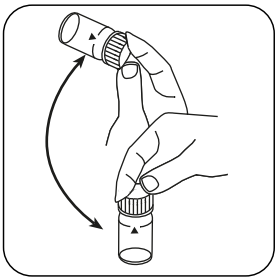
Retirez la cuvette de la chambre de mesure.



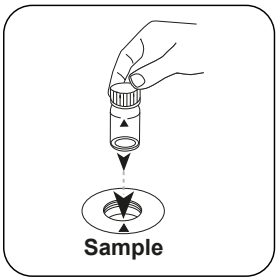
Ajoutez un **sachet de poudre Chlorine FREE-DPD/ F10**.



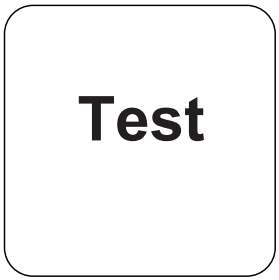
Fermez la(les) cuvette(s).



Retourner plusieurs fois pour mélanger le contenu (20 sec.) .



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



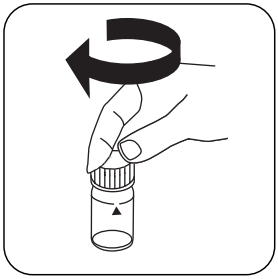
Appuyez sur la touche **TEST** (XD: **START**).

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

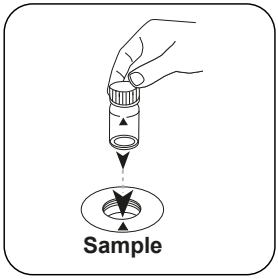
Réalisation de la quantification Chlore total avec réactifs en sachet de poudre (PP)

Sélectionnez la méthode sur l'appareil.

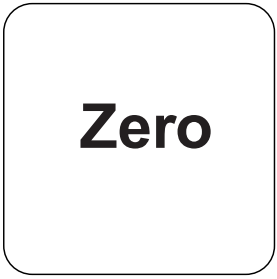
Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



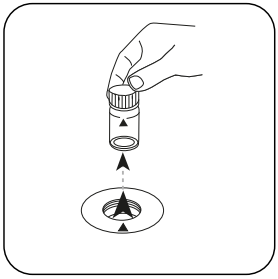
Fermez la(les) cuvette(s).



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

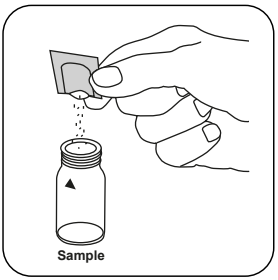


Appuyez sur la touche **ZERO**.

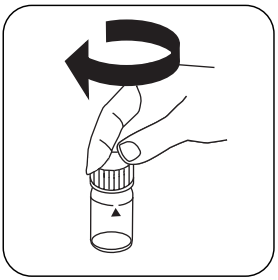


Retirez la cuvette de la chambre de mesure.

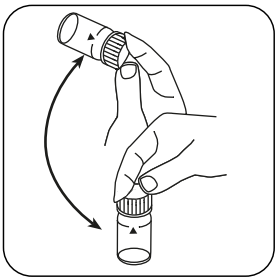
FR



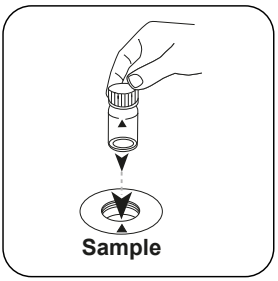
Ajoutez un **sachet de poudre Chlorine TOTAL-DPD/ F10**.



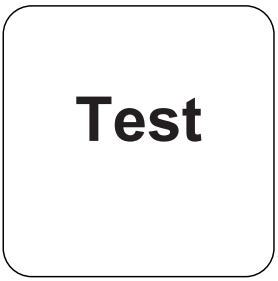
Fermez la(les) cuvette(s).



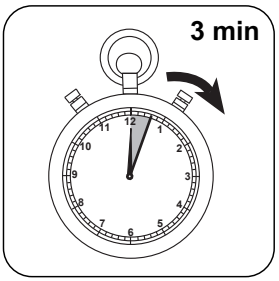
Retourner plusieurs fois pour mélanger le contenu (20 sec.) .



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 3 minute(s)** .

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

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

Méthode chimique

DPD

Appendice

FR

Interférences

Interférences persistantes

- Les agents oxydants contenus dans les échantillons réagissent tous comme le chlore, ce qui entraîne des résultats plus élevés.

Interférences exclues

- Les perturbations causées par le cuivre et le fer (III) seront éliminées par EDTA.
- Les concentrations de chlore supérieures à 2 mg/L peuvent provoquer des résultats dans la plage de mesure allant jusqu'à 0 mg/L en utilisant des sachets de poudre. Dans ce cas, diluez l'échantillon à l'eau déchlorée. Le réactif est ajouté à 10 ml d'échantillon dilué. Ensuite, la mesure est répétée (test de plausibilité).

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

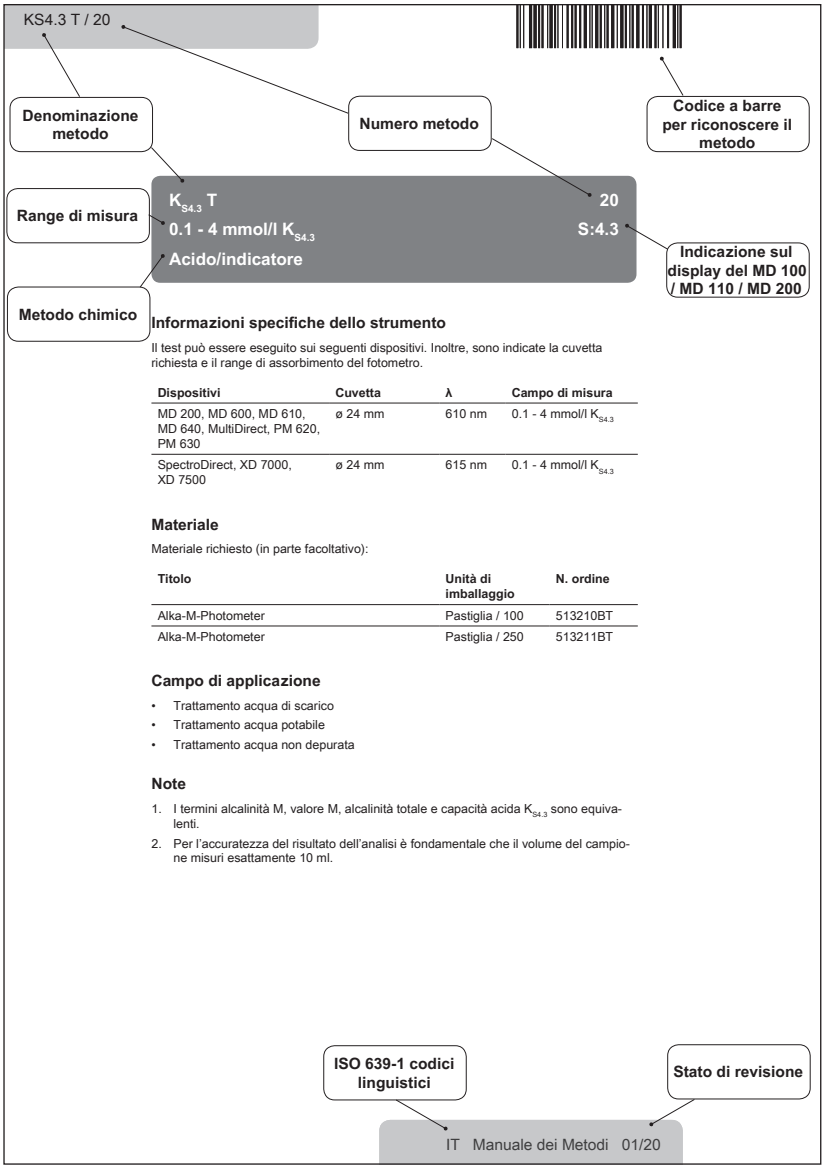
Méthode Validation

Limite de détection	0.01 mg/L
Limite de détermination	0.03 mg/L
Fin de la gamme de mesure	2 mg/L
Sensibilité	1.68 mg/L / Abs
Intervalle de confiance	0.033 mg/L
Déviation standard	0.014 mg/L
Coefficient de variation	1.34 %

Conformité

EN ISO 7393-2

[a)]Détermination du libre, combiné et total



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.

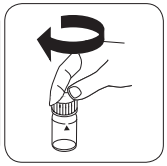
Svolgimento della misurazione

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

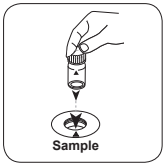
Selezionare il metodo nel dispositivo.

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**.



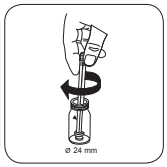
Chiudere la/e cuvetta/e.



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.

Cloro PP M110

0.02 - 2 mg/L Cl_2 [a] CL2

DPD

IT

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
Cloro libero DPD F10	Polvere / 100 pz.	530100
Cloro libero DPD F10	Polvere / 1000 pz.	530103
Cloro totale DPD F10	Polvere / 100 pz.	530120
Cloro totale DPD F10	Polvere / 1000 pz.	530123

Standards disponibles

Titolo	Unità di imballaggio	N. ordine
ValidCheck Cloro 1,5 mg/l	1 pz.	48105510

Prelievo del campione

1. Nella preparazione del campione occorre evitare la degassificazione del cloro, ad es. utilizzando pipette e agitando.
2. L'analisi deve essere eseguita subito dopo il prelievo del campione.

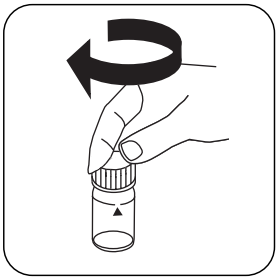
Preparazione

1. Pulizia delle cuvette:
   Poiché molti detergenti ad uso domestico (ad es. detersivo per piatti) contengono sostanze riducenti, nella rilevazione del cloro si potrebbero ottenere risultati troppo bassi. Per escludere tali errori di misura è necessario che i dispositivi in vetro siano esenti dal consumo di cloro. I dispositivi in vetro inoltre vengono conservati in una soluzione di ipoclorito di sodio (0,1 g/L) per un'ora e successivamente vengono risciacquati abbondantemente con acqua demineralizzata.
2. Per la singola rilevazione del cloro libero e del cloro totale è opportuno utilizzare un apposito kit di cuvette per ciascuna procedura (vedere EN ISO 7393-2, par. 5.3).
3. Lo sviluppo della colorazione del DPD avviene con un valore di pH compreso tra 6,2 e 6,5. I reagenti contengono pertanto un tampone per la regolazione del valore di pH. Le acque fortemente alcaline o acide tuttavia devono essere portate prima dell'analisi entro un range di pH compreso tra 6 e 7 (con 0,5 mol/l di acido solforico o 1 mol/l di liscivia).

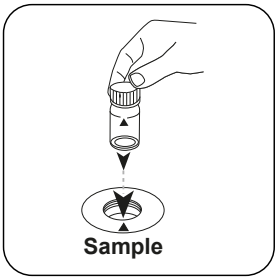
Esecuzione della rilevazione cloro libero con confezioni in polvere

Selezionare il metodo nel dispositivo.

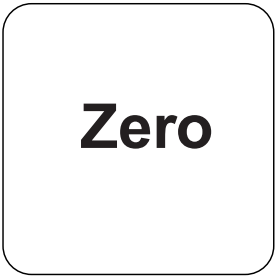
Riempire una cuvetta da 24 mm con **10 mL di campione**.



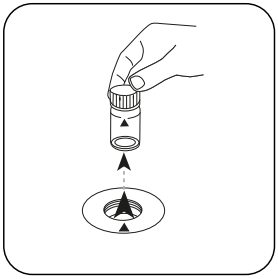
Chiudere la/e cuvetta/e.



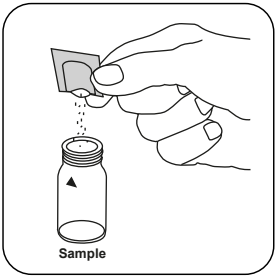
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



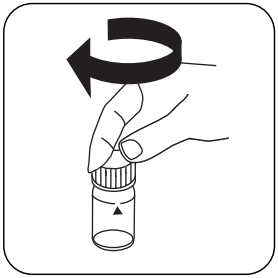
Premere il tasto **ZERO**.



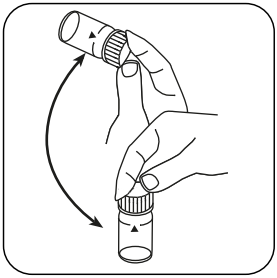
Prelevare la cuvetta dal vano di misurazione.



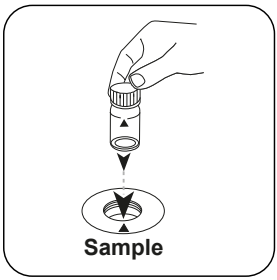
Aggiungere **una bustina di polvere Chlorine FREE-DPD/ F10**.



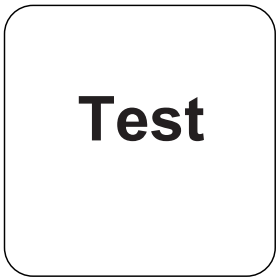
Chiudere la/e cuvetta/e.



Miscelare il contenuto capovolgendo (20 sec.).



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



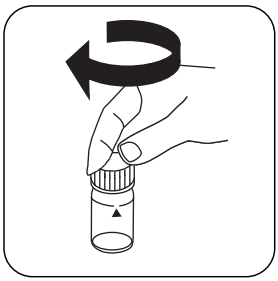
Premere il tasto **TEST** (XD: **START**).

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

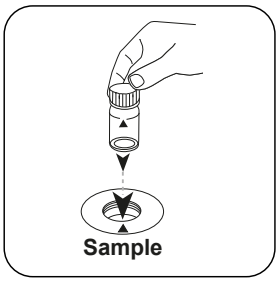
Esecuzione della rilevazione cloro totale con confezioni in polvere

Selezionare il metodo nel dispositivo.

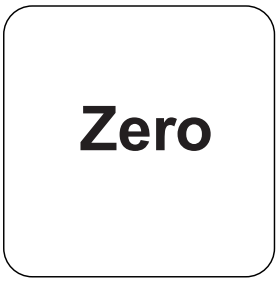
Riempire una cuvetta da 24 mm con **10 mL di campione**.



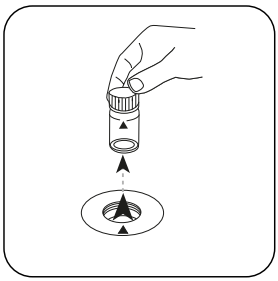
Chiudere la/e cuvetta/e.



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

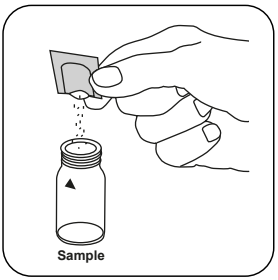


Premere il tasto **ZERO**.

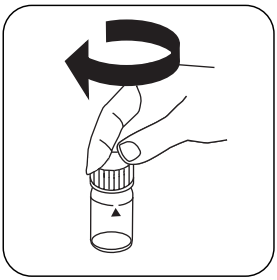


Prelevare la cuvetta dal vano di misurazione.

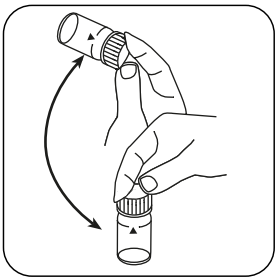
IT



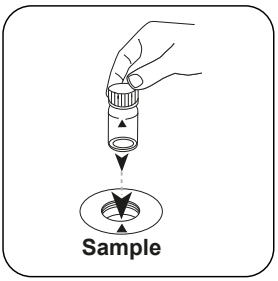
Aggiungere **una bustina di polvere Chlorine TOTAL-DPD/ F10**.



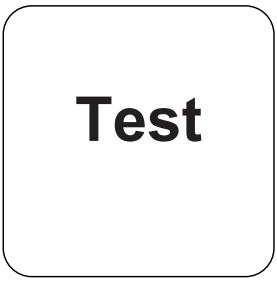
Chiudere la/e cuvetta/e.



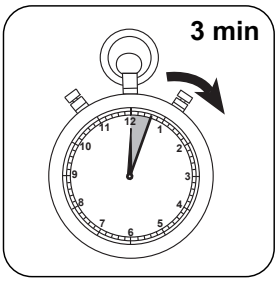
Miscelare il contenuto capovolgendo (20 sec.).



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 3 minuto/i** .

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

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

Metodo chimico

DPD

Appendice

IT

Interferenze

Interferenze permanenti

- Tutti gli ossidanti presenti nei campioni reagiscono come il cloro dando risultati troppo elevati.

Interferenze escludibili

- Le interferenze da parte di rame e ferro(III) devono essere eliminate con EDTA.
- Se si utilizzano Powder Packs, le concentrazioni di cloro maggiori di 2 mg/L possono dare risultati entro il range di misura fino a 0 mg/L. In questo caso il campione deve essere diluito con acqua priva di cloro. 10 ml del campione diluito vengono addizionati con il reagente e la misurazione viene ripetuta (test di plausibilità).

Interferenze	da / [mg/L]
CrO_4^{2-}	0,01
MnO_2	0,01

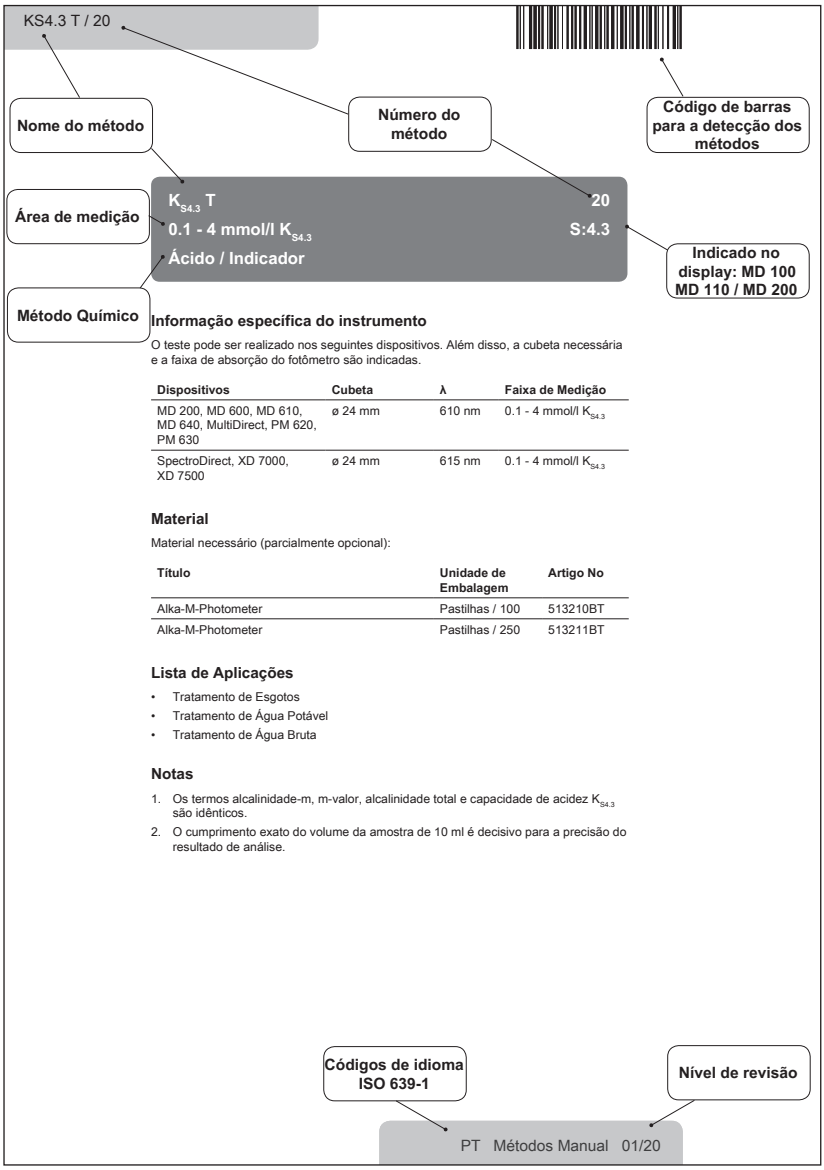
Validazione metodo

Limite di rilevabilità	0.01 mg/L
Limite di quantificazione	0.03 mg/L
Estremità campo di misura	2 mg/L
Sensibilità	1.68 mg/L / Abs
Intervallo di confidenza	0.033 mg/L
Deviazione standard della procedura	0.014 mg/L
Coefficiente di variazione della procedura	1.34 %

Conforme

EN ISO 7393-2

[a)]Determinazione di libero, vincolato, totale possibile


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

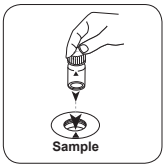
Realização da determinação Capacidade de acidez $K_{S4.3}$ com pastilha

Escolher o método no equipamento.

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

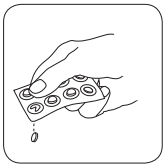
Encher a célula de 24 mm com **10 ml de amostra** .

Fechar a(s) célula(s).

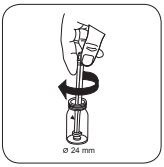


Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

• • •



Pastilha ALKA-M-PHOTOMETER.



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

Fechar a(s) célula(s).

Cloro PP M110

0.02 - 2 mg/L Cl_2 [a] CL2

DPD

PT

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
Sem cloro DPD F10	Pó / 100 pc.	530100
Sem cloro DPD F10	Pó / 1000 pc.	530103
Cloro Total DPD F10	Pó / 100 pc.	530120
Cloro Total DPD F10	Pó / 1000 pc.	530123

Padrões disponíveis

Título	Unidade de Embalagem	Código do Produto
ValidCheck Cloro 1,5 mg/l	1 pc.	48105510

Amostragem

1. Na preparação da amostra é preciso evitar a libertação de gases de cloro, p. ex. através da pipetagem e agitação.
2. A análise tem de ser efetuada logo após a recolha da amostra.

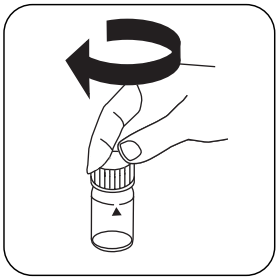
Preparação

1. Limpeza das células:
   Uma vez que muitos produtos de limpeza domésticos (p. ex. lava-louça) contêm substâncias redutoras, na determinação de cloro pode haver demasiadas reduções. Para excluir este erro de medição, os equipamentos de vidro não deviam ter a capacidade de absorção de cloro. Para esse efeito, os equipamentos de vidro são guardados por uma hora sob solução de hipoclorito de sódio (0,1 g/L) e depois devem ser bem enxaguados com água desmineralizada.
2. Para a determinação individual de cloro livre e cloro total é conveniente usar respetivamente um conjunto próprio de células (ver EN ISO 7393-2, alínea 5.3).
3. A formação de cores DPD ocorre com um valor pH entre 6,2 e 6,5. Os reagentes contêm, por isso, um tampão para ajustar o valor pH. As águas fortemente alcalinas ou ácidas devem, porém, antes da análise, ser ajustadas para um valor pH entre 6 e 7 (com 0,5 mol/l de ácido sulfúrico ou 1 mol/l soda cáustica).

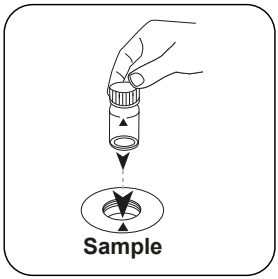
Realização da determinação Cloro livre com pacotes de pó

Escolher o método no equipamento.

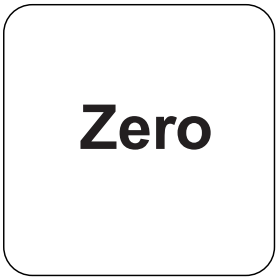
Encher a célula de 24 mm com **10 mL de amostra** .



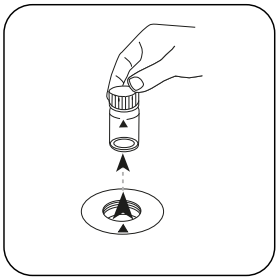
Fechar a(s) célula(s).



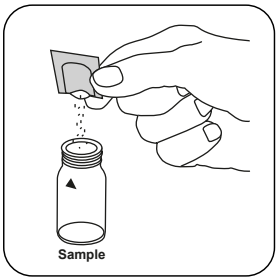
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



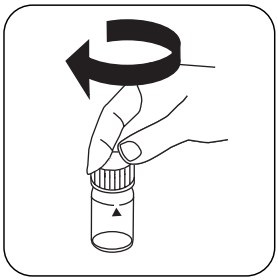
Premir a tecla **ZERO**.



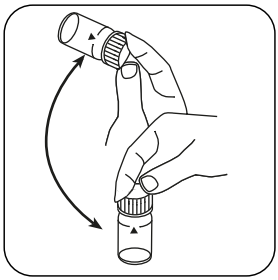
Retirar a célula do compartimento de medição.



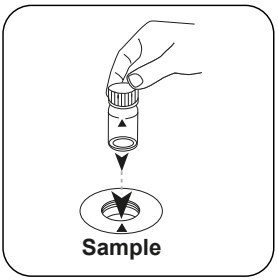
Adicionar um **pacote de pó Chlorine FREE-DPD/ F10** .



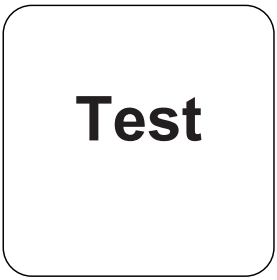
Fechar a(s) célula(s).



Misturar o conteúdo girando (20 sec.).



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



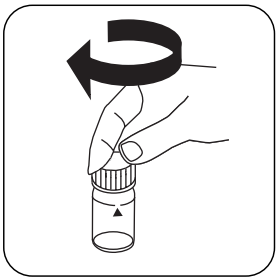
Premir a tecla **TEST** (XD: **START**).

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

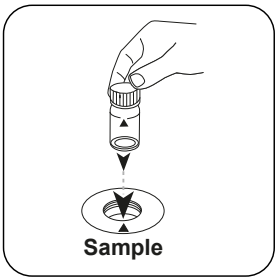
Realização da determinação Cloro total com pacotes de pó

Escolher o método no equipamento.

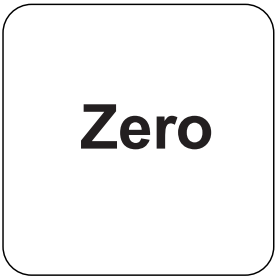
Encher a célula de 24 mm com **10 mL de amostra** .



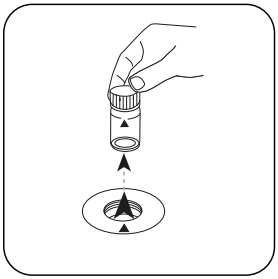
Fechar a(s) célula(s).



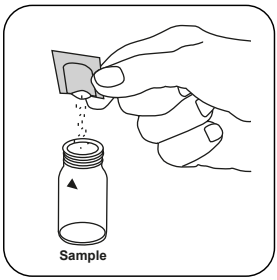
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



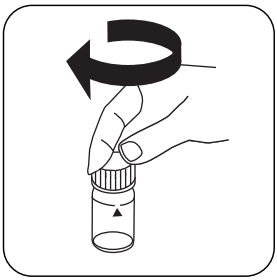
Premir a tecla **ZERO**.



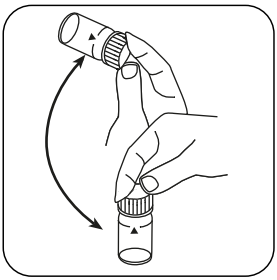
Retirar a célula do compartimento de medição.



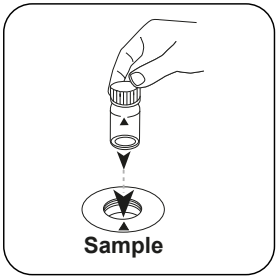
Adicionar um **pacote de pó Chlorine TOTAL-DPD/ F10** .



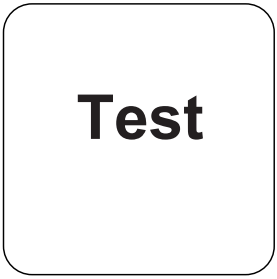
Fechar a(s) célula(s).



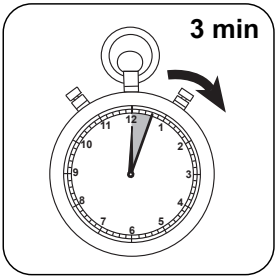
Misturar o conteúdo girando (20 sec.).



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



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



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

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

No visor aparece o resultado em mg/L Cloro total.

Método Químico

DPD

Apêndice

PT

Texto de Interferências

Interferências Pesistentes

- Todos os oxidantes presentes nas amostras reagem como o cloro, o que leva a resultados demasiado altos.

Interferências Removíveis

- As interferências por cobre e ferro(III) devem ser eliminadas por EDTA.
- Concentrações de cloro superiores a 2 mg/L, se forem usados pacotes de pó, podem causar resultados dentro da área de medição até 0 mg/L. Neste caso, deve diluir a amostra com água sem cloro. 10 ml da amostra diluída é colocada em reagente e a medição é repetida (teste de plausibilidade).

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

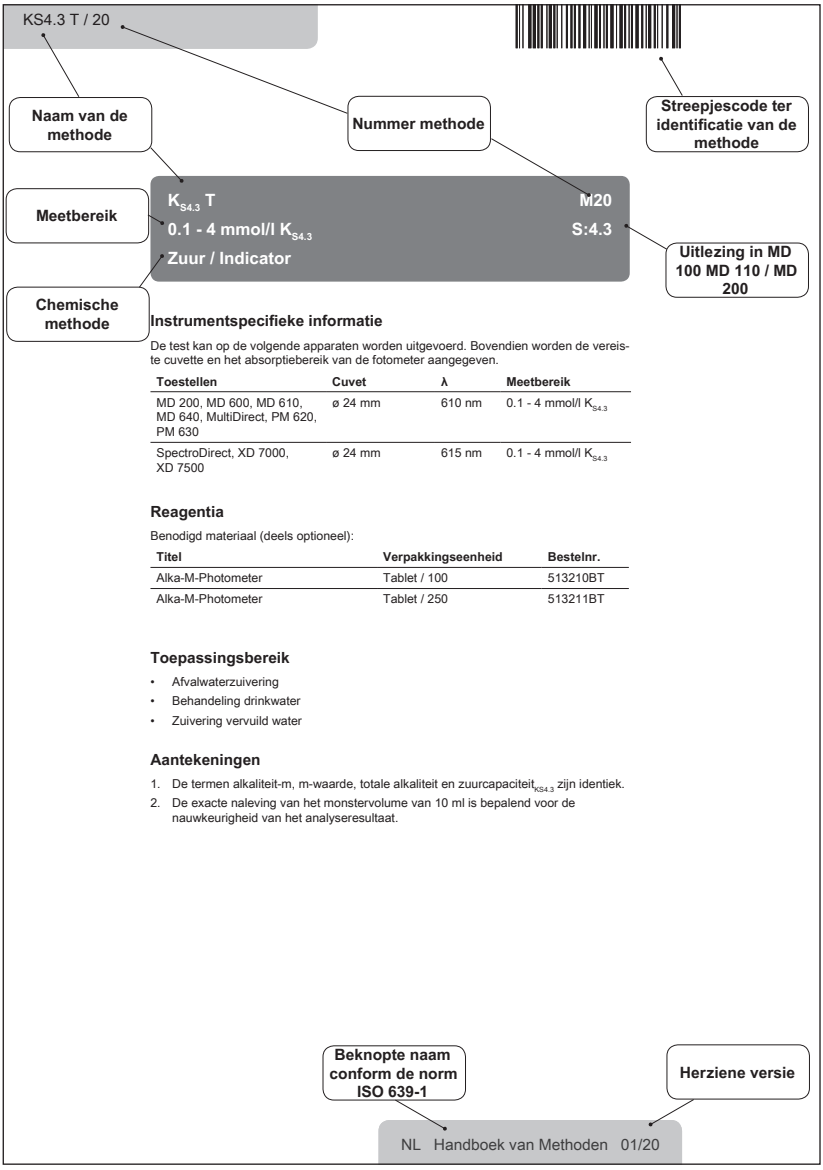
Validação de método

Limite de Detecção	0.01 mg/L
Limite de Determinação	0.03 mg/L
Fim da Faixa de Medição	2 mg/L
Sensibilidade	1.68 mg/L / Abs
Faixa de Confiança	0.033 mg/L
Desvio Padrão	0.014 mg/L
Coeficiente de Variação	1.34 %

Conformidade

EN ISO 7393-2

[a)]Determinação do possível livre, vinculado, total



Instrumentspecifieke informatie

De test kan op de volgende apparaten worden uitgevoerd. Bovendien worden de vereiste cuvette en het absorptiebereik van de fotometer aangegeven.

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

Reagentia

Benodigd materiaal (deels optioneel):

Titel	Verpakkingseenheid	Bestelnr.
Alka-M-Photometer	Tablet / 100	513210BT
Alka-M-Photometer	Tablet / 250	513211BT

Toepassingsbereik

- Afvalwaterzuivering
- Behandeling drinkwater
- Zuivering vervuild water

Aantekeningen

1. De termen alkaliteit-m, m-waarde, totale alkaliteit en zuurcapaciteit$_{KS4.3}$ zijn identiek.
2. De exacte naleving van het monstervolume van 10 ml is bepalend voor de nauwkeurigheid van het analyseresultaat.

Uitvoering van de meting

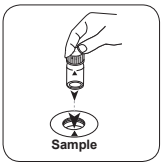
Uitvoering van de bepaling Zuurcapaciteit $K_{S4.3}$ met tablet

De methode in het apparaat selecteren.

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

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

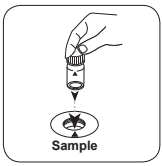
De spoelbakjes afsluiten.



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

• • •

Tabletten oplossen door om te draaien



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

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

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

Chloor PP M110

0.02 - 2 mg/L Cl_2 [a] CL2

DPD

NL

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
Chloor vrij DPD F10	Poeder / 100 St.	530100
Chloor vrij DPD F10	Poeder / 1000 St.	530103
Chloor totaal DPD F10	Poeder / 100 St.	530120
Chloor totaal DPD F10	Poeder / 1000 St.	530123

Beschikbare standaarden

Omschrijving	Verpakkingseenheid	Bestelnr.
ValidCheck Chloor 1,5 mg/l	1 St.	48105510

Bemonstering

1. Tijdens de monstervoorbereiding moet worden vermeden dat het chloor wordt uitgestoten, bijvoorbeeld door pipetteren en schudden.
2. De analyse moet onmiddellijk na de bemonstering worden uitgevoerd.

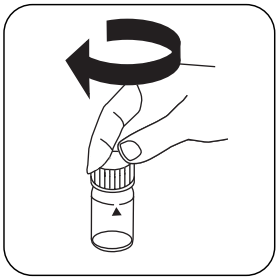
Voorbereiding

1. Het schoonmaken van de spoelbakjes:
   Aangezien veel huishoudelijke reinigingsmiddelen (bijv. afwasmiddelen) minder schadelijke stoffen bevatten, kan de bepaling van chloor leiden tot minder goede resultaten. Om deze meetfout uit te sluiten, moeten de glasapparaten chloorvrij zijn. Hiertoe wordt het glaswerk gedurende één uur onder natriumhypochlorietoplossing (0,1 g/L) bewaard en vervolgens grondig gespoeld met gedeïoniseerd water.
2. Voor de individuele bepaling van vrij chloor en totaal chloor is het zinvol om een aparte set spoelbakjes te gebruiken (zie EN ISO 7393-2, paragraaf 5.3).
3. De DPD-kleurontwikkeling vindt plaats bij een pH-waarde van 6,2 tot 6,5. De reagentia bevatten daarom een buffer voor de aanpassing van de pH-waarde. Sterk alkalisch of zuur water moet echter vóór de analyse in een pH-gebied tussen 6 en 7 (met 0,5 mol/l-zwavelzuur of 1 mol/l-natriumhydroxideoplossing) worden geplaatst.

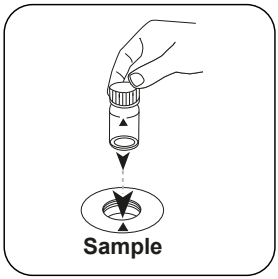
Uitvoering van de bepaling vrij chloor met poederpakjes

De methode in het apparaat selecteren.

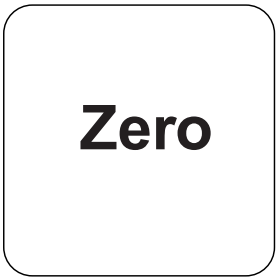
Spoelbakje van 24 mm met **10 mL staal** vullen.



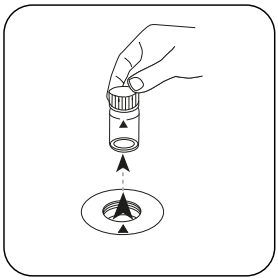
De spoelbakjes afsluiten.



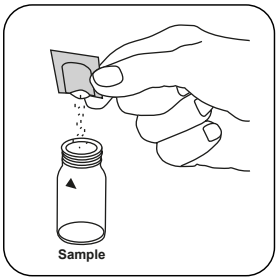
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



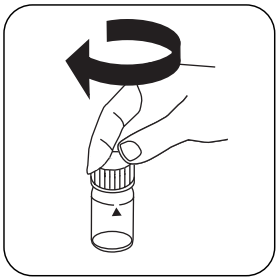
De toets **NUL** indrukken.



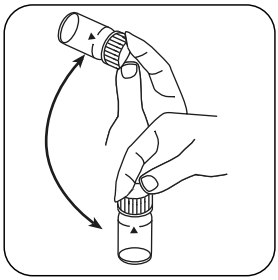
Het spoelbakje uit de meetschacht nemen.



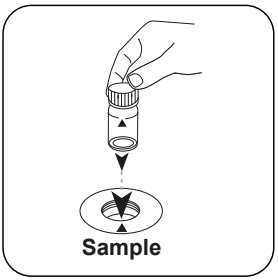
Een **Chloor FREE-DPD/ F10 poederpakje** toevoegen.



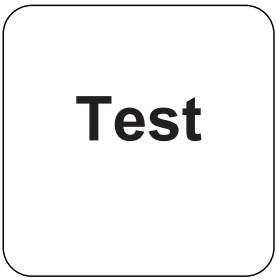
De spoelbakjes afsluiten.



De inhoud mengen door om te draaien (20 sec.).



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



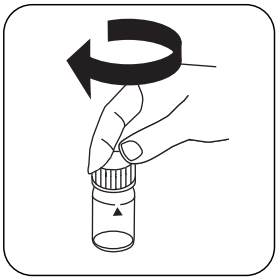
De toets **TEST** (XD: **START**) indrukken.

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

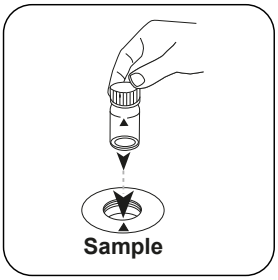
Uitvoering van de bepaling totaal chloor met poederpakjes

De methode in het apparaat selecteren.

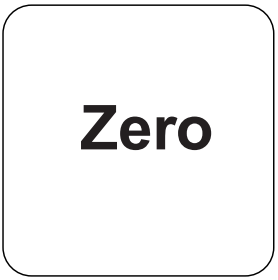
Spoelbakje van 24 mm met **10 mL staal** vullen.



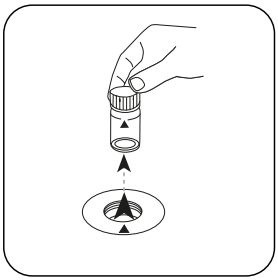
De spoelbakjes afsluiten.



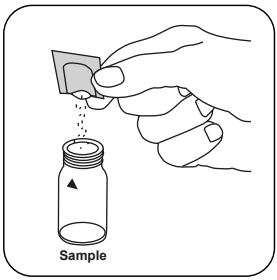
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



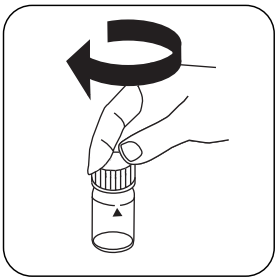
De toets **NUL** indrukken.



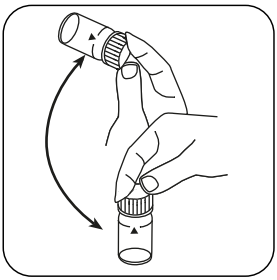
Het spoelbakje uit de meetschacht nemen.



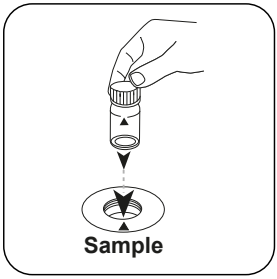
Een **Chloor TOTAL-DPD/ F10 poederpakje** toevoegen.



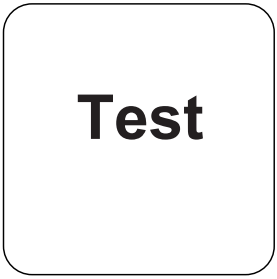
De spoelbakjes afsluiten.



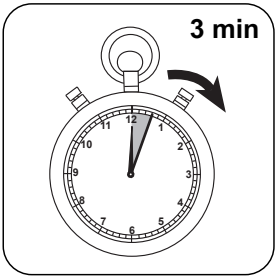
De inhoud mengen door om te draaien (20 sec.).



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



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



De reactietijd van 3 minuten afwachten.

Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

De display toont het resultaat in mg/L Totaal chloor.

Chemische methode

DPD

Aanhangsel

NL

Verstoringen

Permanente verstoringen

- Alle oxidatiemiddelen in de monsters reageren als chloor, wat tot extra resultaten leidt.

Uit te sluiten verstoringen

- Storingen veroorzaakt door koper en ijzer(III) worden door EDTA geëlimineerd.
- Concentraties van meer dan 2 mg/L chloor, bij gebruik van Powder Packs, kunnen leiden tot resultaten binnen het meetbereik tot 0 mg/L. In dit geval moet het monster worden verdund met chloorvrij water. Voeg reagens toe aan 10 ml van het verdunde monster en herhaal de meting (plausibiliteitstest).

Verstoringen	verstoort vanaf
CrO_4^{2-}	0,01
MnO_2	0,01

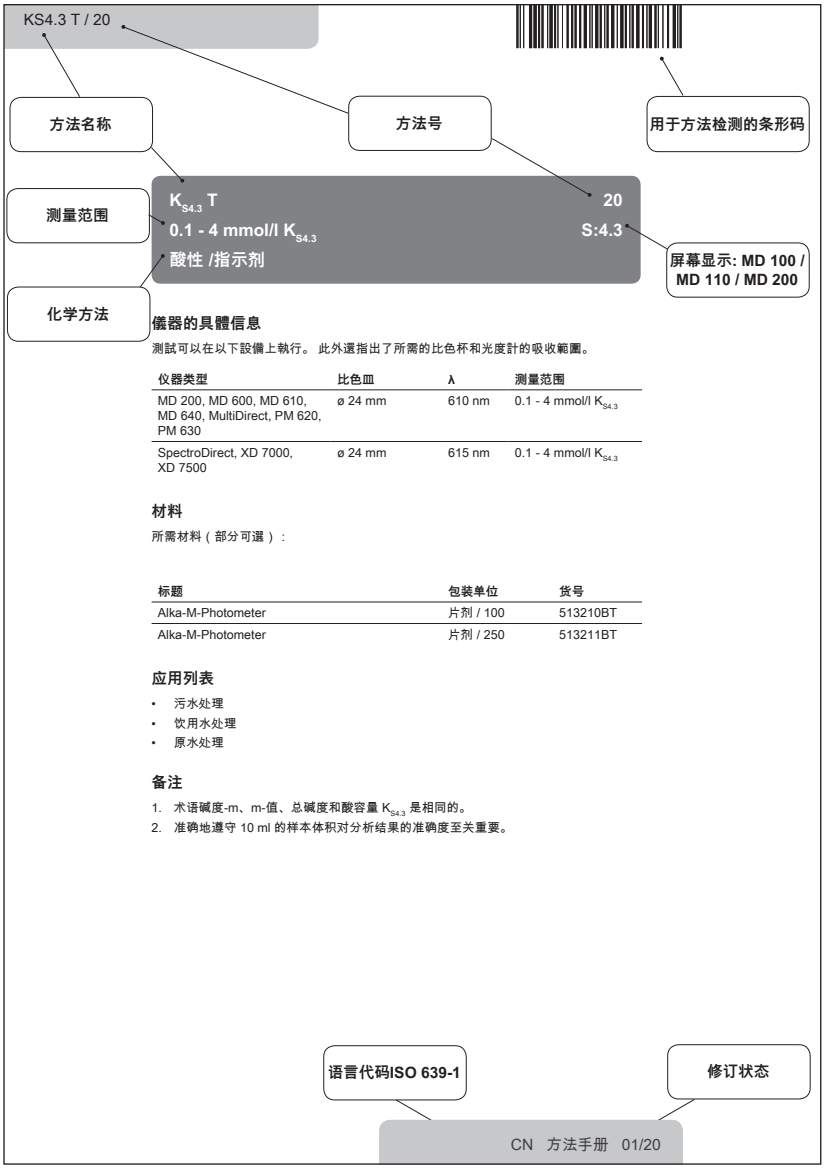
Validatie van de methodes

Aantoonbaarheidsgrens	0.01 mg/L
Bepaalbaarheidsgrens	0.03 mg/L
Einde meetbereik	2 mg/L
Gevoeligheid	1.68 mg/L / Abs
Betrouwbaarheidsgrenzen	0.033 mg/L
Standaardafwijking procedure	0.014 mg/L
Variatiecoefficient procedure	1.34 %

Conform

EN ISO 7393-2

[a] bepaling van de vrije, gebonden, totaal mogelijke



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。

KS4.3 T / 20

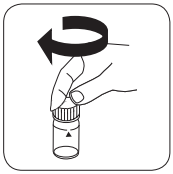
开始测量

进行测定 $K_{S4.3}$ 片剂酸容量

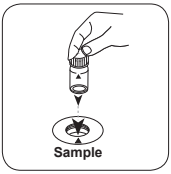
选择设备中的方法。

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

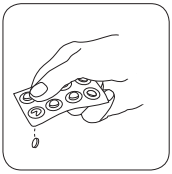
用 **10 ml** 样本填充 24 mm 比色杯。



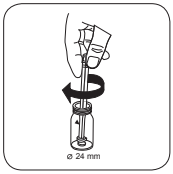
密封比色杯。



将样本比色杯放入测量轴中。注意定位。



加入 **ALKA-M-PHOTOMETER** 片剂。



用轻微的扭转压碎片剂。

密封比色杯。

CN 方法手册 01/20

PP 氯 M110

0.02 - 2 mg/L Cl_2 [a] CL2

DPD

材料
所需材料（部分可選）：

ZH

试剂	包装单位	货号
游离氯 DPD F10	粉剂 / 100 片	530100
游离氯 DPD F10	粉剂 / 1000 片	530103
氯总量 DPD F10	粉剂 / 100 片	530120
氯总量 DPD F10	粉剂 / 1000 片	530123

現有標準

标题	包装单位	货号
ValidCheck 氯 1.5 mg/l	1 片	48105510

取样

1. 在样本制备中，通过移液和摇动来避免氯的排气。
2. 取样后必须立即进行分析。

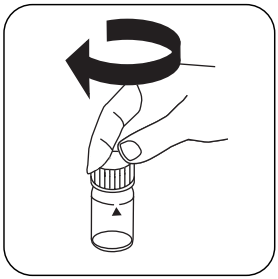
准备

1. 清洗比色杯：
   由于许多家用清洁剂（例如洗碗用洗涤剂）含有还原剂，所以测定的氯结果可能会不足。为了排除这种测量误差，玻璃器皿应无氯。为此，将玻璃器皿在次氯酸钠溶液（0.1 g/L）下存放 1 小时，然后用去离子水（软化水）彻底冲洗。
2. 对于游离氯和总氯的单独测定，使用一套相应单独的比色杯是有意义的（参见 EN ISO 7393-2，第 5.3 段）。
3. DPD 显色发生在 pH 值在 6.2 至 6.5 时。因此该试剂含有用于调节 pH 值的缓冲液。但在分析前（用 0.5 mol/l 硫酸或 1 mol/l 氢氧化钠溶液）必须将强碱性或酸性水的 pH 范围调节到 6 和 7 之间。

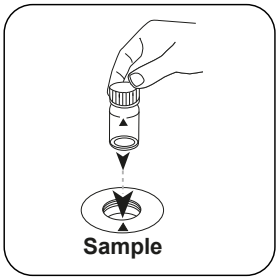
进行测定 余氯 粉剂法

选择设备中的方法。

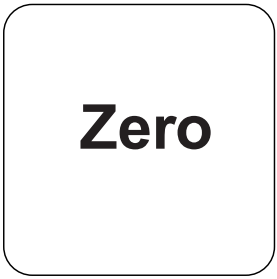
用 **10 mL 样本**填充 24 mm 比色杯。



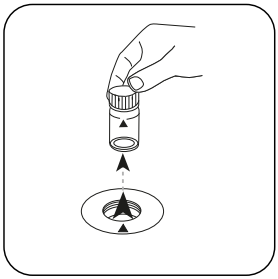
密封比色杯。



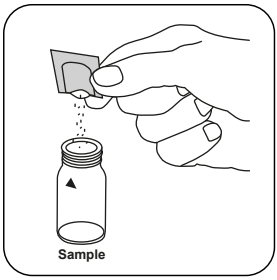
将**样本比色杯**放入测量轴中。注意定位。



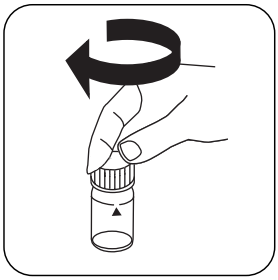
按下 **ZERO** 按钮。



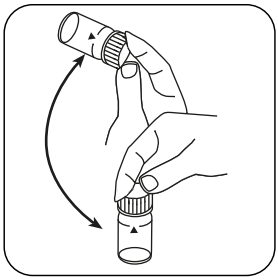
从测量轴上取下比色杯。



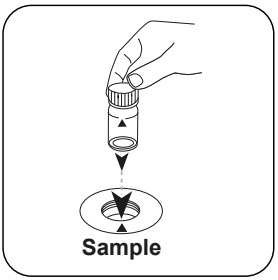
加入 **Chlorine FREE-DPD/ F10 粉包** 。



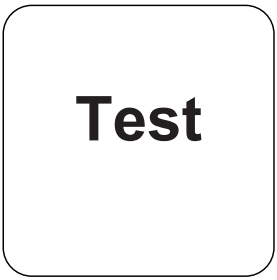
密封比色杯。



通过旋转混合内容物（20 sec.）。



将**样本比色杯**放入测量轴中。注意定位。



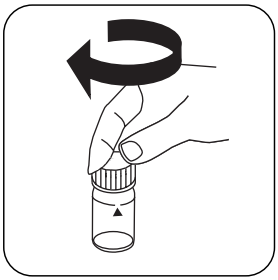
按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 mg / l 余氯。

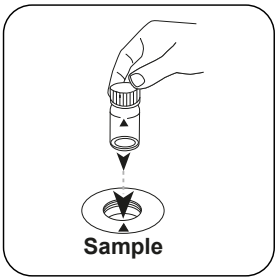
进行测定 总氯 粉剂法

选择设备中的方法。

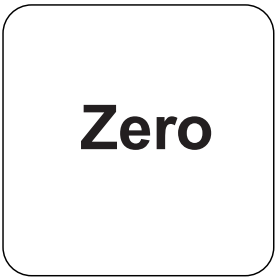
用 **10 mL 样本**填充 24 mm 比色杯。



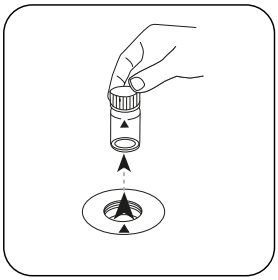
密封比色杯。



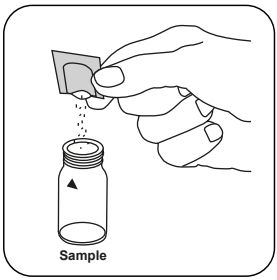
将**样本比色杯**放入测量轴中。注意定位。



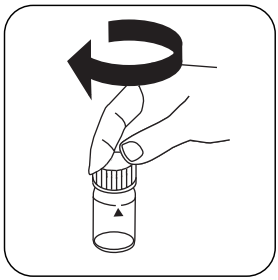
按下 **ZERO** 按钮。



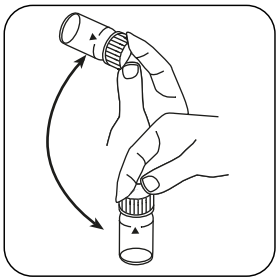
从测量轴上取下比色杯。



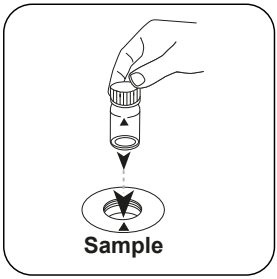
加入 **Chlorine TOTAL-DPD/ F10 粉包** 。



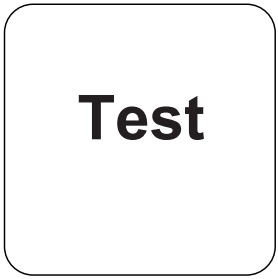
密封比色杯。



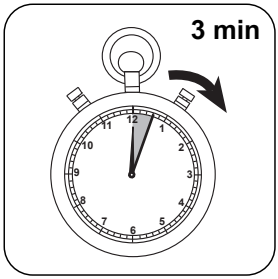
通过旋转混合内容物（20 sec.）。



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 **3 分钟反应时间** 。

反应时间结束后，自动进行测量。

结果在显示屏上显示为 mg / l 总氯。

化学方法

DPD

附錄

ZH

干扰说明

持续干扰

- 存在于样本中的所有氧化剂都像氯一样反应，导致多重结果。

可消除干扰

- 铜和铁（III）的干扰必须通过 EDTA 消除。
- 在使用粉包时，高于 2 mg/L 氯的浓度可导致测量范围内的结果高达 0 mg/L。在这种情况下应用无氯水稀释样本。将 10 ml 稀释的样本与试剂混合并重复测量（可信度测试）。

干擾	從/ [mg/l]
CrO_4^{2-}	0,01
MnO_2	0,01

方法验证

检出限	0.01 mg/L
测定下限	0.03 mg/L
测量上限	2 mg/L
灵敏度	1.68 mg/L / Abs
置信范围	0.033 mg/L
标准偏差	0.014 mg/L
变异系数	1.34 %

一致性

EN ISO 7393-2

[a] 测定余氯，总氯和结合氯

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