

# Lovibond® Water Testing

Tintometer® Group



## Manual of Methods

MD 100 • MD 110 • MD 200

### Hardness

**EN Manual of Methods**

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**IT Manuale dei Metodi**

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**NL Handboek Methoden**

Zijde 66

**DE Methodenhandbuch**

Seite 14

**FR Méthodes Manuel**

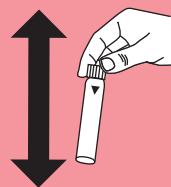
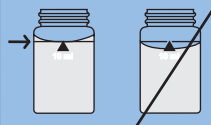
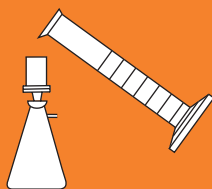
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**PT Métodos Manual**


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KS4.3 T / 20


Method name

Method number

Bar code for the detection of the methods

Measuring range

20

S:4.3

Display in the MD 100 / MD 110 / MD 200

Chemical Method

**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	$\lambda$	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.

Language codes ISO 639-1

Revision status

EN Handbook of Methods 01/20

Performing test procedure

### Implementation of the provision Acid capacity $K_{S_{4.3}}$ with Tablet

Select the method on the device

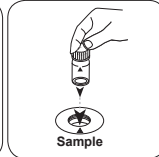
For this method, no ZERO measurements are to be carried out with the following devices: XD 7000, XD 7500



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

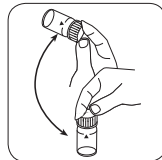


Close vial(s).

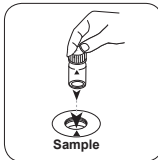


Place **sample vial** in the sample chamber. • Pay attention to the positioning.

• • •



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  $K_{S_{4.3}}$  appears on the display.



Hardness total T

M200

2 - 50 mg/L CaCO<sub>3</sub>

tH1

Metallphthaleine

EN

## Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Hardcheck P	Tablet / 100	515660BT
Hardcheck P	Tablet / 250	515661BT

## Preparation

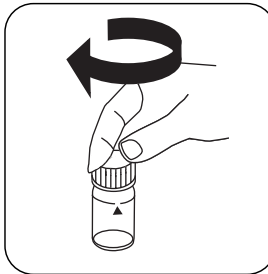
1. Strong alkaline or acidic water samples should be adjusted between pH 4 and pH 10 before the analysis (use 1 mol/l Sulphuric acid or 1 mol/l Sodium hydroxide).

## Determination of Hardness, Total with Tablet

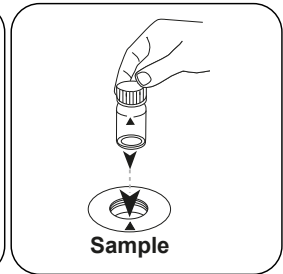
Select the method on the device.



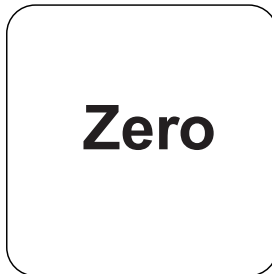
Fill 24 mm vial with **10 mL sample**.



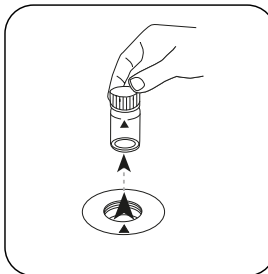
Close vial(s).



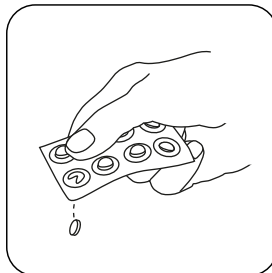
Place **sample vial** in the sample chamber. Pay attention to the positioning.



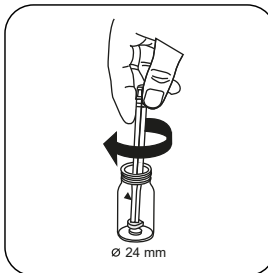
Press the **ZERO** button.



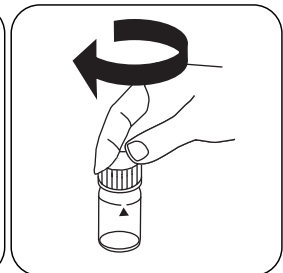
Remove the vial from the sample chamber.



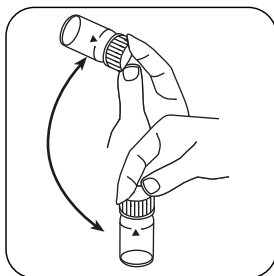
Add **HARDCHECK P** tablet.



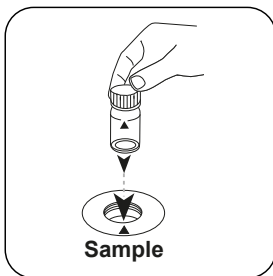
Crush tablet(s) by rotating slightly.



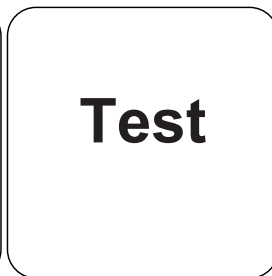
Close vial(s).



Dissolve tablet(s) by inverting.

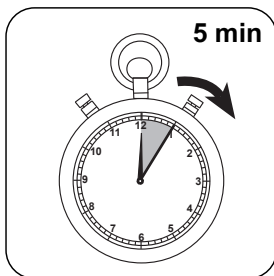


Place **sample vial** in the sample chamber. Pay attention to the positioning.



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

EN



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

Once the reaction period is finished, the measurement takes place automatically. The result in total Hardness appears on the display.

## Analyses

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

Unit	Cite form	Scale Factor
mg/l	CaCO <sub>3</sub>	1
	°dH	0.056
	°eH	0.07
	°fH	0.1
	°aH	1
mg/l	Ca	0.40043

EN

## Chemical Method

Metallphthaleine

## Appendix

### Interferences

#### Removeable Interferences

1. Interference from zinc and magnesium can be eliminated by the addition of 8-hydroxyquinoline.
2. Concentrations of strontium and barium that occur in waters and soils do not interfere.

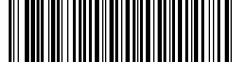
### Method Validation

<b>Limit of Detection</b>	0.88 mg/L
<b>Limit of Quantification</b>	2.64 mg/L
<b>End of Measuring Range</b>	50 mg/L
<b>Sensitivity</b>	42.5 mg/L / Abs
<b>Confidence Intervall</b>	2.62 mg/L
<b>Standard Deviation</b>	1.08 mg/L
<b>Variation Coefficient</b>	4.17 %

### Bibliography

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989





Hardness total HR T

M201

20 - 500 mg/L CaCO<sub>3</sub> <sup>1)</sup>

tH2

Metallphthaleine

EN

## Material

Required material (partly optional):

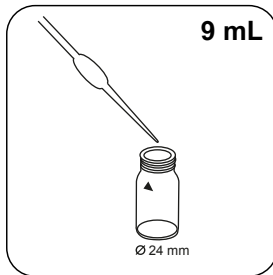
Reagents	Packaging Unit	Part Number
Hardcheck P	Tablet / 100	515660BT
Hardcheck P	Tablet / 250	515661BT

## Preparation

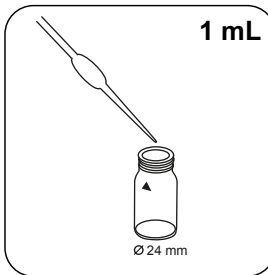
1. Strong alkaline or acidic water samples should be adjusted between pH 4 and pH 10 before the analysis (use 1 mol/l Sulphuric acid or 1 mol/l Sodium hydroxide).

## Determination of Hardness total HR with tablet

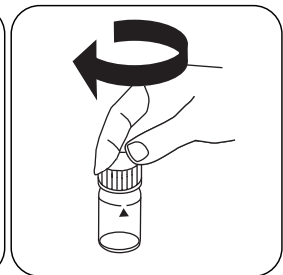
Select the method on the device.



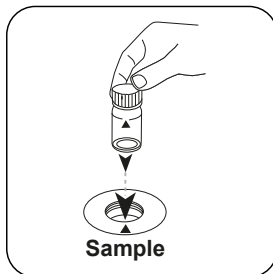
Fill 24 mm vial with **9 mL deionised water**.



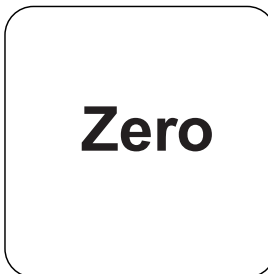
Put **1 mL sample** in the vial.



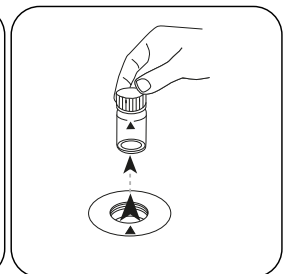
Close vial(s).



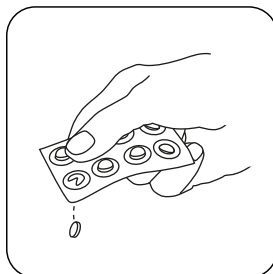
Place **sample vial** in the sample chamber. Pay attention to the positioning.



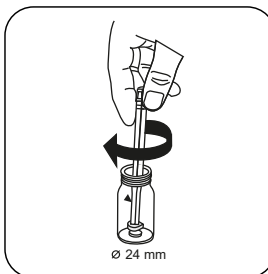
Press the **ZERO** button.



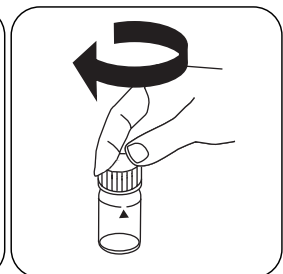
Remove the vial from the sample chamber.



Add **HARDCHECK P** tablet.

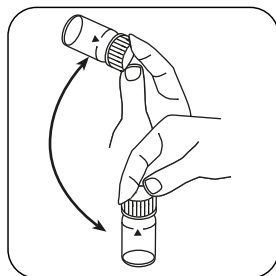


Crush tablet(s) by rotating slightly.

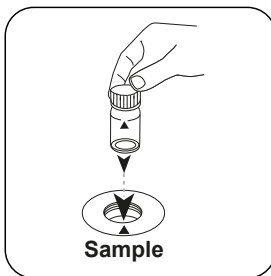


Close vial(s).

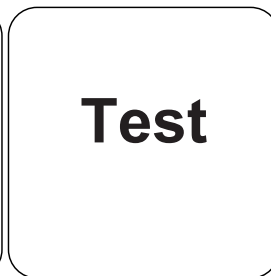
EN



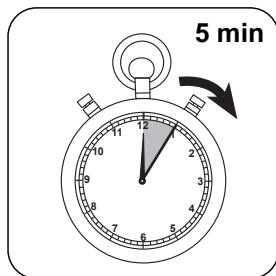
Dissolve tablet(s) by inverting.



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



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



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

Once the reaction period is finished, the measurement takes place automatically. The result in total Hardness appears on the display.

## Analyses

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

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mg/l	CaCO <sub>3</sub>	1
	°dH	0.056
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EN

## Chemical Method

Metallphthaleine

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## Interferences


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1. Interference from zinc and magnesium can be eliminated by the addition of 8-hydroxyquinoline.
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### Bibliography

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<sup>3</sup> high range by dilution

KS4.3 T / 20


Methoden Name

Methodennummer

Barcode zur Methodenerkennung

Messbereich

20

S:4.3

Säure / Indikator  
 Displayanzeige im MD 100 MD 110 / MD 200

Chemische Methode

**Instrumentenspezifische Informationen**

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

Geräte	Küvette	$\lambda$	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 Analyseergebnisses entscheidend.

Sprachkürzel nach ISO 639-1

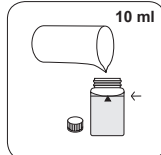
Revisionsstand

DE Methodenhandbuch 01/20

Durchführung der  
Messung**Durchführung der Bestimmung Säurekapazität  $K_{s4,3}$  mit Tablette**

Die Methode im Gerät auswählen.

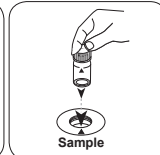
Für diese Methode muss bei folgenden Geräten keine ZERO-Messung durchgeführt werden: XD 7000, XD 7500



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

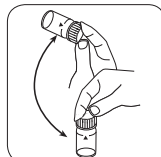


Küvette(n) verschließen.

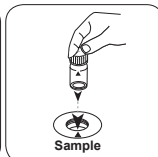


Die **Probeküvette** in den Messschacht stellen. Positionierung beachten.

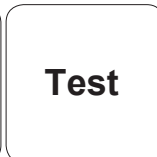
• • •



Tablette(n) durch Umschwenken lösen.



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



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

In der Anzeige erscheint das Ergebnis als Säurekapazität  $K_{s4,3}$ .

**Härte gesamt T****M200****2 - 50 mg/L CaCO<sub>3</sub>****tH1****Metallphthalein**

DE

**Material**

Benötigtes Material (zum Teil optional):

<b>Reagenzien</b>	<b>Form/Menge</b>	<b>Bestell-Nr.</b>
Hardcheck P	Tablette / 100	515660BT
Hardcheck P	Tablette / 250	515661BT

**Vorbereitung**

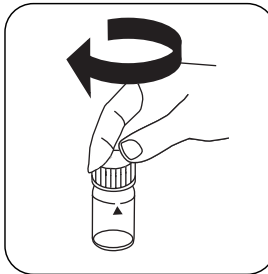
1. Stark alkalische oder saure Wässer sollten vor der Analyse in einen pH-Bereich zwischen 4 und 10 gebracht werden (mit 1 mol/l Salzsäure bzw. 1 mol/l Natronlauge).

## Durchführung der Bestimmung Härte, gesamt mit Tablette

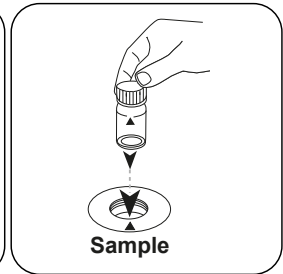
Die Methode im Gerät auswählen.



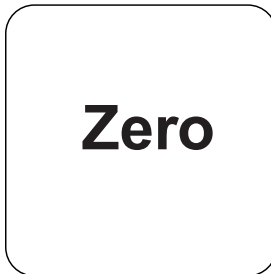
24-mm-Küvette mit **10 mL Probe** füllen.



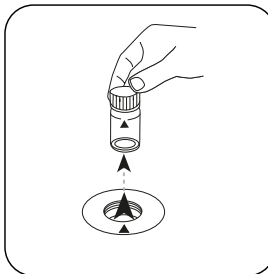
Küvette(n) verschließen.



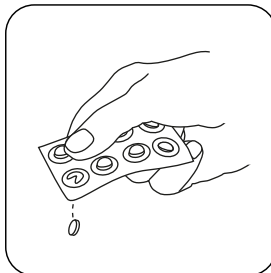
Die **Probeküvette** in den Messschacht stellen. Positionierung beachten.



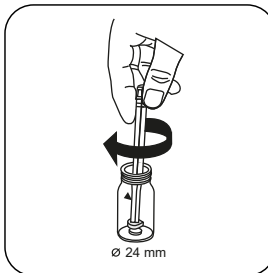
Taste **ZERO** drücken.



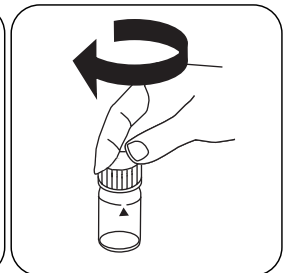
Küvette aus dem Messschacht nehmen.



Eine **HARDCHECK P** Tablette zugeben.

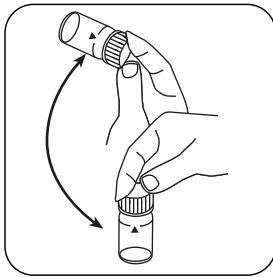


Tablette(n) unter leichter Drehung zerdrücken.

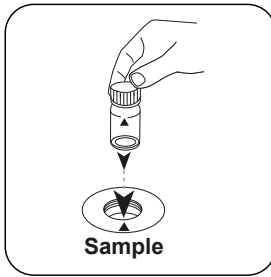


Küvette(n) verschließen.

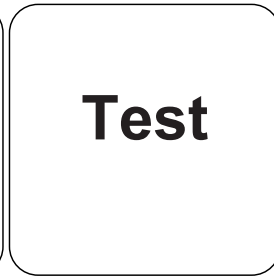




Tablette(n) durch Umschwenken lösen.

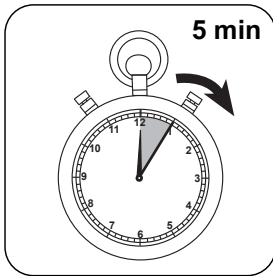


Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



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

DE



**5 Minute(n) Reaktionszeit** abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

In der Anzeige erscheint das Ergebnis als Gesamthärte.

## Auswertung

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

Einheit	Zitierform	Umrechnungsfaktor
mg/l	CaCO <sub>3</sub>	1
	°dH	0.056
	°eH	0.07
	°fH	0.1
	°aH	1
mg/l	Ca	0.40043

DE

## Chemische Methode

Metallphthalein

## Appendix

### Störungen

#### Ausschließbare Störungen

1. Die Störung durch Zink und Magnesium wird durch die Zugabe von 8-hydroxychinolin beseitigt.
2. Strontium und Barium treten in Wässern und Böden nicht in störenden Konzentrationen auf.

### Methodenvalidierung

<b>Nachweisgrenze</b>	0.88 mg/L
<b>Bestimmungsgrenze</b>	2.64 mg/L
<b>Messbereichsende</b>	50 mg/L
<b>Empfindlichkeit</b>	42.5 mg/L / Abs
<b>Vertrauensbereich</b>	2.62 mg/L
<b>Verfahrensstandardabweichung</b>	1.08 mg/L
<b>Verfahrensvariationskoeffizient</b>	4.17 %

#### Literaturverweise

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989



Härte gesamt HR T

M201

20 - 500 mg/L CaCO<sub>3</sub> <sup>1)</sup>

tH2

Metallphthalein

DE

## Material

Benötigtes Material (zum Teil optional):

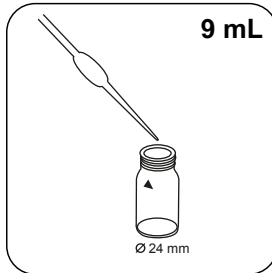
Reagenzien	Form/Menge	Bestell-Nr.
Hardcheck P	Tablette / 100	515660BT
Hardcheck P	Tablette / 250	515661BT

## Vorbereitung

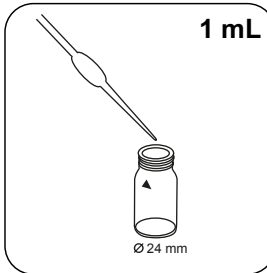
1. Stark alkalische oder saure Wässer sollten vor der Analyse in einen pH-Bereich zwischen 4 und 10 gebracht werden (mit 1 mol/l Salzsäure bzw. 1 mol/l Natronlauge).

## Durchführung der Bestimmung Härte, gesamt HR mit Tablette

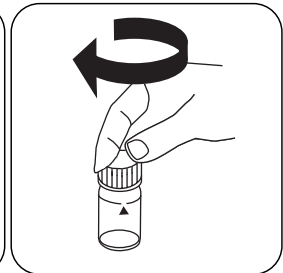
Die Methode im Gerät auswählen.



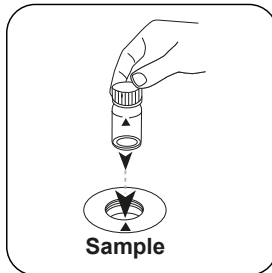
24 mm-Küvette mit **9 mL VE-Wasser** füllen.



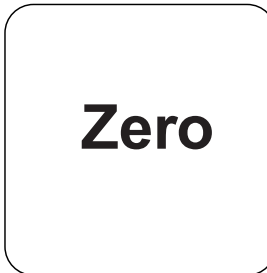
**1 mL Probe** in die Küvette geben.



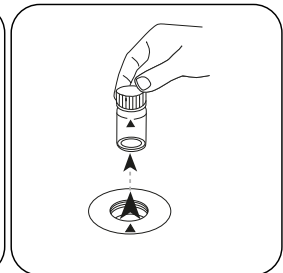
Küvette(n) verschließen.



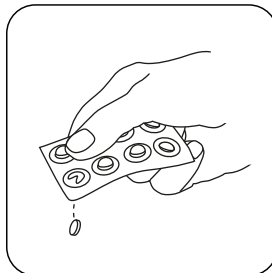
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



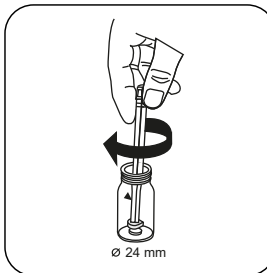
Taste **ZERO** drücken.



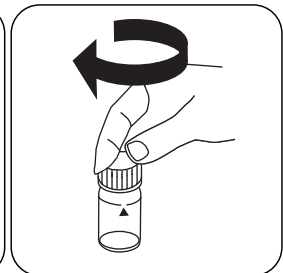
Küvette aus dem Messschacht nehmen.



Eine **HARDCHECK P Tablette** zugeben.

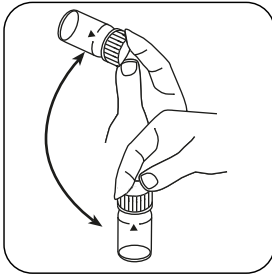


Tablette(n) unter leichter Drehung zerdrücken.

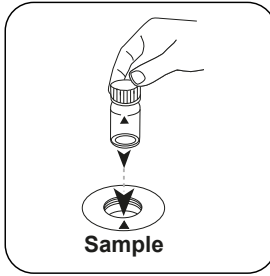


Küvette(n) verschließen.

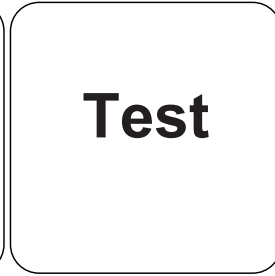
DE



Tablette(n) durch Umschwenken lösen.



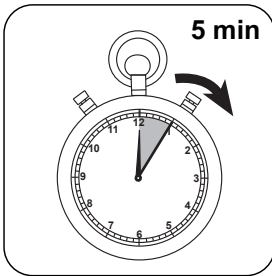
Die **Probeküvette** in den Messschacht stellen. Positionierung beachten.



**Test**

Taste **TEST (XD: START)** drücken.

DE



**5 Minute(n) Reaktionszeit** abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

In der Anzeige erscheint das Ergebnis als Gesamthärte.

## Auswertung

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

Einheit	Zitierform	Umrechnungsfaktor
mg/l	CaCO <sub>3</sub>	1
	°dH	0.056
	°eH	0.07
	°fH	0.1
	°aH	1
mg/l	Ca	0.40043

DE

## Chemische Methode

Metallphthalein

## Appendix

## Störungen

### Ausschließbare Störungen


1. Die Störung durch Zink und Magnesium wird durch die Zugabe von 8-hydroxychinolin beseitigt.
2. Strontium und Barium treten in Wässern und Böden nicht in störenden Konzentrationen auf.

### Literaturverweise

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989

<sup>3</sup> Hoher Messbereich durch Verdünnung

KS4.3 T / 20



**Nombre del método**

**Número de método**

**Código de barras para reconocer el método**

**Rango de medición**

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

20  
S:4.3

**Método químico**

**Indicación en la pantalla de MD 100 / MD 110 / MD 200**

**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	$\lambda$	Rango de medición
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630	$\varnothing$ 24 mm	610 nm	0.1 - 4 mmol/l $K_{S4.3}$
SpectroDirect, XD 7000, XD 7500	$\varnothing$ 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

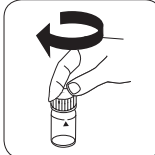
Ejecución de la determinación Capacidad ácida  $K_{a4.3}$  con tableta

Seleccionar el método en el aparato.

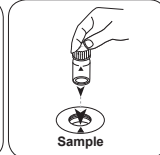
Para este método no es necesario realizar medición CERO en los aparatos siguientes: XD 7000, XD 7500



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

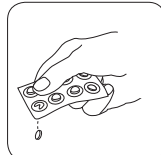


Cerrar la(s) cubeta(s).

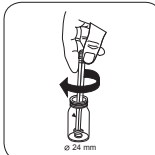


Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

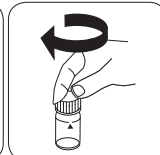
• • •



Añadir **tableta ALKA-M-PHOTOMETER**.



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



Cerrar la(s) cubeta(s).



**Dureza total T****M200****2 - 50 mg/L CaCO<sub>3</sub>****tH1****Ftaleina metal**

ES

**Material**

Material requerido (parcialmente opcional):

<b>Reactivos</b>	<b>Unidad de embalaje</b>	<b>No. de referencia</b>
Hardcheck P	Tabletas / 100	515660BT
Hardcheck P	Tabletas / 250	515661BT

**Preparación**

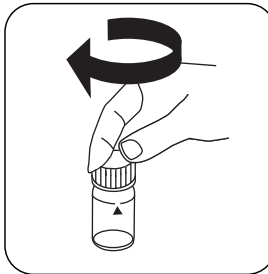
1. Las muestras acuosas muy ácidas o muy básicas se deberán neutralizar a un valor de pH entre 4 y 10 antes de realizar el análisis (con 1 mol/l de ácido clorhídrico o 1 mol/l de hidróxido sódico).

## Ejecución de la determinación Dureza, total con tableta

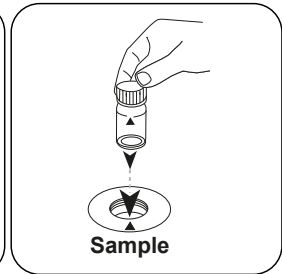
Seleccionar el método en el aparato.



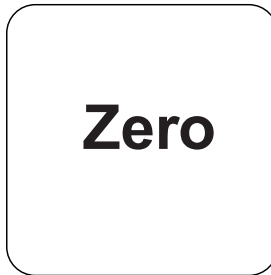
Llenar la cubeta de 24 mm con **10 mL de muestra** .



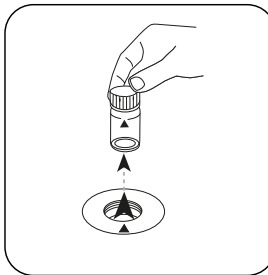
Cerrar la(s) cubeta(s).



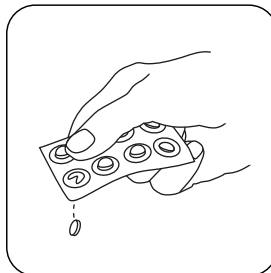
Poner la **cubeta de muestra** en el compartimento de medición. ¡Debe tenerse en cuenta el posicionamiento!



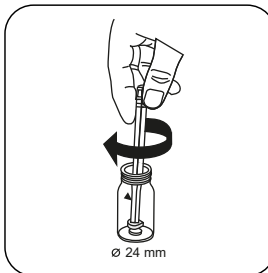
Pulsar la tecla **ZERO**.



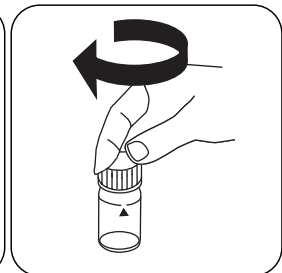
Extraer la cubeta del compartimento de medición.



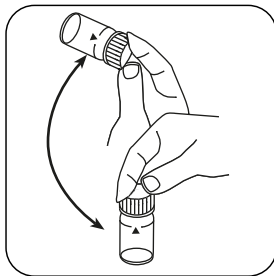
Añadir **tableta HARDCHECK P**.



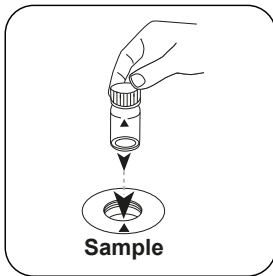
Triturar la(s) tableta(s) girando ligeramente.



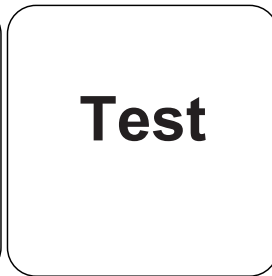
Cerrar la(s) cubeta(s).



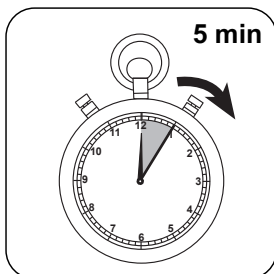
Disolver la(s) tableta(s) girando.



Poner la **cupeta de muestra** en el compartimento de medición. ¡Debe tenerse en cuenta el posicionamiento!



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



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

Finalizado el periodo de reacción se realizará la determinación automáticamente.

A continuación se visualizará el resultado como Dureza total.

## Evaluación

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

Unidad	Conversión	Factor de conversión
mg/l	CaCO <sub>3</sub>	1
	°dH	0.056
	°eH	0.07
	°fH	0.1
	°aH	1
mg/l	Ca	0.40043

ES

## Método químico

Ftaleina metal

## Apéndice

### Interferencia

#### Interferencias extraíbles

1. La perturbación por cinc y magnesio se elimina añadiendo 8-hidroxiquinolina.
2. El estroncio y el bario se encuentran en las aguas y en los suelos, en concentraciones no perturbadoras.

### Validación del método

Límite de detección	0.88 mg/L
Límite de determinación	2.64 mg/L
Límite del rango de medición	50 mg/L
Sensibilidad	42.5 mg/L / Abs
Intervalo de confianza	2.62 mg/L
Desviación estándar	1.08 mg/L
Coefficiente de variación	4.17 %

### Bibliografía

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989



Dureza total HR T

M201

20 - 500 mg/L CaCO<sub>3</sub> <sup>i)</sup>

tH2

Ftaleina metal

ES

## Material

Material requerido (parcialmente opcional):

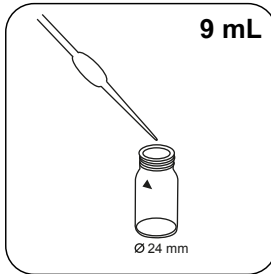
Reactivos	Unidad de embalaje	No. de referencia
Hardcheck P	Tabletas / 100	515660BT
Hardcheck P	Tabletas / 250	515661BT

## Preparación

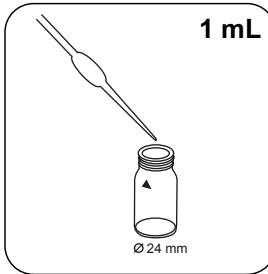
1. Las muestras acuosas muy ácidas o muy básicas se deberán neutralizar a un valor de pH entre 4 y 10 antes de realizar el análisis (con 1 mol/l de ácido clorhídrico o 1 mol/l de hidróxido sódico).

## Ejecución de la determinación Dureza, total HR con tableta

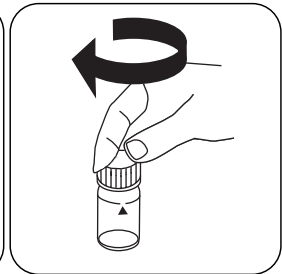
Seleccionar el método en el aparato.



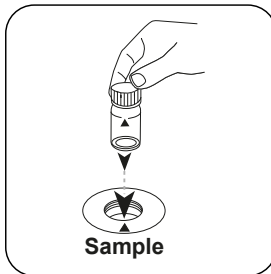
Llenar la cubeta de 24 mm con **9 mL de agua desionizada**.



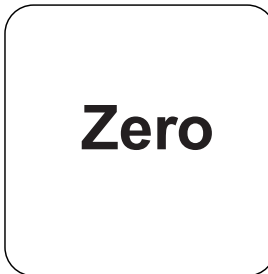
Añadir **1 mL de muestra** en la cubeta.



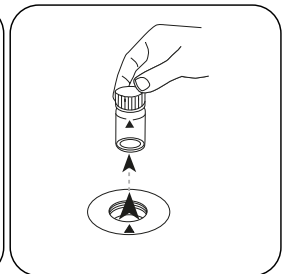
Cerrar la(s) cubeta(s).



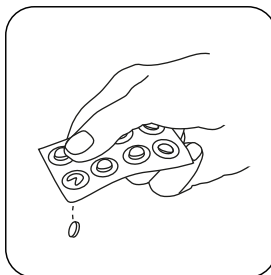
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



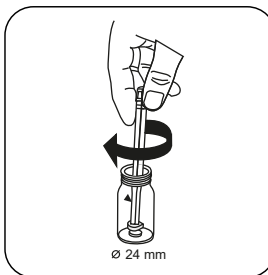
Pulsar la tecla **ZERO**.



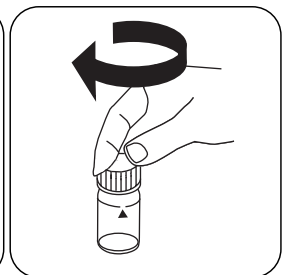
Extraer la cubeta del compartimiento de medición.



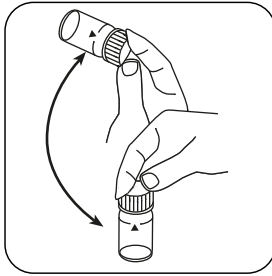
Añadir **tableta HARDCHECK P**.



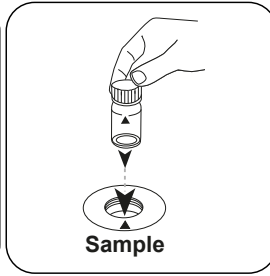
Triturar la(s) tableta(s) girando ligeramente.



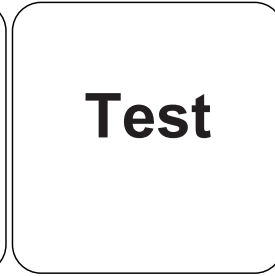
Cerrar la(s) cubeta(s).



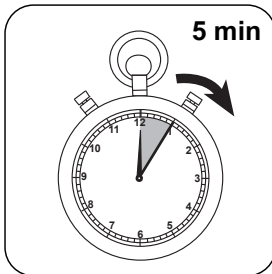
Disolver la(s) tableta(s) girando.



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



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



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

Finalizado el periodo de reacción se realizará la determinación automáticamente.

A continuación se visualizará el resultado como Dureza total.

## Evaluación

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

Unidad	Conversión	Factor de conversión
mg/l	CaCO <sub>3</sub>	1
	°dH	0.056
	°eH	0.07
	°fH	0.1
	°aH	1
mg/l	Ca	0.40043

ES

## Método químico

Ftaleina metal

## Apéndice

### Interferencia

#### Interferencias extraíbles

1. La perturbación por cinc y magnesio se elimina añadiendo 8-hidroxiquinolina.
2. El estroncio y el bario se encuentran en las aguas y en los suelos, en concentraciones no perturbadoras.


#### Bibliografía

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989

<sup>9</sup> Campo de medición elevado con dilución



KS4.3 T / 20



**Nom de la méthode** → KS4.3 T

**Numéro de méthode** → 20

**Code à barres pour reconnaître la méthode** → [Barcode]

**Plage de mesure** → 0.1 - 4 mmol/l  $K_{S4.3}$

**Méthode chimique** → Acide / Indicateur

**Affichage dans le MD 100 / MD 110 / MD 200** → S:4.3

**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	$\lambda$	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** → FR

**État de révision** → 01/20

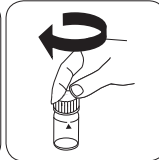
FR Méthodes Manuel 01/20

## Procédure du test

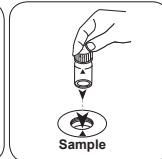
**Réalisation de la quantification Capacité acide  $K_{s4,3}$  avec pastille**

Sélectionnez la méthode sur l'appareil.

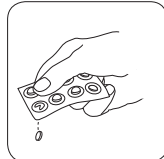
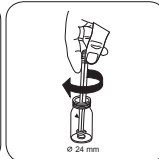
Cette méthode ne nécessite aucune mesure du zéro sur les appareils suivants : XD 7000, XD 7500

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

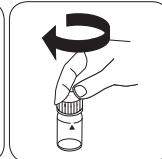
Fermez la(les) cuvette(s).

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).

**Dureté totale T****M200****2 - 50 mg/L CaCO<sub>3</sub>****tH1****Métalophtaléine**

FR

**Matériel**

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
Test de dureté P	Pastilles / 100	515660BT
Test de dureté P	Pastilles / 250	515661BT

**Préparation**

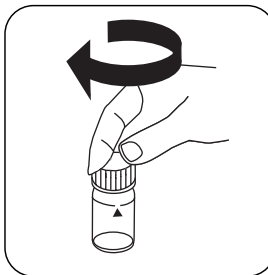
1. Avant l'analyse, les eaux fortement alcalines ou acides devraient être ajustées sur un pH compris entre 4 et 10 (avec 1 mol/l d'acide chlorhydrique ou 1 mol/l de soude caustique).

## Réalisation de la quantification Dureté, totale avec pastille

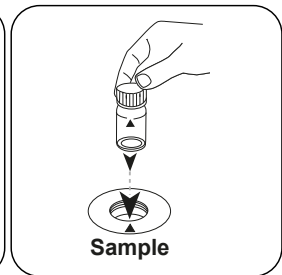
Sélectionnez la méthode sur l'appareil.



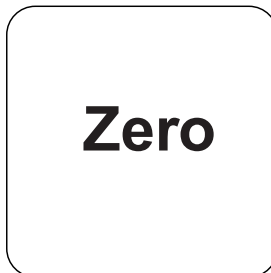
Remplissez une cuvette de 24 mm de **10 mL** d'échantillon.



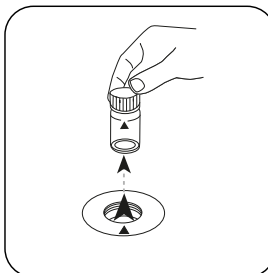
Fermez la(les) cuvette(s).



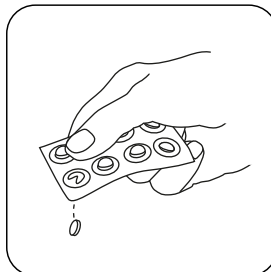
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



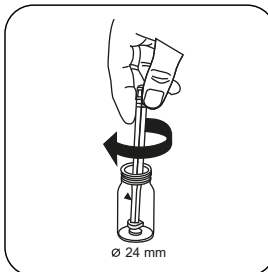
Appuyez sur la touche **ZERO**.



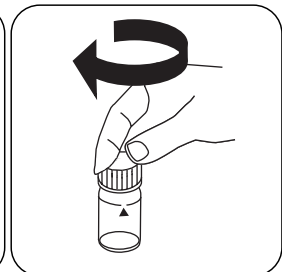
Retirez la cuvette de la chambre de mesure.



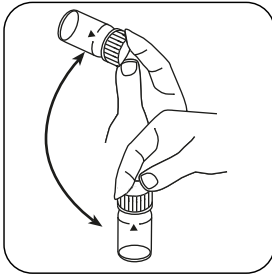
Ajoutez une **pastille de HARDCHECK P**.



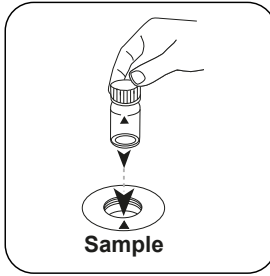
Écrasez la(les) pastille(s) en la(les) tournant un peu.



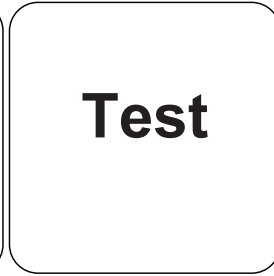
Fermez la(les) cuvette(s).



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

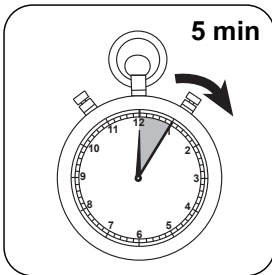


Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



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

FR



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

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

Le résultat s'affiche à l'écran en Dureté totale.

## Analyses

Le tableau suivant identifie les valeurs de sortie qui peuvent être converties en d'autres formes de citation.

Unité	Formes de citation	Facteur de conversion
mg/l	CaCO <sub>3</sub>	1
	°dH	0.056
	°eH	0.07
	°fH	0.1
	°aH	1
mg/l	Ca	0.40043

FR

## Méthode chimique

Métalophtaléine

## Appendice

## Interférences

### Interférences exclues

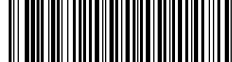
1. La perturbation par le zinc et le magnésium est éliminée par un apport de 8-hydroxyquinoléine.
2. La concentration du strontium et le baryum contenus dans les eaux et sols n'est pas perturbatrice.

## Méthode Validation

Limite de détection	0.88 mg/L
Limite de détermination	2.64 mg/L
Fin de la gamme de mesure	50 mg/L
Sensibilité	42.5 mg/L / Abs
Intervalle de confiance	2.62 mg/L
Déviation standard	1.08 mg/L
Coefficient de variation	4.17 %

## Bibliographie

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989

**Dureté totale HR T****M201****20 - 500 mg/L CaCO<sub>3</sub> <sup>1)</sup>****tH2****Métalophtaléine**

FR

**Matériel**

Matériel requis (partiellement optionnel):

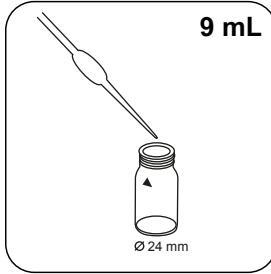
Réactifs	Pack contenant	Code
Test de dureté P	Pastilles / 100	515660BT
Test de dureté P	Pastilles / 250	515661BT

**Préparation**

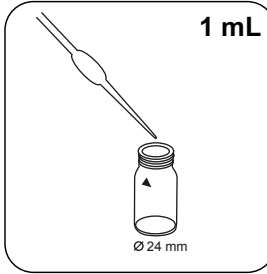
1. Avant l'analyse, les eaux fortement alcalines ou acides devraient être ajustées sur un pH compris entre 4 et 10 (avec 1 mol/l d'acide chlorhydrique ou 1 mol/l de soude caustique).

## Réalisation de la quantification Dureté totale HR avec pastille

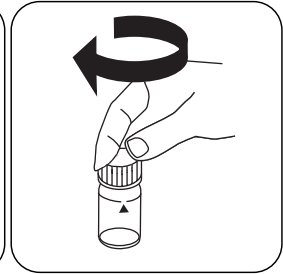
Sélectionnez la méthode sur l'appareil.



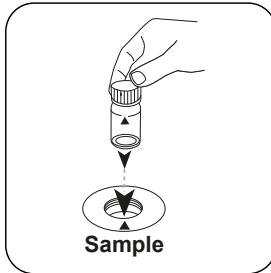
Remplissez une cuvette de 24 mm de **9 mL d'eau déminéralisée**.



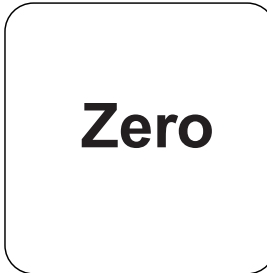
Versez **1 mL d'échantillon** dans la cuvette.



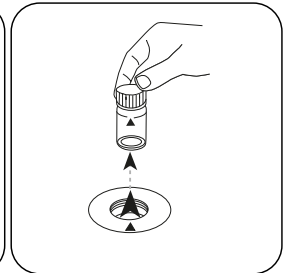
Fermez la(les) cuvette(s).



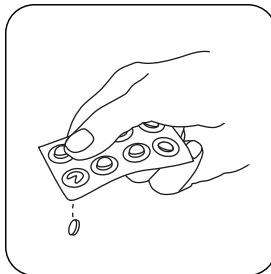
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



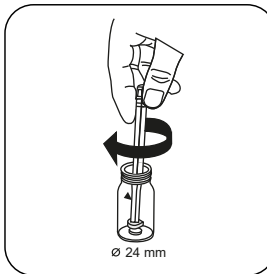
Appuyez sur la touche **ZERO**.



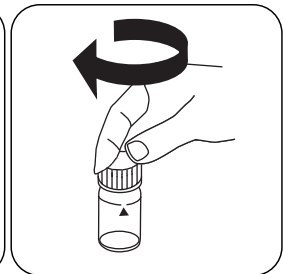
Retirez la cuvette de la chambre de mesure.



Ajoutez une **pastille de HARDCHECK P**.

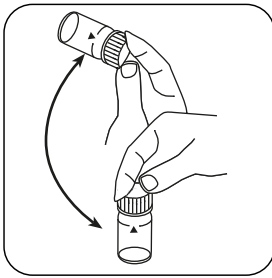


Écrasez la(les) pastille(s) en la(les) tournant un peu.

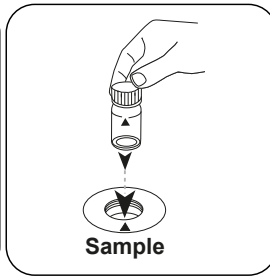


Fermez la(les) cuvette(s).

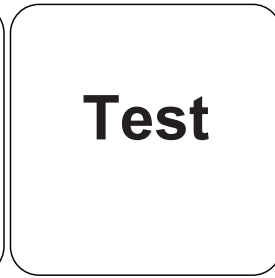




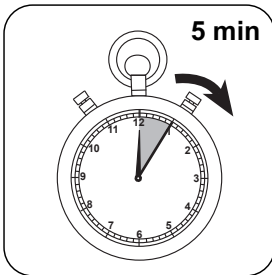
Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



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 5 minute(s)**.

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

Le résultat s'affiche à l'écran en Dureté totale.

## Analyses

Le tableau suivant identifie les valeurs de sortie qui peuvent être converties en d'autres formes de citation.

Unité	Formes de citation	Facteur de conversion
mg/l	CaCO <sub>3</sub>	1
	°dH	0.056
	°eH	0.07
	°fH	0.1
	°aH	1
mg/l	Ca	0.40043

FR

## Méthode chimique

Métalophtaléine

## Appendice

## Interférences

### Interférences exclues


1. La perturbation par le zinc et le magnésium est éliminée par un apport de 8-hydroxyquinoléine.
2. La concentration du strontium et le baryum contenus dans les eaux et sols n'est pas perturbatrice.

### Bibliographie

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989

<sup>3</sup> Gamme haute par dilution

KS4.3 T / 20



**Denominazione metodo**

**Numero metodo**

**Codice a barre per riconoscere il metodo**

**Range di misura**

$K_{S_{4.3} T}$   
0.1 - 4 mmol/l  $K_{S_{4.3}}$

**Acido/indicatore**

20  
S:4.3

**Indicazione sul display del MD 100 / MD 110 / MD 200**

**Metodo chimico**

**Informazioni specifiche dello strumento**

Il test può essere eseguito sui seguenti dispositivi. Inoltre, sono indicate la cuvetta richiesta e il range di assorbimento del fotometro.

Dispositivi	Cuvetta	$\lambda$	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 $K_{S_{4.3}}$
SpectroDirect, XD 7000, XD 7500	ø 24 mm	615 nm	0.1 - 4 mmol/l $K_{S_{4.3}}$

**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  $K_{S_{4.3}}$  sono equivalenti.
2. Per l'accuratezza del risultato dell'analisi è fondamentale che il volume del campione misuri esattamente 10 ml.

**ISO 639-1 codici linguistici**

**Stato di revisione**

IT Manuale dei Metodi 01/20

**Svolgimento della  
misurazione**

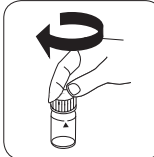
**Esecuzione della rilevazione Capacità acida  $K_{s4,3}$  con pastiglia**

Selezionare il metodo nel dispositivo.

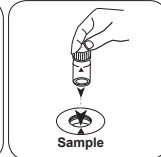
Con i seguenti dispositivi, per questo metodo non è necessario eseguire una misurazione ZERO: XD 7000, XD 7500



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

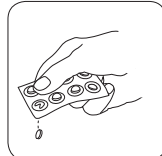


Chiudere la/e cuvetta/e.

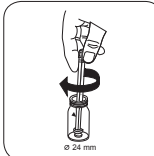


Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

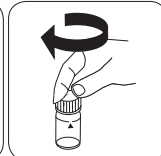
• • •



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



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



Chiudere la/e cuvetta/e.

**Durezza totale T****M200****2 - 50 mg/L CaCO<sub>3</sub>****tH1****Violetto di ftaleina**

IT

**Materiale**

Materiale richiesto (in parte facoltativo):

<b>Reagenti</b>	<b>Unità di imballaggio</b>	<b>N. ordine</b>
Hardcheck P	Pastiglia / 100	515660BT
Hardcheck P	Pastiglia / 250	515661BT

**Preparazione**

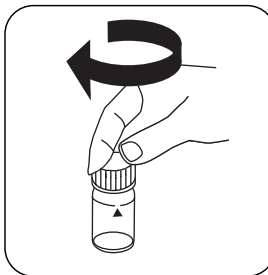
1. Le acque fortemente alcaline o acide dovrebbero essere portate prima dell'analisi entro un range di pH compreso tra 4 e 10 (con 1 mol/l di acido cloridrico o 1 mol/l di liscivia).

## Esecuzione della rilevazione Durezza totale con pastiglia

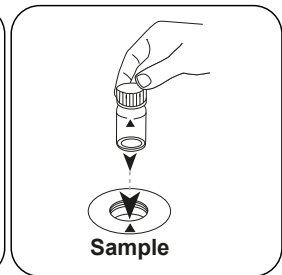
Selezionare il metodo nel dispositivo.



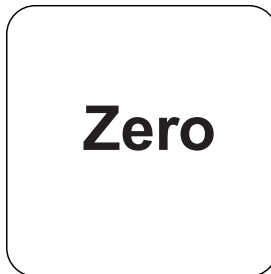
Riempire una cuvetta da 24 mm con **10 mL di campione**.



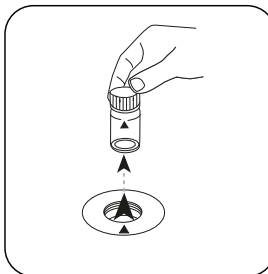
Chiudere la/e cuvetta/e.



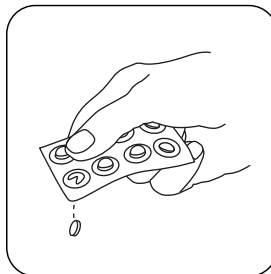
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



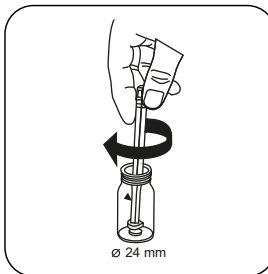
Premere il tasto **ZERO**.



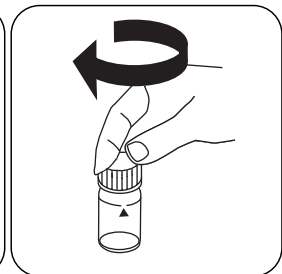
Prelevare la cuvetta dal vano di misurazione.



Aggiungere **una pastiglia HARDCHECK P**.



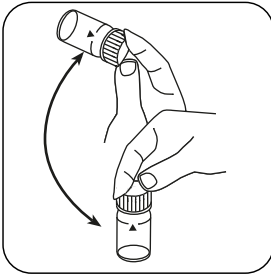
Frantumare la/e pastiglia/e con una leggera rotazione.



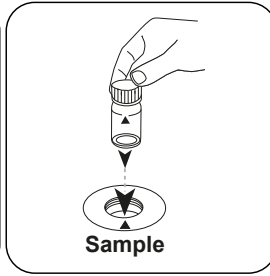
Chiudere la/e cuvetta/e.



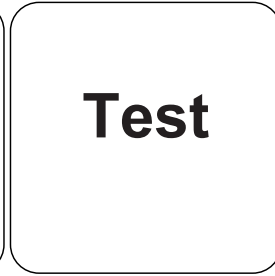
IT



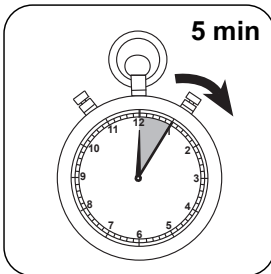
Far sciogliere la/e pastiglia/e agitando.



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



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



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

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

Sul display compare il risultato come Durezza totale.

## Valutazione

La seguente tabella identifica i valori di output che possono essere convertiti in altre forme di citazione.

Unità di misura	Forma di citazione	Fattore di conversione
mg/l	CaCO <sub>3</sub>	1
	°dH	0.056
	°eH	0.07
	°fH	0.1
	°aH	1
mg/l	Ca	0.40043

## Metodo chimico

Violetto di ftaleina

## Appendice

## Interferenze

### Interferenze escludibili

1. L'interferenza da parte di zinco e magnesio viene eliminata con l'aggiunta di 8-idrossichinolina.
2. Nell'acqua e nel terreno lo stronzio e il bario non compaiono in concentrazioni tali da provocare interferenze.

## Validazione metodo

Limite di rilevabilità	0.88 mg/L
Limite di quantificazione	2.64 mg/L
Estremità campo di misura	50 mg/L
Sensibilità	42.5 mg/L / Abs
Intervallo di confidenza	2.62 mg/L
Deviazione standard della procedura	1.08 mg/L
Coefficiente di variazione della procedura	4.17 %



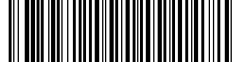


### **Riferimenti bibliografici**

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stoccarda 1989

IT





Durezza totale HR T

M201

20 - 500 mg/L CaCO<sub>3</sub> <sup>1)</sup>

tH2

Violetto di ftaleina

IT

## Materiale

Materiale richiesto (in parte facoltativo):

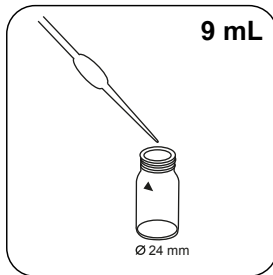
Reagenti	Unità di imballaggio	N. ordine
Hardcheck P	Pastiglia / 100	515660BT
Hardcheck P	Pastiglia / 250	515661BT

## Preparazione

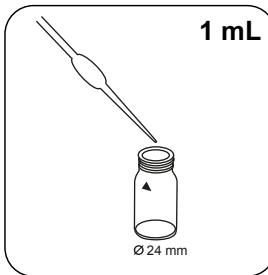
1. Le acque fortemente alcaline o acide dovrebbero essere portate prima dell'analisi entro un range di pH compreso tra 4 e 10 (con 1 mol/l di acido cloridrico o 1 mol/l di liscivia).

## Esecuzione della rilevazione Durezza HR totale con pastiglia

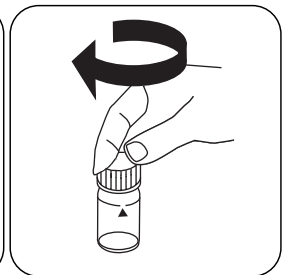
Selezionare il metodo nel dispositivo.



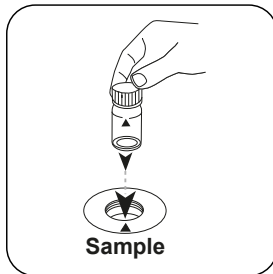
Riempire una cuvetta da 24 mm con **9 mL di acqua demineralizzata**.



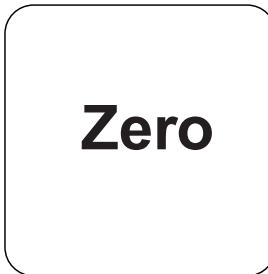
Immettere **1 mL di campione** nella cuvetta.



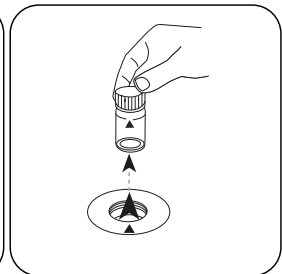
Chiudere la/e cuvetta/e.



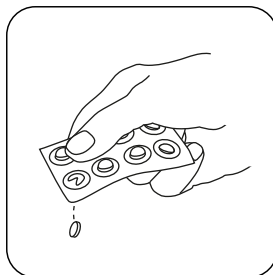
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



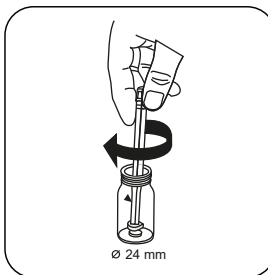
Premere il tasto **ZERO**.



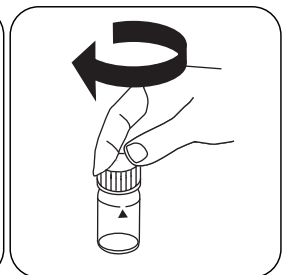
Prelevare la cuvetta dal vano di misurazione.



Aggiungere **una pastiglia HARDCHECK P**.



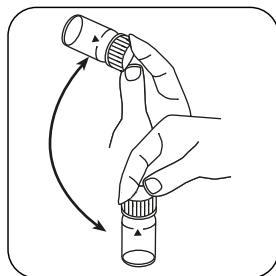
Frantumare la/e pastiglia/e con una leggera rotazione.



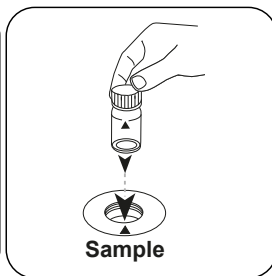
Chiudere la/e cuvetta/e.



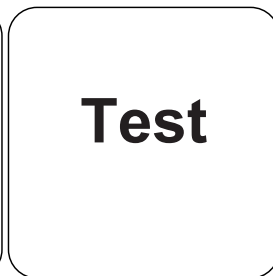
IT



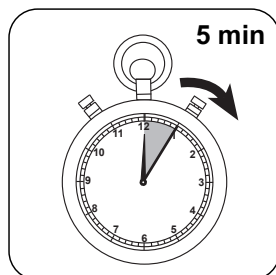
Far sciogliere la/e pastiglia/e agitando.



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



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



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

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

Sul display compare il risultato come Durezza totale.

## Valutazione

La seguente tabella identifica i valori di output che possono essere convertiti in altre forme di citazione.

Unità di misura	Forma di citazione	Fattore di conversione
mg/l	CaCO <sub>3</sub>	1
	°dH	0.056
	°eH	0.07
	°fH	0.1
	°aH	1
mg/l	Ca	0.40043

## Metodo chimico

Violetto di ftaleina

## Appendice

## Interferenze

### Interferenze escludibili


1. L'interferenza da parte di zinco e magnesio viene eliminata con l'aggiunta di 8-idrossichinolina.
2. Nell'acqua e nel terreno lo stronzio e il bario non compaiono in concentrazioni tali da provocare interferenze.

### Riferimenti bibliografici

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stoccarda 1989

<sup>3</sup> Elevato intervallo di misurazione grazie alla diluizione

KS4.3 T / 20



**Nome do método**

**Número do método**

**Código de barras para a detecção dos métodos**

**Área de medição**

$K_{S_{4.3}} T$   
0.1 - 4 mmol/l  $K_{S_{4.3}}$   
Ácido / Indicador

20  
S:4.3

**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 fotómetro são indicadas.

Dispositivos	Cubeta	$\lambda$	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 $K_{S_{4.3}}$
SpectroDirect, XD 7000, XD 7500	ø 24 mm	615 nm	0.1 - 4 mmol/l $K_{S_{4.3}}$

**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  $K_{S_{4.3}}$  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

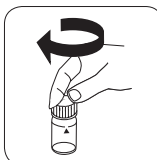
### Realização da determinação Capacidade de acidez $K_{s4.3}$ com pastilha

Escolher o método no equipamento.

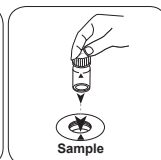
Para este método não tem de ser efetuada uma medição ZERO nos seguintes equipamentos: XD 7000, XD 7500



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

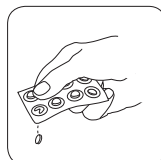


Fechar a(s) célula(s).

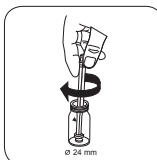


Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

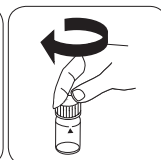
• • •



Pastilha ALKA-M-PHOTO-METER.



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



Fechar a(s) célula(s).

PT Métodos Manual 01/20

PT



**Dureza total T****M200****2 - 50 mg/L CaCO<sub>3</sub>****tH1****Metallphthaleine**

PT

**Material**

Material necessário (parcialmente opcional):

<b>Reagentes</b>	<b>Unidade de Embalagem</b>	<b>Código do Produto</b>
Hardcheck P	Pastilhas / 100	515660BT
Hardcheck P	Pastilhas / 250	515661BT

**Preparação**

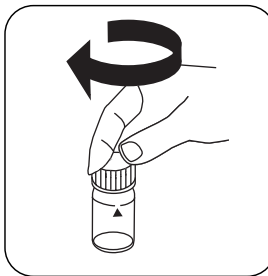
1. As águas fortemente alcalinas ou ácidas deviam, antes da análise, ser ajustadas para um valor pH entre 4 e 10 (com 1 mol/l de ácido sulfúrico ou 1 mol/l soda cáustica).

## Realização da determinação Dureza, total com pastilha

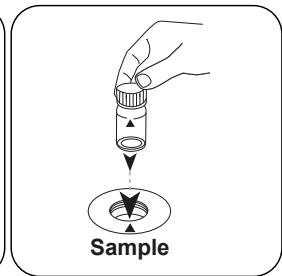
Escolher o método no equipamento.



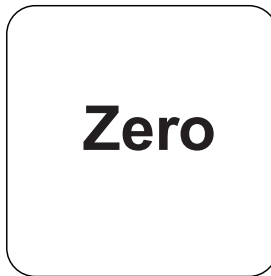
Encher a célula de 24 mm com **10 mL de amostra**.



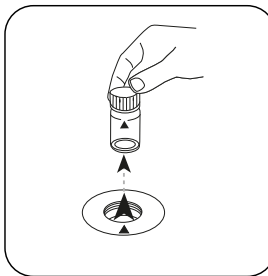
Fechar a(s) célula(s).



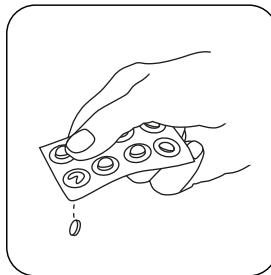
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



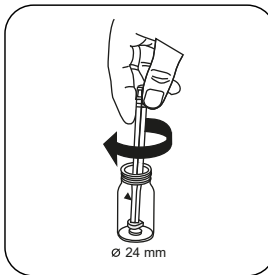
Premir a tecla **ZERO**.



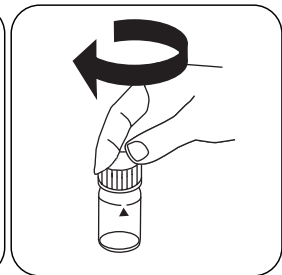
Retirar a célula do compartimento de medição.



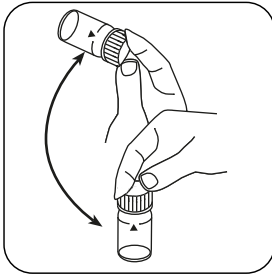
**Pastilha HARDCHECK P.**



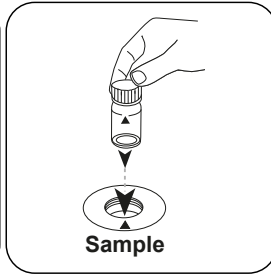
Esmagar a(s) pastilha(s) rodando ligeiramente.



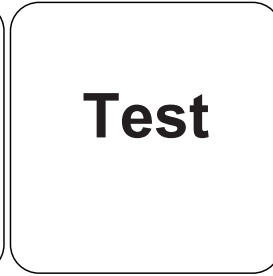
Fechar a(s) célula(s).



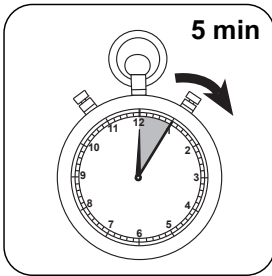
Dissolver a(s) pastilha(s) girando.



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



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



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

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

No visor aparece o resultado como Dureza total.

## Análises

A tabela a seguir identifica os valores de saída que podem ser convertidos em outras formas de citação.

Unidade	Forma de citação	Fator de conversão
mg/l	CaCO <sub>3</sub>	1
	°dH	0.056
	°eH	0.07
	°fH	0.1
	°aH	1
mg/l	Ca	0.40043

PT

## Método Químico

Metallphthaleine

## Apêndice

## Texto de Interferências

### Interferências Removíveis

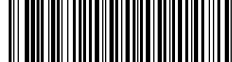
1. A interferência por zinco e magnésio pode ser eliminada com a adição de 8-hidroxiquinolina.
2. O estrôncio e o bário não aparecem em concentrações perturbadoras em águas e solos.

## Validação de método

Limite de Detecção	0.88 mg/L
Limite de Determinação	2.64 mg/L
Fim da Faixa de Medição	50 mg/L
Sensibilidade	42.5 mg/L / Abs
Faixa de Confiança	2.62 mg/L
Desvio Padrão	1.08 mg/L
Coefficiente de Variação	4.17 %

## Bibliografia

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

**Dureza total HR T****M201****20 - 500 mg/L CaCO<sub>3</sub> <sup>1)</sup>****tH2****Metallphthaleine**

PT

**Material**

Material necessário (parcialmente opcional):

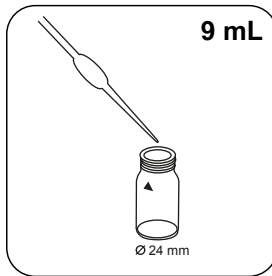
<b>Reagentes</b>	<b>Unidade de Embalagem</b>	<b>Código do Produto</b>
Hardcheck P	Pastilhas / 100	515660BT
Hardcheck P	Pastilhas / 250	515661BT

**Preparação**

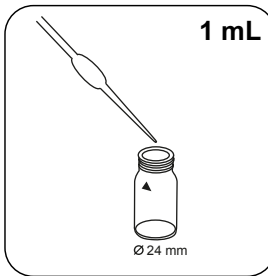
1. As águas fortemente alcalinas ou ácidas deviam, antes da análise, ser ajustadas para um valor pH entre 4 e 10 (com 1 mol/l de ácido sulfúrico ou 1 mol/l soda cáustica).

## Realização da determinação Dureza HR total com pastilha

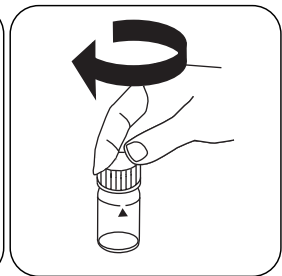
Escolher o método no equipamento.



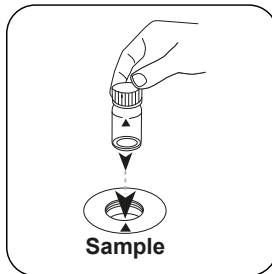
Encher a célula de 24 mm com **9 mL de água desmineralizada**.



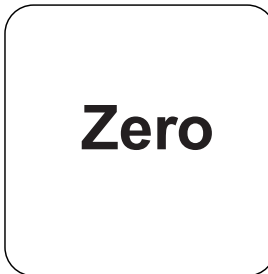
Adicionar **1 mL de amostra** à célula.



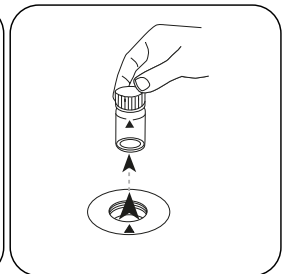
Fechar a(s) célula(s).



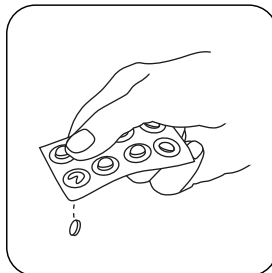
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



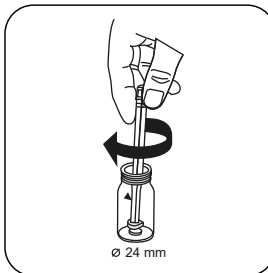
Premir a tecla **ZERO**.



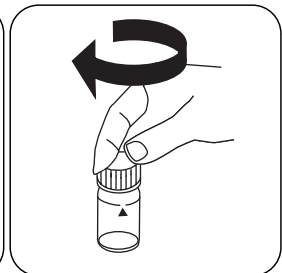
Retirar a célula do compartimento de medição.



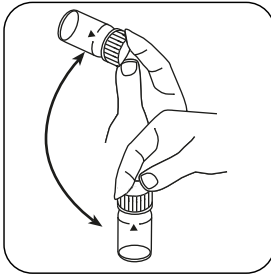
**Pastilha HARDCHECK P.**



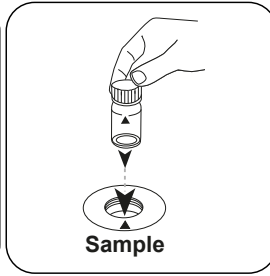
Esmagar a(s) pastilha(s) rodando ligeiramente.



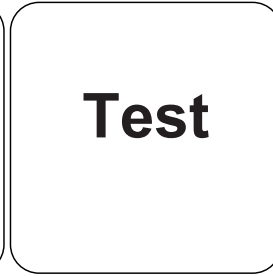
Fechar a(s) célula(s).



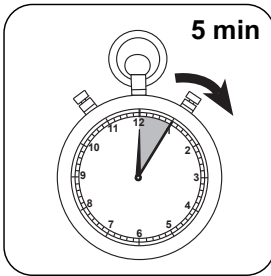
Dissolver a(s) pastilha(s) girando.



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



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



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

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

No visor aparece o resultado como Dureza total.

## Análises

A tabela a seguir identifica os valores de saída que podem ser convertidos em outras formas de citação.

Unidade	Forma de citação	Fator de conversão
mg/l	CaCO <sub>3</sub>	1
	°dH	0.056
	°eH	0.07
	°fH	0.1
	°aH	1
mg/l	Ca	0.40043

PT

## Método Químico

Metallphthaleine

## Apêndice

### Texto de Interferências

#### Interferências Removíveis

1. A interferência por zinco e magnésio pode ser eliminada com a adição de 8-hidroxiquinolina.
2. O estrôncio e o bário não aparecem em concentrações perturbadoras em águas e solos.


#### Bibliografia

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

<sup>3</sup>Faixa de medição alta devido à diluição



KS4.3 T / 20



**Naam van de methode**

**Nummer methode**

**Streepjescode ter identificatie van de methode**

**Meetbereik**

$K_{S_{4.3}} T$  M20  
0.1 - 4 mmol/l  $K_{S_{4.3}}$  S:4.3  
Zuur / Indicator

**Chemische methode**

**Uitlezing in MD**  
100 MD 110 / MD  
200

**Instrument specifieke informatie**

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

Toestellen	Cuvet	$\lambda$	Meetbereik
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630	$\varnothing$ 24 mm	610 nm	0.1 - 4 mmol/l $K_{S_{4.3}}$
SpectroDirect, XD 7000, XD 7500	$\varnothing$ 24 mm	615 nm	0.1 - 4 mmol/l $K_{S_{4.3}}$

**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<sub>S<sub>4.3</sub></sub> zijn identiek.
2. De exacte naleving van het monstervolume van 10 ml is bepalend voor de nauwkeurigheid van het analysesresultaat.

**Beknopte naam conform de norm ISO 639-1**

**Herziene versie**

NL Handboek van Methoden 01/20

**Uitvoering van de meting**

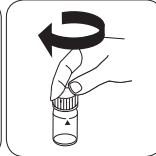
**Uitvoering van de bepaling Zuurcapaciteit  $K_{s4,3}$  met tablet**

De methode in het apparaat selecteren.

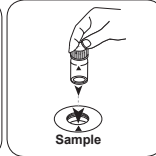
Voor deze methode moet bij de volgende apparaten geen nulmeting worden uitgevoerd:  
XD 7000, XD 7500



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

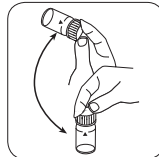


De spoelbakjes afsluiten.

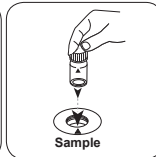


Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.

• • •



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  $K_{s4,3}$ .



Totale hardheid T

M200

2 - 50 mg/L CaCO<sub>3</sub>

tH1

Metaalftaleïne

NL

## Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
Hardcheck P	Tablet / 100	515660BT
Hardcheck P	Tablet / 250	515661BT

## Vorbereiding

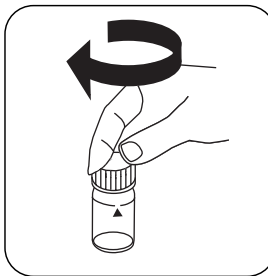
1. Sterk alkalisch of zuur water moet vóór de analyse in een pH-gebied tussen 4 en 10 (met 1 mol/l-zoutzuur of 1 mol/l-natriumhydroxideoplossing) worden geplaatst.

## Uitvoering van de bepaling Hardheid, totaal met tablet

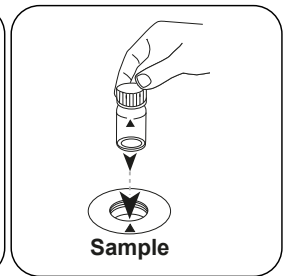
De methode in het apparaat selecteren.



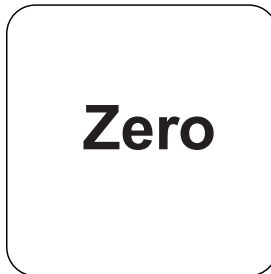
Spoelbakje van 24 mm met 10 mL staal vullen.



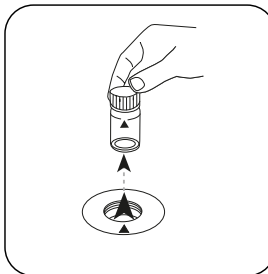
De spoelbakjes afsluiten.



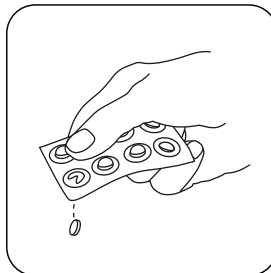
Het **staal**spoelbakje in de meetschacht plaatsen. Op de positionering letten.



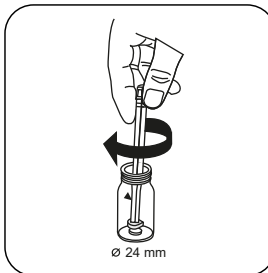
De toets **NUL** indrukken.



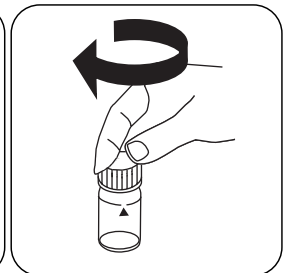
Het spoelbakje uit de meetschacht nemen.



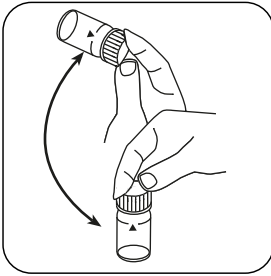
Een **HARDCHECK P** tablet toevoegen.



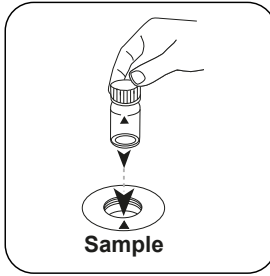
De tabletten onder lichte rotatie verpletteren.



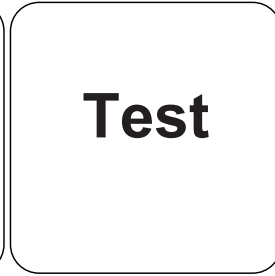
De spoelbakjes afsluiten.



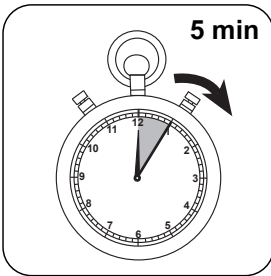
Tabletten oplossen door om te draaien



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



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



**De reactietijd van 5 minuten** afwachten.

Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

De display toont het resultaat als Totale hardheid.

## Evaluatie

De volgende tabel geeft aan dat de uitvoerwaarden kunnen worden geconverteerd naar andere citatievormen.

Eenheid	Dagvaardingsformulier	Omrekeningsfactor
mg/l	CaCO <sub>3</sub>	1
	°dH	0.056
	°eH	0.07
	°fH	0.1
	°aH	1
mg/l	Ca	0.40043

NL

## Chemische methode

Metaalfaleïne

## Aanhangsel

## Verstoringen

### Uit te sluiten verstoringen

1. De verstoring door zink en magnesium wordt geëlimineerd door de toevoeging van 8-hydroxyquinoline.
2. Strontium en barium komen niet voor in storende concentraties in water en bodem.

## Validatie van de methodes

<b>Aantoonbaarheidsgrens</b>	0.88 mg/L
<b>Bepaalbaarheidsgrens</b>	2.64 mg/L
<b>Einde meetbereik</b>	50 mg/L
<b>Gevoeligheid</b>	42.5 mg/L / Abs
<b>Betrouwbaarheidsgrenzen</b>	2.62 mg/L
<b>Standaardafwijking procedure</b>	1.08 mg/L
<b>Variatiecoëfficiënt procedure</b>	4.17 %

### Literatuurverwijzing

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989



Totale hardheid HR T

M201

20 - 500 mg/L CaCO<sub>3</sub> <sup>1)</sup>

tH2

Metaalftaleïne

NL

## Reagentia

Benodigd materiaal (deels optioneel):

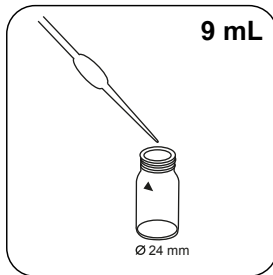
Reagentia	Verpakkingseenheid	Bestelnr.
Hardcheck P	Tablet / 100	515660BT
Hardcheck P	Tablet / 250	515661BT

## Vorbereitung

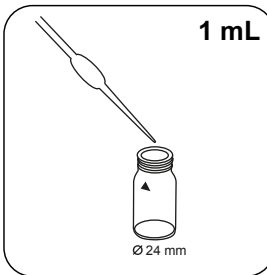
1. Sterk alkalisch of zuur water moet vóór de analyse in een pH-gebied tussen 4 en 10 (met 1 mol/l-zoutzuur of 1 mol/l-natriumhydroxideoplossing) worden geplaatst.

## Uitvoering van de bepaling Hardheid, totaal HR met tablet

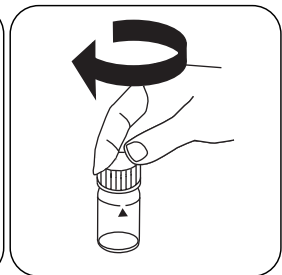
De methode in het apparaat selecteren.



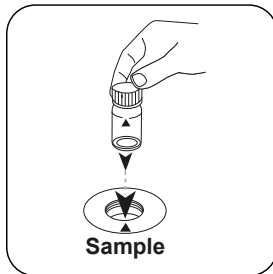
Spoelbakje van 24 mm met **9 mL gedeïoniseerd water** vullen.



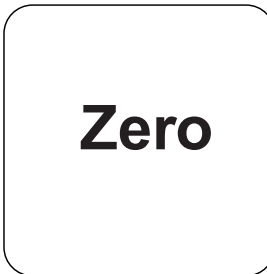
**1 mL staal** aan het spoelbakje toevoegen.



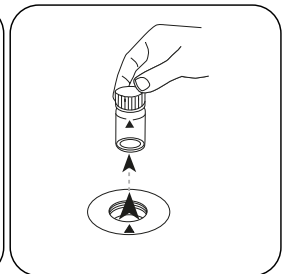
De spoelbakjes afsluiten.



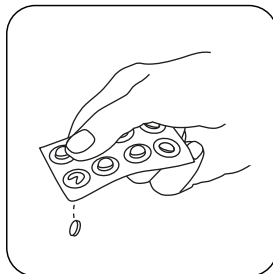
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



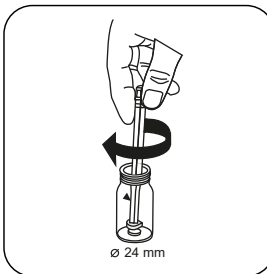
De toets **NUL** indrukken.



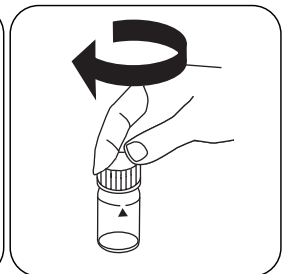
Het spoelbakje uit de meetschacht nemen.



Een **HARDCHECK P** tablet toevoegen.



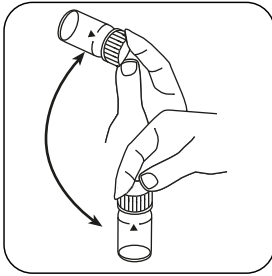
De tabletten onder lichte rotatie verpletteren.



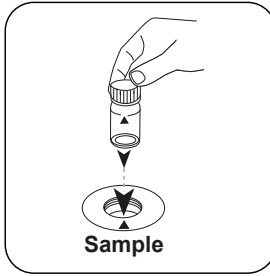
De spoelbakjes afsluiten.

NL

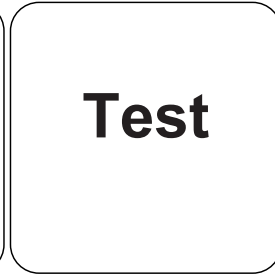




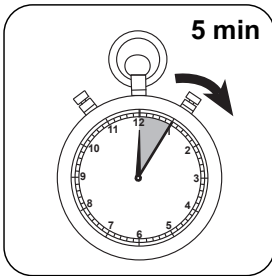
Tabletten oplossen door om te draaien



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



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



**De reactietijd van 5 minuten** afwachten.

Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

De display toont het resultaat als Totale hardheid.

## Evaluatie

De volgende tabel geeft aan dat de uitvoerwaarden kunnen worden geconverteerd naar andere citatievormen.

Eenheid	Dagvaardingsformulier	Omrekeningsfactor
mg/l	CaCO <sub>3</sub>	1
	°dH	0.056
	°eH	0.07
	°fH	0.1
	°aH	1
mg/l	Ca	0.40043

NL

## Chemische methode

Metaalfaleïne

## Aanhangsel

## Verstoringen

### Uit te sluiten verstoringen

1. De verstoring door zink en magnesium wordt geëlimineerd door de toevoeging van 8-hydroxyquinoline.
2. Strontium en barium komen niet voor in storende concentraties in water en bodem.

### Literatuurverwijzing

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989

<sup>9</sup> hoog meetbereik als gevolg van verdunning

KS4.3 T / 20

方法名称

方法号

用于方法检测的条形码

测量范围

酸性 / 指示剂

化学方法

**仪器的具體信息**

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。

儀器類型	比色皿	$\lambda$	測量範圍
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630	$\varnothing$ 24 mm	610 nm	0.1 - 4 mmol/l $K_{S4.3}$
SpectroDirect, XD 7000, XD 7500	$\varnothing$ 24 mm	615 nm	0.1 - 4 mmol/l $K_{S4.3}$

**材料**

所需材料 (部分可選) :

標題	包裝單位	貨號
Alka-M-Photometer	片劑 / 100	513210BT
Alka-M-Photometer	片劑 / 250	513211BT

**應用列表**

- 污水處理
- 飲用水處理
- 原水處理

**備註**

1. 術語總度-m、m-值、總碱度和酸容量  $K_{S4.3}$  是相同的。
2. 準確地遵守 10 ml 的樣本體積對分析結果的準確度至關重要。

語言代碼ISO 639-1

修訂狀態

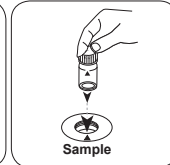
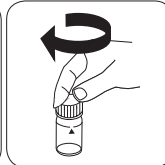
CN 方法手冊 01/20

开始测量

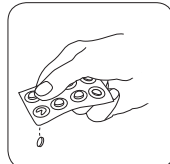
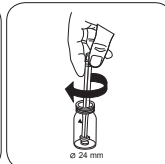
进行测定  $K_{s4.3}$  片剂酸容量

选择设备中的方法。

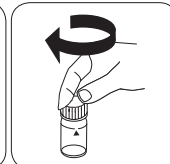
对于这种方法，在以下设备上不能进行 ZERO 测量：XD 7000, XD 7500

用 10 ml 样本填充 24 mm 比密封比色杯。  
色杯。将样本比色杯放入测量轴  
中。注意定位。

• • •

加入 ALKA-M-PHOTOME-  
TER 片剂。

用轻微的扭转压碎片剂。



密封比色杯。

CN 方法手册 01/20

ZH



总 T 硬度

M200

2 - 50 mg/L CaCO<sub>3</sub>

tH1

Metallphthaleine

材料

所需材料 ( 部分可选 ) :

ZH

试剂	包装单位	货号
Hardcheck P	片剂 / 100	515660BT
Hardcheck P	片剂 / 250	515661BT

## 准备

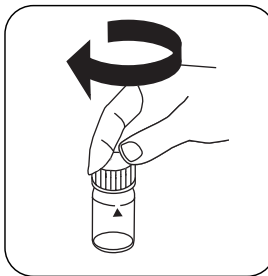
1. 在分析前 ( 用 1 mol/l 盐酸或 1 mol/l 氢氧化钠溶液 ) 应将强碱性或酸性水的 pH 范围调节到 4 和 10 之间。

## 进行测定 硬度，含片剂的总硬度

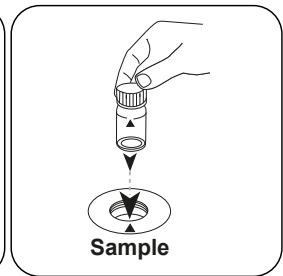
选择设备中的方法。



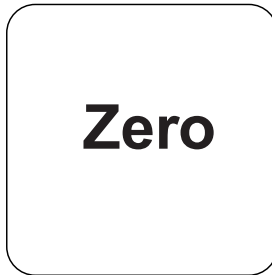
用 10 mL 样本填充 24 mm 比色杯。



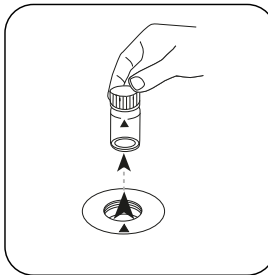
密封比色杯。



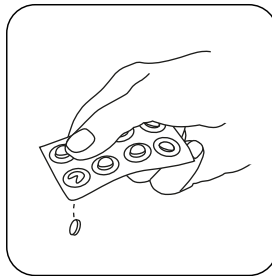
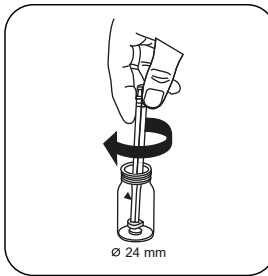
将样本比色杯放入测量轴中。注意定位。



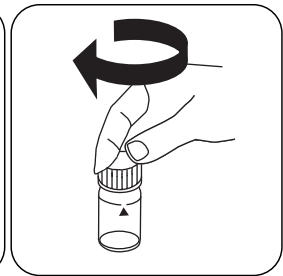
按下 ZERO 按钮。



从测量轴上取下比色杯。

加入 **HARDCHECK P** 片剂。

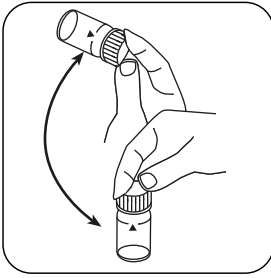
用轻微的扭转压碎片剂。



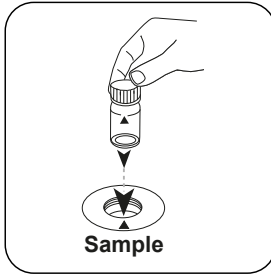
密封比色杯。



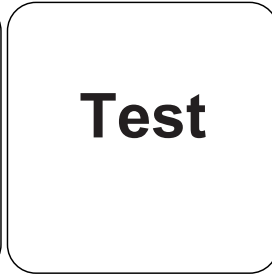
ZH



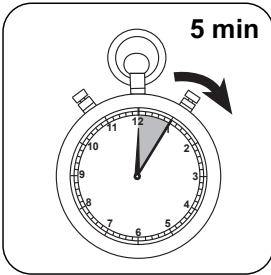
通过旋转溶解片剂。



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 **5 分钟** 反应时间。

反应时间结束后，自动进行测量。

结果在显示屏上显示为 total Hardness。

## 分析

下表中输出数据也可转换为其他格式表示.

单位	参考表格	因素
mg/l	CaCO <sub>3</sub>	1
	°dH	0.056
	°eH	0.07
	°fH	0.1
	°aH	1
mg/l	Ca	0.40043

ZH

## 化学方法

Metallphthaleine

## 附錄

## 干扰说明

可消除干扰

1. 通过加入 8-羟基喹啉消除锌和镁的干扰。
2. 锶和钡不会以可产生干扰的浓度出现在水和土壤中。

## 方法验证

检出限	0.88 mg/L
测定下限	2.64 mg/L
测量上限	50 mg/L
灵敏度	42.5 mg/L / Abs
置信范围	2.62 mg/L
标准偏差	1.08 mg/L
变异系数	4.17 %

参考文献

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989





总 HR T 硬度

M201

20 - 500 mg/L CaCO<sub>3</sub><sup>1)</sup>

tH2

Metallphthaleine

材料

所需材料 ( 部分可选 ) :

ZH

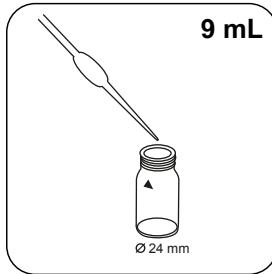
试剂	包装单位	货号
Hardcheck P	片剂 / 100	515660BT
Hardcheck P	片剂 / 250	515661BT

## 准备

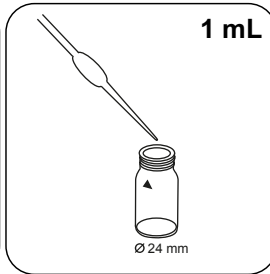
1. 在分析前 ( 用 1 mol/l 盐酸或 1 mol/l 氢氧化钠溶液 ) 应将强碱性或酸性水的 pH 范围调节到 4 和 10 之间。

## 进行测定 总硬度 HR 片剂法

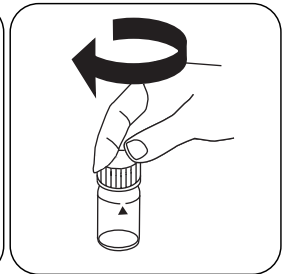
选择设备中的方法。



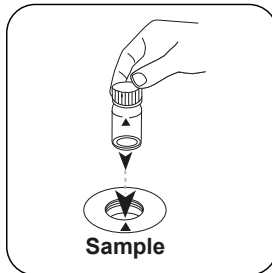
用 9 mL 去离子水填充 24 mm 比色杯。



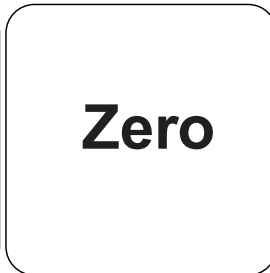
添加 1 mL 样本来到比色杯中。



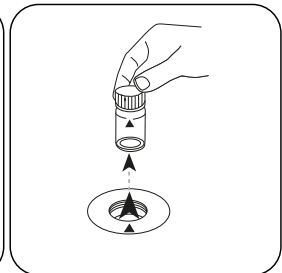
密封比色杯。



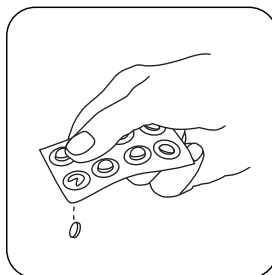
将样本比色杯放入测量轴中。注意定位。



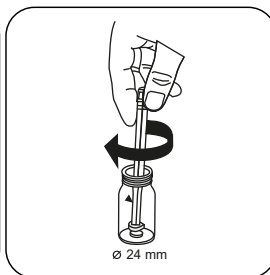
按下 ZERO 按钮。



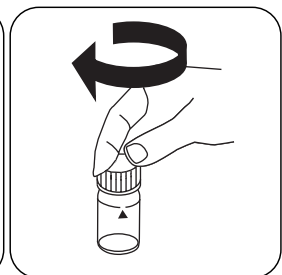
从测量轴上取下比色杯。



加入 HARDCHECK P 片剂。



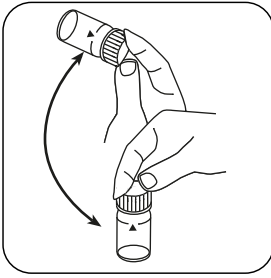
用轻微的扭转压碎片剂。



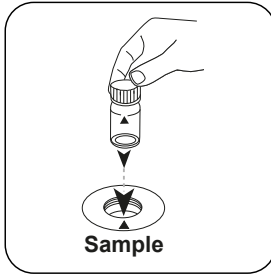
密封比色杯。



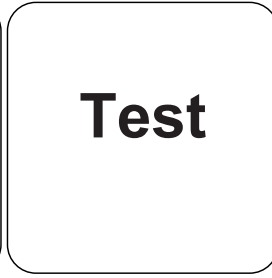
ZH



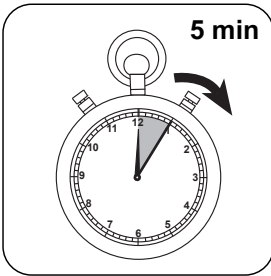
通过旋转溶解片剂。



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 **5 分钟** 反应时间。

反应时间结束后，自动进行测量。

结果在显示屏上显示为 总硬度。

## 分析

下表中输出数据也可转换为其他格式表示.

单位	参考表格	因素
mg/l	CaCO <sub>3</sub>	1
	°dH	0.056
	°eH	0.07
	°fH	0.1
	°aH	1
mg/l	Ca	0.40043

ZH

## 化学方法

Metallphthaleine

## 附錄

## 干扰说明

### 可消除干扰

1. 通过加入 8-羟基喹啉消除锌和镁的干扰。
2. 锶和钡不会以可产生干扰的浓度出现在水和土壤中。

### 参考文献

Photometrische Analyseverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989

<sup>9</sup> 通过稀释进行高量程测定











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