Lovibond® Water Testing

Tintometer® Group

Manual of Methods

MD 100 • MD 110 • MD 200

Aluminium

(EN) **Manual of Methods**
Page 4

(ES) **Manual de Métodos**
Página 28

(IT) **Manuale dei Metodi**
Pagina 52

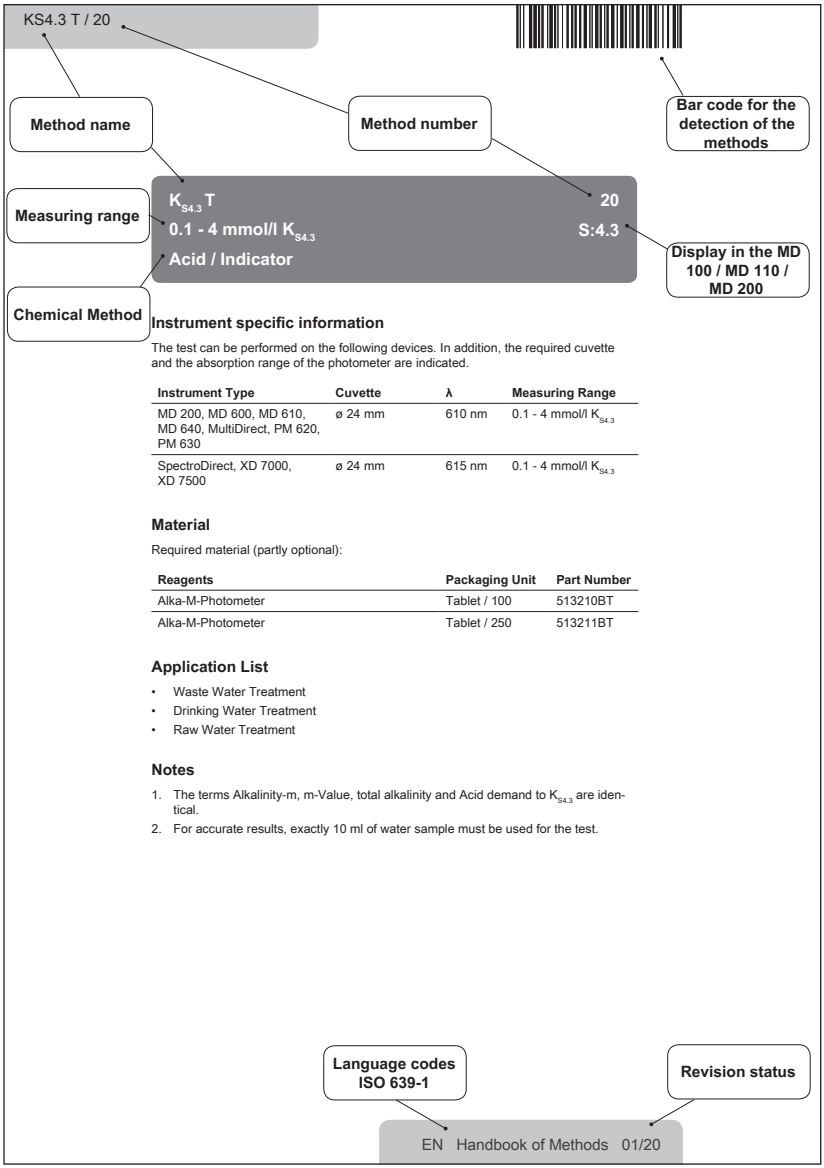
(NL) **Handboek Methoden**
Zijde 76

(DE) **Methodenhandbuch**
Seite 16

(FR) **Méthodes Manuel**
Page 40

(PT) **Métodos Manual**
Página 64

(ZH) **方法手册**
Page 88



Instrument specific information

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

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

Material

Required material (partly optional):

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

Application List

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

Notes

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

Performing test procedure

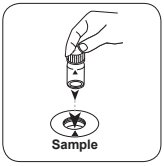
Implementation of the provision Acid capacity $K_{S4.3}$ with Tablet

Select the method on the device

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

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

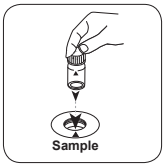
Close vial(s).



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

• • •

Dissolve tablet(s) by inverting.



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

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

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

Aluminium T M40

0.01 - 0.3 mg/L Al AL

Eriochrom Cyanine R

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Aluminium No. 1	Tablet / 100	515460BT
Aluminium No. 1	Tablet / 250	515461BT
Aluminium No. 2	Tablet / 100	515470BT
Aluminium No. 2	Tablet / 250	515471BT
Set Aluminium No. 1/No. 2 100 Pc.#	100 each	517601BT
Set Aluminium No. 1/No. 2 250 Pc.#	250 each	517602BT

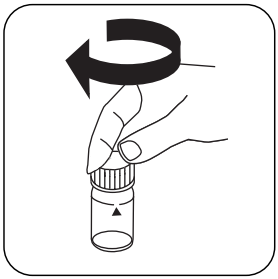
Preparation

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

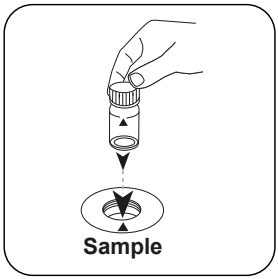
Determination of Aluminium with Tablet

Select the method on the device.

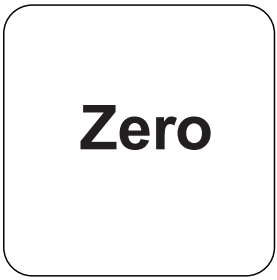
Fill 24 mm vial with **10 mL sample**.



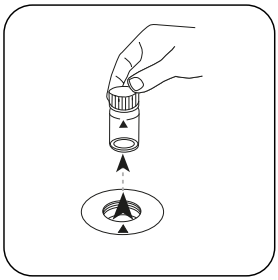
Close vial(s).



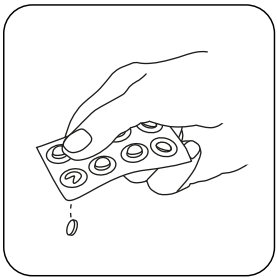
Place **sample vial** in the sample chamber. Pay attention to the positioning.



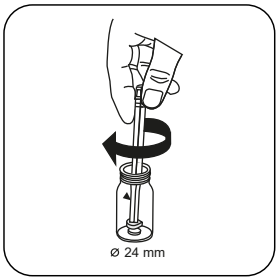
Press the **ZERO** button.



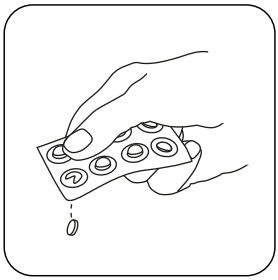
Remove the vial from the sample chamber.



Add **ALUMINIUM No. 1 tablet** .

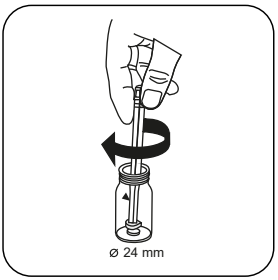


Crush tablet(s) by rotating slightly and dissolve.

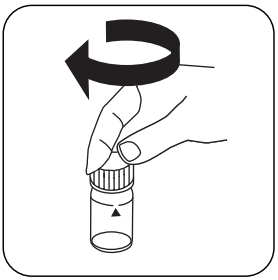


Add **ALUMINIUM No. 2 tablet** .

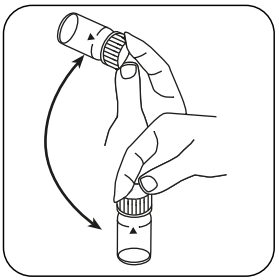
EN



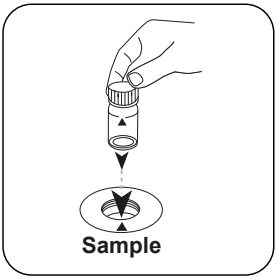
Crush tablet(s) by rotating slightly.



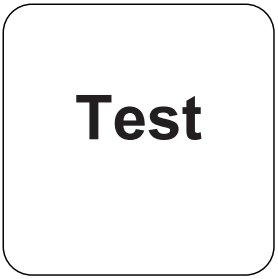
Close vial(s).



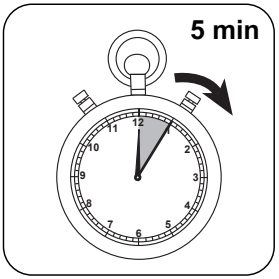
Dissolve tablet(s) by inverting.



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



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



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

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

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

Analyses

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

Unit	Cite form	Scale Factor
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Chemical Method

Eriochrom Cyanine R

Appendix

Interferences

Removeable Interferences

- A low test result may be given in the presence of Fluorides and Polyphosphates. The effect of this is generally insignificant unless the water has fluoride added artificially. In this case, the following table should be used to determine the actual concentration of aluminium.
- A special tablet ingredient prevents the measurement being affected as a result of iron and manganese.

Fluoride	Displayed value: Aluminium [mg/L]					
[mg/L F]	0.05	0.10	0.15	0.20	0.25	0.30
0.2	0.05	0.11	0.16	0.21	0.27	0.32
0.4	0.06	0.11	0.17	0.23	0.28	0.34
0.6	0.06	0.12	0.18	0.24	0.30	0.37
0.8	0.06	0.13	0.20	0.26	0.32	0.40
1.0	0.07	0.13	0.21	0.28	0.36	0.45
1.5	0.09	0.20	0.29	0.37	0.48	---

Method Validation

Limit of Detection	0.02 mg/L
Limit of Quantification	0.044 mg/L
End of Measuring Range	0.3 mg/L
Sensitivity	0.17 mg/L / Abs
Confidence Intervall	0.014 mg/L
Standard Deviation	0.006 mg/L
Variation Coefficient	3.71 %

Bibliography

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

According to

APHA Method 3500-Al B

including stirring rod, 10 cm

Aluminium PP M50

0.01 - 0.25 mg/L Al AL

Eriochrom Cyanine R

EN

Material

Required material (partly optional):

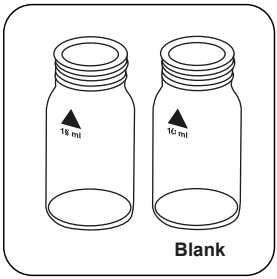
Reagents	Packaging Unit	Part Number
VARIO Aluminium Reagent, Set F20	1 pc.	535000

Preparation

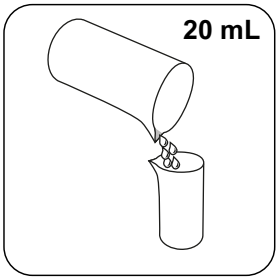
1. To get accurate results the sample temperature must be between 20 °C and 25 °C.
2. To avoid errors caused by contamination, rinse the vial and the accessories with Hydrochloric acid (approx. 20%) before the analysis. Then rinse them with deionised water.

Determination of Aluminium with Vario Powder Pack

Select the method on the device.

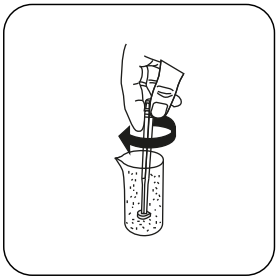


Prepare two clean 24 mm vials. Mark one as a blank.

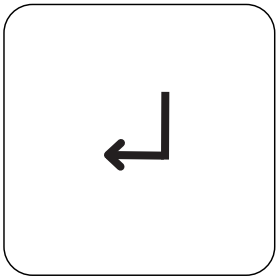


Put **20 mL sample** in 100 mL measuring beaker

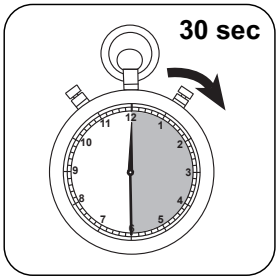
Add **Vario ALUMINIUM ECR F20 powder pack**.



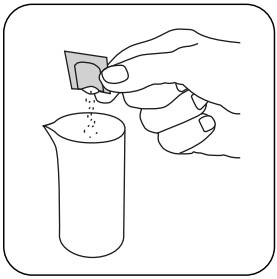
Dissolve the powder by mixing.



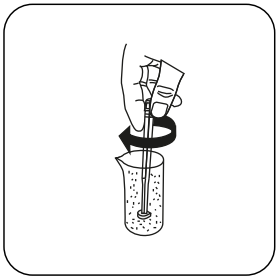
Press the **ENTER** button.



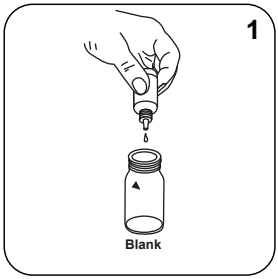
Wait for **30 second(s) reaction time**.



Add **Vario HEXAMINE F20 powder pack**.



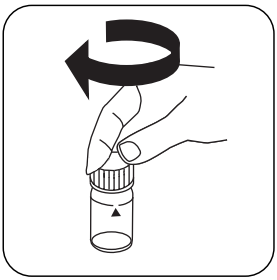
Dissolve the powder by mixing.



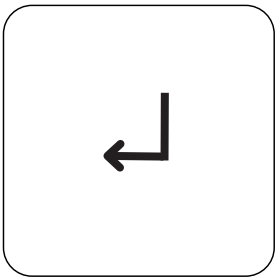
Place **1 drops Vario ALUMINIUM ECR Masking Reagent** in the blank.

EN

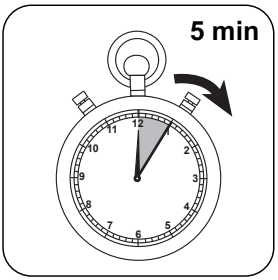
Place **10 mL pre-treated sample** in each vial.



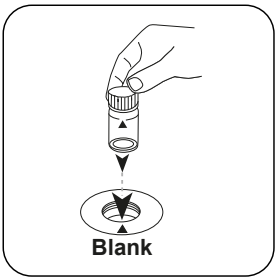
Close vial(s).



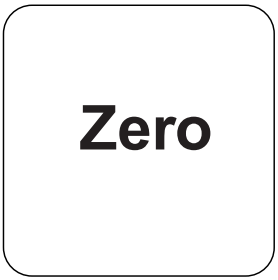
Press the **ENTER** button.



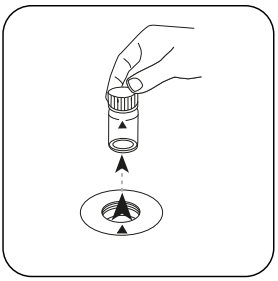
Wait for **5 minute(s) reaction time**.



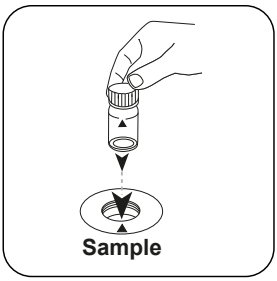
Place **blank** in the sample chamber. Pay attention to the positioning.



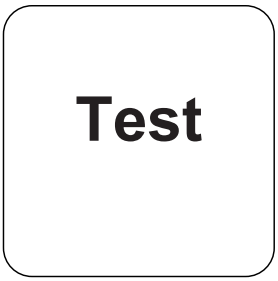
Press the **ZERO** button.



Remove the vial from the sample chamber.



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



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

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

Analyses

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

Unit	Cite form	Scale Factor
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Chemical Method

Eriochrom Cyanine R

Appendix

Interferences

Removeable Interferences

- A low test result may be given in the presence of Fluorides and Polyphosphates. The effect of this is generally insignificant unless the water has fluoride added artificially. In this case, the following table should be used to determine the actual concentration of aluminium.

Fluoride	Displayed value: Aluminium [mg/L]					
[mg/L F]	0.05	0.10	0.15	0.20	0.25	0.30
0.2	0.05	0.11	0.16	0.21	0.27	0.32
0.4	0.06	0.11	0.17	0.23	0.28	0.34
0.6	0.06	0.12	0.18	0.24	0.30	0.37
0.8	0.06	0.13	0.20	0.26	0.32	0.40
1.0	0.07	0.13	0.21	0.28	0.36	0.45
1.5	0.09	0.20	0.29	0.37	0.48	---

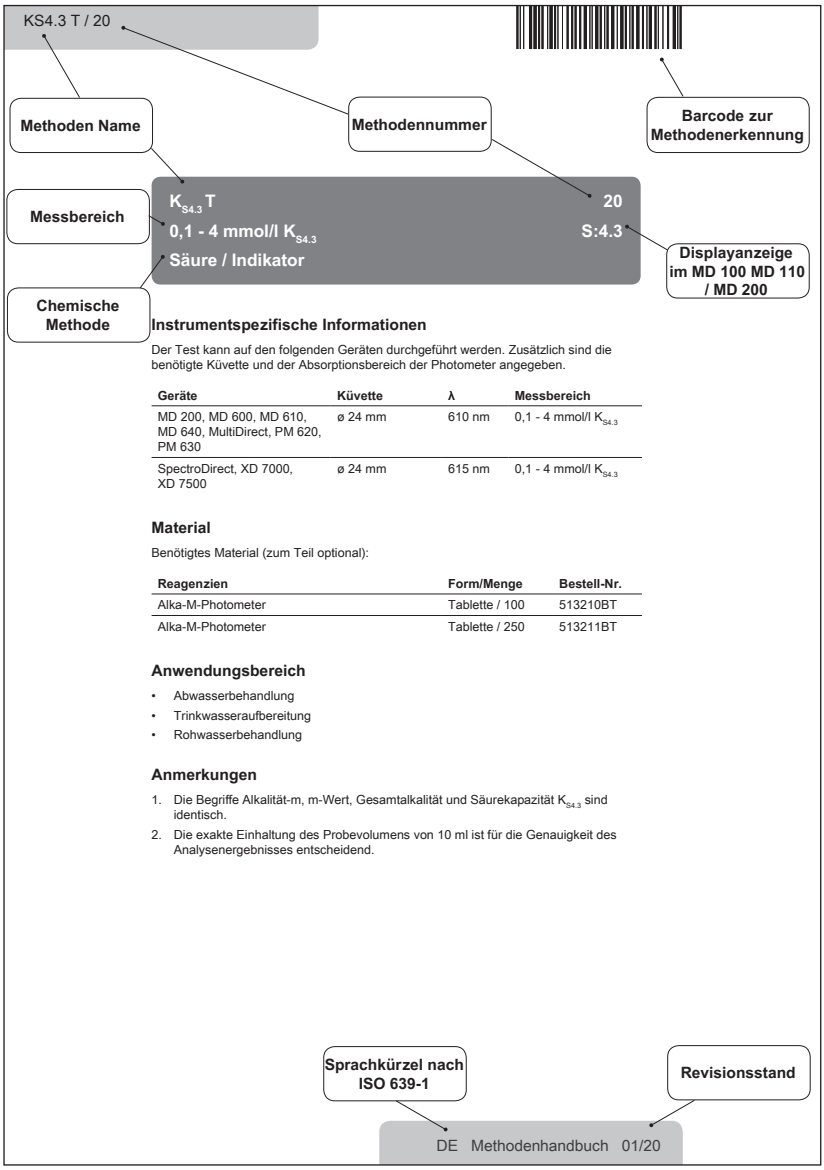
Bibliography

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

According to

APHA Method 3500-Al B

DE



Instrumentspezifische Informationen

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

Geräte	Küvette	λ	Messbereich
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630	ø 24 mm	610 nm	0,1 - 4 mmol/l $K_{S4.3}$
SpectroDirect, XD 7000, XD 7500	ø 24 mm	615 nm	0,1 - 4 mmol/l $K_{S4.3}$

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
Alka-M-Photometer	Tablette / 100	513210BT
Alka-M-Photometer	Tablette / 250	513211BT

Anwendungsbereich

- Abwasserbehandlung
- Trinkwasseraufbereitung
- Rohwasserbehandlung

Anmerkungen

1. Die Begriffe Alkalität-m, m-Wert, Gesamtalkalität und Säurekapazität $K_{S4.3}$ sind identisch.
2. Die exakte Einhaltung des Probevolumens von 10 ml ist für die Genauigkeit des Analysenergebnisses entscheidend.

Durchführung der Messung

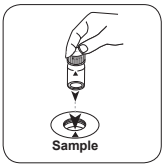
Durchführung der Bestimmung Säurekapazität $K_{S4.3}$ mit Tablette

Die Methode im Gerät auswählen.

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

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

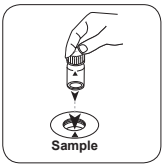
Küvette(n) verschließen.



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

• • •

Tablette(n) durch Umschwenken lösen.



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

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

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

Aluminium T M40

0,01 - 0,3 mg/L Al AL

Eriochromcyanin R

DE

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
Aluminium No. 1	Tablette / 100	515460BT
Aluminium No. 1	Tablette / 250	515461BT
Aluminium No. 2	Tablette / 100	515470BT
Aluminium No. 2	Tablette / 250	515471BT
Set Aluminium No. 1/No. 2#	je 100	517601BT
Set Aluminium No. 1/No. 2#	je 250	517602BT

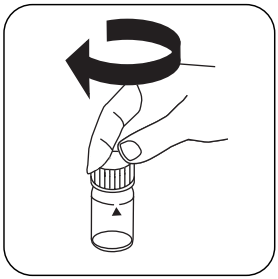
Vorbereitung

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

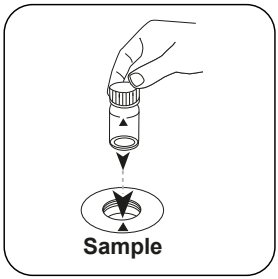
Durchführung der Bestimmung Aluminium mit Tablette

Die Methode im Gerät auswählen.

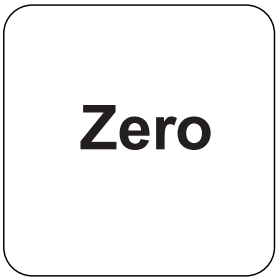
24-mm-Küvette mit **10 mL Probe** füllen.



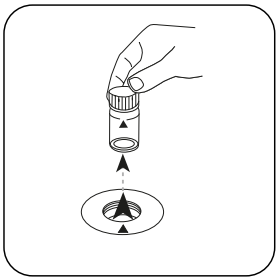
Küvette(n) verschließen.



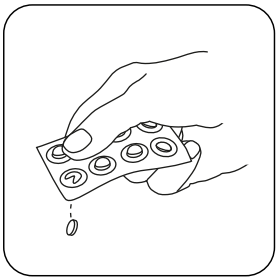
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



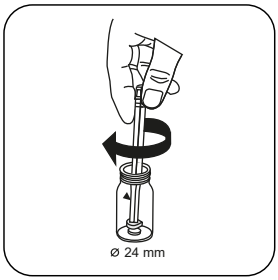
Taste **ZERO** drücken.



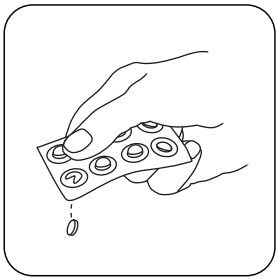
Küvette aus dem Messschacht nehmen.



Eine **ALUMINIUM No. 1 Tablette** zugeben.

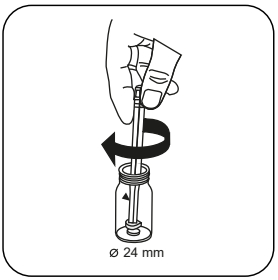


Die Tablette(n) unter leichter Drehung zerdrücken und lösen.

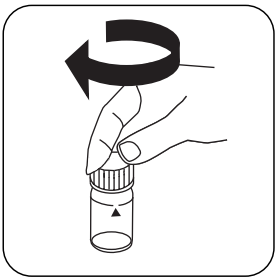


Eine **ALUMINIUM No. 2 Tablette** zugeben.

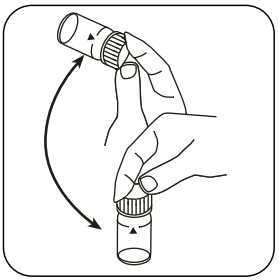
DE



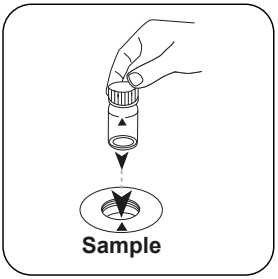
Tablette(n) unter leichter Drehung zerdrücken.



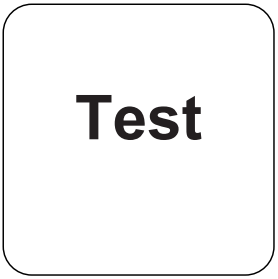
Küvette(n) verschließen.



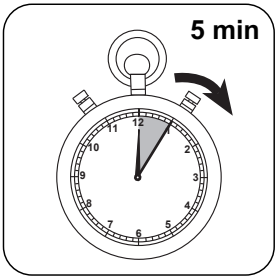
Tablette(n) durch Umschwenken lösen.



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



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



5 Minute(n) Reaktionszeit abwarten.

Nach Ablauf der Reaktionszeit erfolgt automatisch die Messung.

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

Auswertung

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

Einheit	Zitierform	Umrechnungsfaktor
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Chemische Methode

Eriochromcyanin R

Appendix

Störungen

Ausschließbare Störungen

- Durch die Anwesenheit von Fluoriden und Polyphosphaten können die Analyseergebnisse zu niedrig ausfallen. Dieser Einfluss hat im allgemeinen keine signifikante Bedeutung, es sei denn, das Wasser wird künstlich fluoriert. In diesem Fall kann die unten angegebene Tabelle angewandt werden, um die tatsächliche Aluminiumkonzentration zu bestimmen.
- Störungen durch Eisen und Mangan werden durch einen speziellen Tabletteninhaltsstoff verhindert.

Fluorid	Wert im Display: Aluminium [mg/L]					
[mg/L F]	0,05	0,10	0,15	0,20	0,25	0,30
0,2	0,05	0,11	0,16	0,21	0,27	0,32
0,4	0,06	0,11	0,17	0,23	0,28	0,34
0,6	0,06	0,12	0,18	0,24	0,30	0,37
0,8	0,06	0,13	0,20	0,26	0,32	0,40
1,0	0,07	0,13	0,21	0,28	0,36	0,45
1,5	0,09	0,20	0,29	0,37	0,48	---

Methodenvalidierung

Nachweisgrenze	0.02 mg/L
Bestimmungsgrenze	0.044 mg/L
Messbereichsende	0.3 mg/L
Empfindlichkeit	0.17 mg/L / Abs
Vertrauensbereich	0.014 mg/L
Verfahrensstandardabweichung	0.006 mg/L
Verfahrensvariationskoeffizient	3.71 %

Literaturverweise

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

Gemäß

APHA Method 3500-Al B

inklusive Rührstab

Aluminium PP M50

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

Eriochromcyanin R

DE

Material

Benötigtes Material (zum Teil optional):

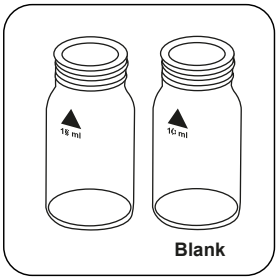
Reagenzien	Form/Menge	Bestell-Nr.
VARIO Aluminium Set 20 ml	1 St.	535000

Vorbereitung

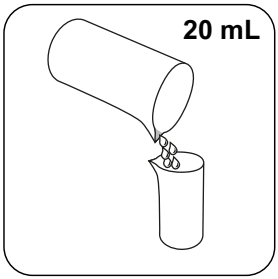
1. Zur Erzielung genauer Analyseergebnisse muss eine Probentemperatur von 20 °C bis 25 °C eingehalten werden.
2. Zur Vermeidung von Fehlern durch Verunreinigungen, die Küvette und das Zubehör vor der Analyse mit Salzsäurelösung (ca. 20%ig) und anschließend mit VE-Wasser spülen.

Durchführung der Bestimmung Aluminium mit Vario Pulverpäckchen

Die Methode im Gerät auswählen.

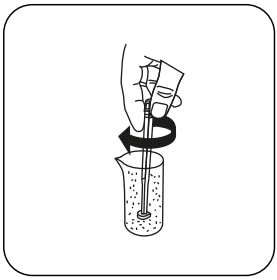


Zwei saubere 24-mm-Küvetten bereitstellen. Eine als Nullküvette kennzeichnen.

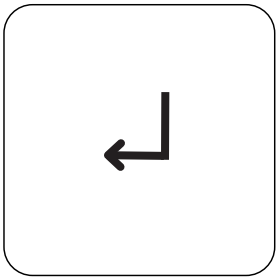


20 mL Probe in einen 100-mL-Messbecher geben.

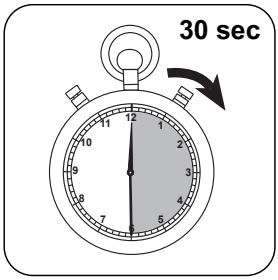
Ein **Vario ALUMINIUM ECR F20 Pulverpäckchen** zugeben.



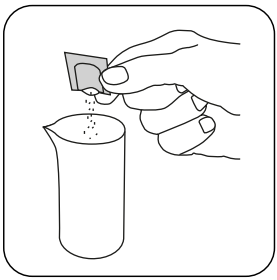
Pulver durch Rühren lösen.



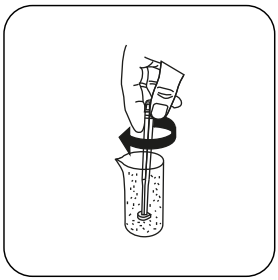
Taste **ENTER** drücken.



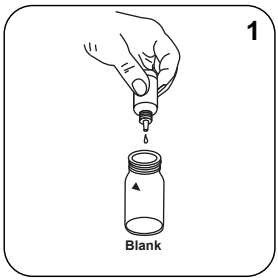
30 Sekunden Reaktionszeit abwarten.



Ein **Vario HEXAMINE F20 Pulverpäckchen** zugeben.



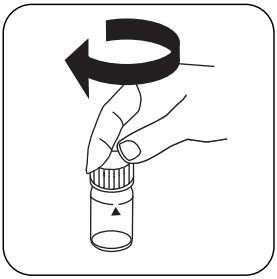
Pulver durch Rühren lösen.



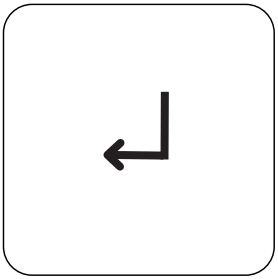
1 Tropfen Vario ALUMINIUM ECR Masking Reagent in die Nullküvette geben.

DE

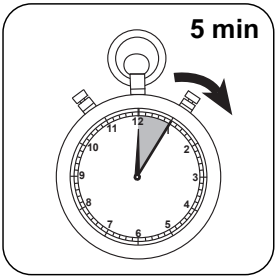
In jede Küvette **10 mL vorbehandelte Probe** geben.



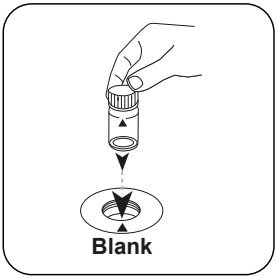
Küvette(n) verschließen.



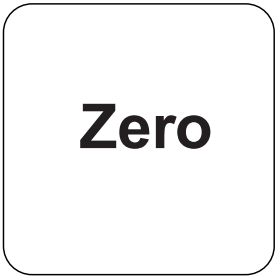
Taste **ENTER** drücken.



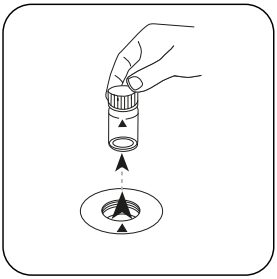
5 Minute(n) Reaktionszeit abwarten.



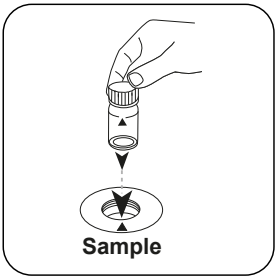
Die **Nullküvette** in den Messschacht stellen. Positionierung beachten.



Taste **ZERO** drücken.



Küvette aus dem Messschacht nehmen.



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

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

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

Auswertung

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

Einheit	Zitierform	Umrechnungsfaktor
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Chemische Methode

Eriochromcyanin R

Appendix

Störungen

Ausschließbare Störungen

- Durch die Anwesenheit von Fluoriden und Polyphosphaten können die Analyseergebnisse zu niedrig ausfallen. Dieser Einfluss hat im Allgemeinen keine signifikante Bedeutung, es sei denn, das Wasser wird künstlich fluoriert. In diesem Fall kann die unten angegebene Tabelle angewandt werden, um die tatsächliche Aluminiumkonzentration zu bestimmen.

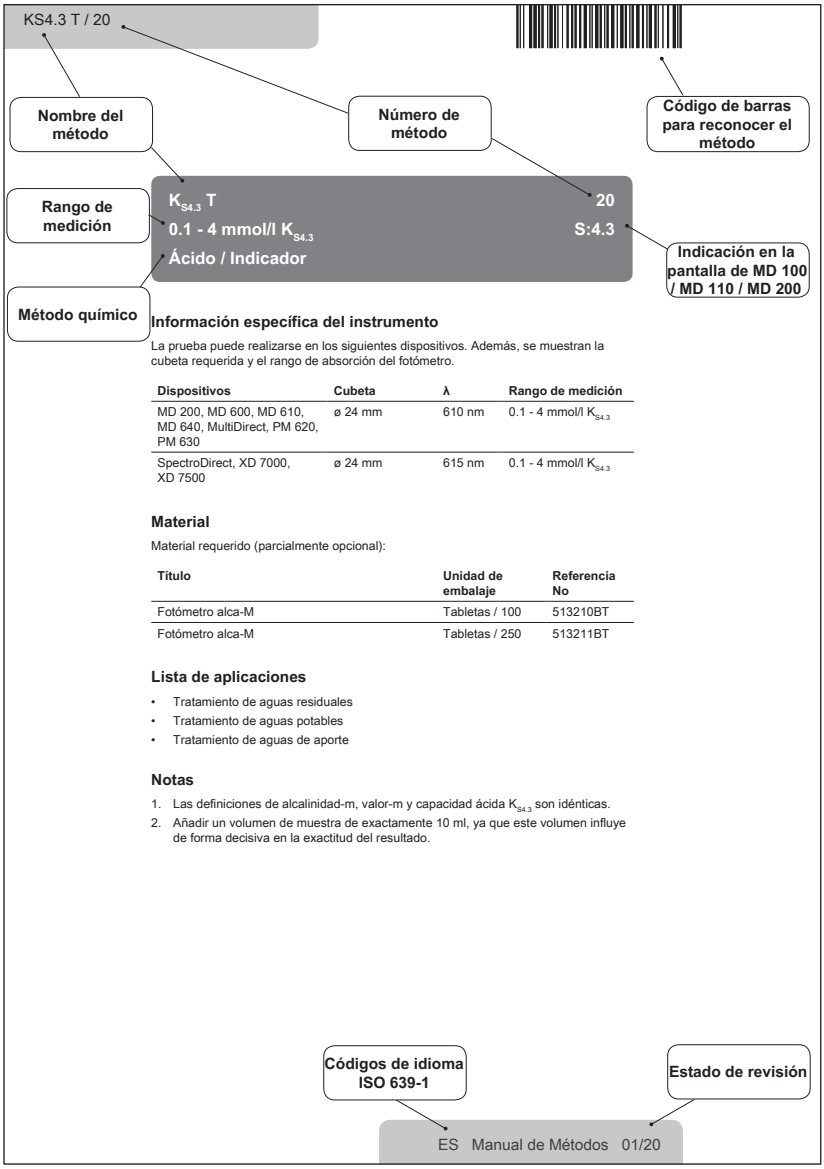
Fluorid	Wert im Display: Aluminium [mg/L]					
[mg/L F]	0,05	0,10	0,15	0,20	0,25	0,30
0,2	0,05	0,11	0,16	0,21	0,27	0,32
0,4	0,06	0,11	0,17	0,23	0,28	0,34
0,6	0,06	0,12	0,18	0,24	0,30	0,37
0,8	0,06	0,13	0,20	0,26	0,32	0,40
1,0	0,07	0,13	0,21	0,28	0,36	0,45
1,5	0,09	0,20	0,29	0,37	0,48	---

Literaturverweise

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

Gemäß

APHA Method 3500-Al B



Información específica del instrumento

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

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

Material

Material requerido (parcialmente opcional):

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

Lista de aplicaciones

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

Notas

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

Realización de la determinación

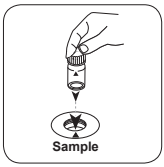
Ejecución de la determinación Capacidad ácida $K_{S4.3}$ con tableta

Seleccionar el método en el aparato.

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

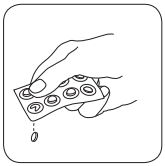
Llenar la cubeta de 24 mm con **10 ml de muestra** .

Cerrar la(s) cubeta(s).

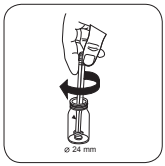


Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!

• • •



Añadir **tableta ALKA-M-PHOTOMETER**.



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

Cerrar la(s) cubeta(s).

Aluminio T M40

0.01 - 0.3 mg/L Al AL

Eriocromcianina R

ES

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Aluminio nº 1	Tabletas / 100	515460BT
Aluminio nº 1	Tabletas / 250	515461BT
Aluminio nº 2	Tabletas / 100	515470BT
Aluminio nº 2	Tabletas / 250	515471BT
Juego aluminio nº 1/nº 2#	100 cada	517601BT
Juego aluminio nº 1/nº 2#	250 cada	517602BT

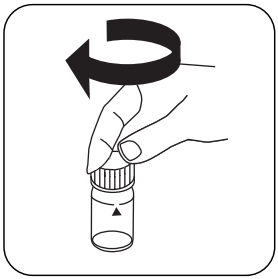
Preparación

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

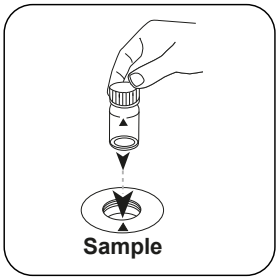
Ejecución de la determinación Aluminio T con tableta

Seleccionar el método en el aparato.

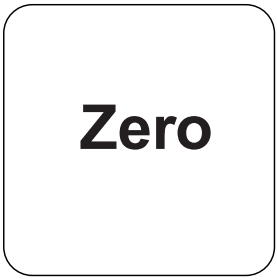
Llenar la cubeta de 24 mm con **10 mL de muestra** .



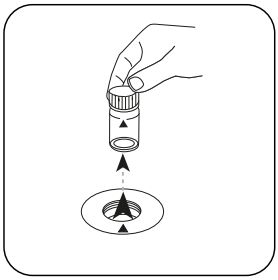
Cerrar la(s) cubeta(s).



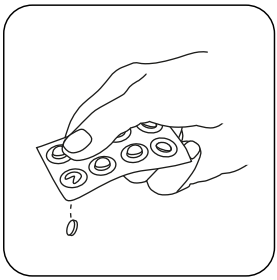
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



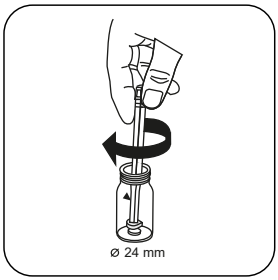
Pulsar la tecla **ZERO**.



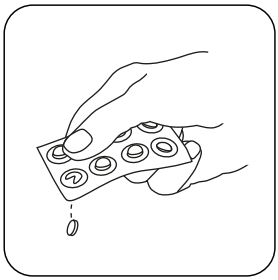
Extraer la cubeta del compartimiento de medición.



Añadir **tableta ALUMINIUM No. 1**.

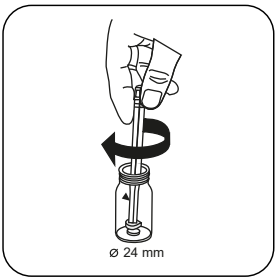


Triturar la(s) tableta(s) girando ligeramente y disolver.

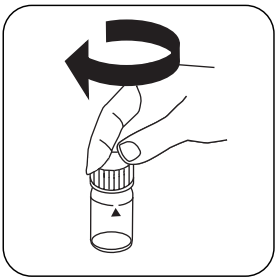


Añadir **tableta ALUMINIUM No. 2**.

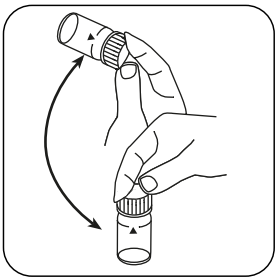
ES



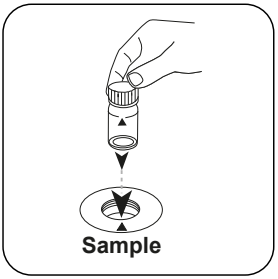
Triturar la(s) tableta(s) girando ligeramente.



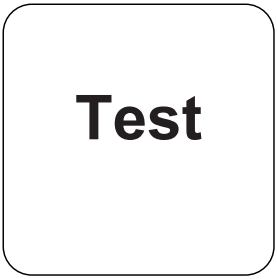
Cerrar la(s) cubeta(s).



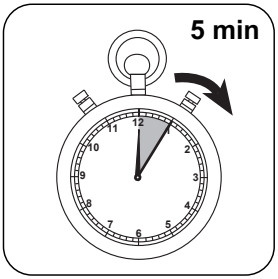
Disolver la(s) tableta(s) girando.



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



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



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

Finalizado el periodo de reacción se realizará la determinación automáticamente.

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

Evaluación

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

Unidad	Conversión	Factor de conversión
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Método químico

Eriocromcianina R

Apéndice

Interferencia

Interferencias extraibles

- La presencia de fluoruros y polifosfatos puede hacer disminuir el valor de los resultados. Esta influencia no suele tener mayor significado, a menos que el agua se fluorure artificialmente. En este caso puede usarse la tabla siguiente para determinar la concentración real de aluminio.
- Las perturbaciones producidas por el hierro y el manganeso se eliminan por la presencia de un compuesto especial en la tableta.

Fluoruro	Valor visualizado: Aluminio [mg/L]					
[mg/L F]	0,05	0,10	0,15	0,20	0,25	0,30
0,2	0,05	0,11	0,16	0,21	0,27	0,32
0,4	0,06	0,11	0,17	0,23	0,28	0,34
0,6	0,06	0,12	0,18	0,24	0,30	0,37
0,8	0,06	0,13	0,20	0,26	0,32	0,40
1,0	0,07	0,13	0,21	0,28	0,36	0,45
1,5	0,09	0,20	0,29	0,37	0,48	---

Validación del método

Límite de detección	0.02 mg/L
Límite de determinación	0.044 mg/L
Límite del rango de medición	0.3 mg/L
Sensibilidad	0.17 mg/L / Abs
Intervalo de confianza	0.014 mg/L
Desviación estándar	0.006 mg/L
Coeficiente de variación	3.71 %

Bibliografía

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

De acuerdo a

Método APHA 3500-Al B

Aluminio PP M50

0.01 - 0.25 mg/L Al AL

Eriocromcianina R

ES

Material

Material requerido (parcialmente opcional):

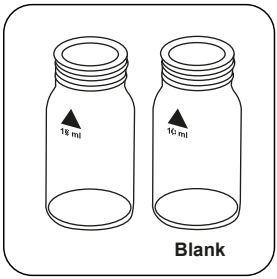
Reactivos	Unidad de embalaje	No. de referencia
Juego aluminio 20 ml VARIO	1 Cantidad	535000

Preparación

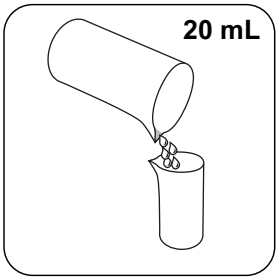
1. Para conseguir resultados de análisis exactos, la muestra acuosa deberá tener una temperatura entre 20 °C y 25 °C.
2. Para reducir errores por impurificaciones, lavar las cubetas y accesorios necesarios antes de su uso con una solución de ácido clorhídrico (aprox. 20%), enjuagándolos a continuación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

Ejecución de la determinación Aluminio con sobres de polvos Vario

Seleccionar el método en el aparato.

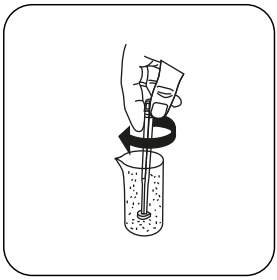


Preparar dos cubetas limpias de 24 mm. Identificar una como cubeta en blanco.

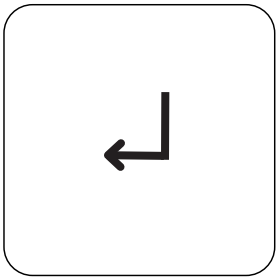


Añadir **20 mL de muestra** en un vaso de medición de 100 mL.

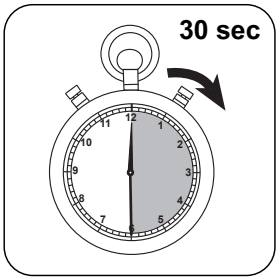
Añadir un **sobre de polvos Vario ALUMINIUM ECR F20** .



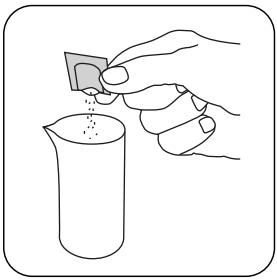
Disolver los polvos agitando.



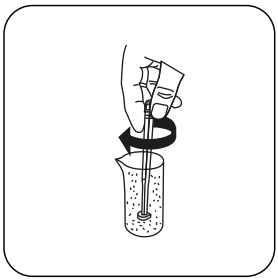
Pulsar la tecla **ENTER**.



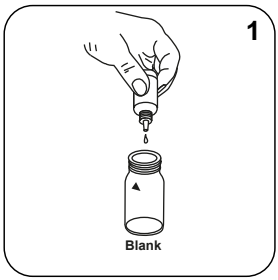
Esperar **30 segundos como periodo de reacción**.



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



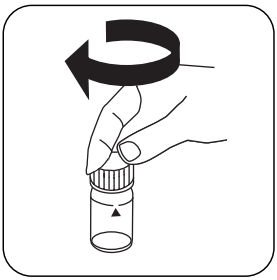
Disolver los polvos agitando.



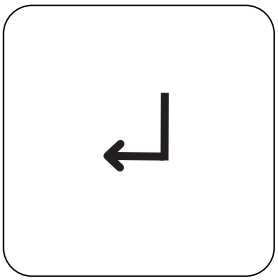
Añadir **1 gotas de Vario ALUMINIUM ECR Masking Reagent** en la cubeta en blanco.

ES

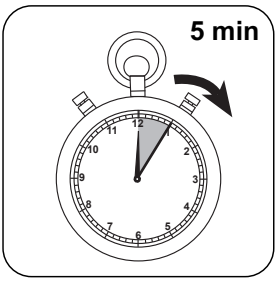
Añadir en cada cubeta **10 mL de muestra pretratada**.



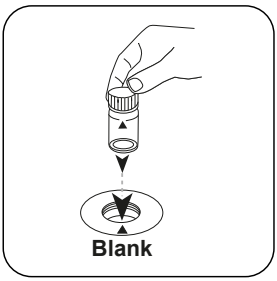
Cerrar la(s) cubeta(s).



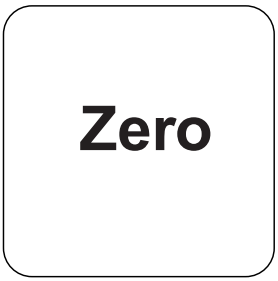
Pulsar la tecla **ENTER**.



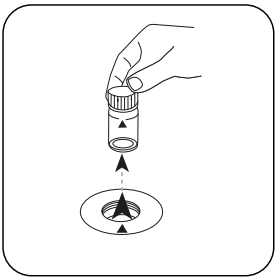
Esperar **5 minutos como periodo de reacción**.



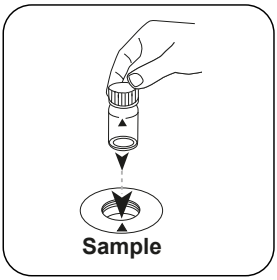
Poner la **cubeta en blanco** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



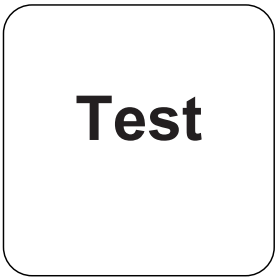
Pulsar la tecla **ZERO**.



Extraer la cubeta del compartimiento de medición.



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



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

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

Evaluación

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

Unidad	Conversión	Factor de conversión
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Método químico

Eriocromcianina R

Apéndice

Interferencia

Interferencias extraibles

- La presencia de fluoruros y polifosfatos puede hacer disminuir el valor de los resultados. Esta influencia no suele tener mayor significado, a menos que el agua se fluorure artificialmente. En este caso puede usarse la tabla siguiente para determinar la concentración real de aluminio.

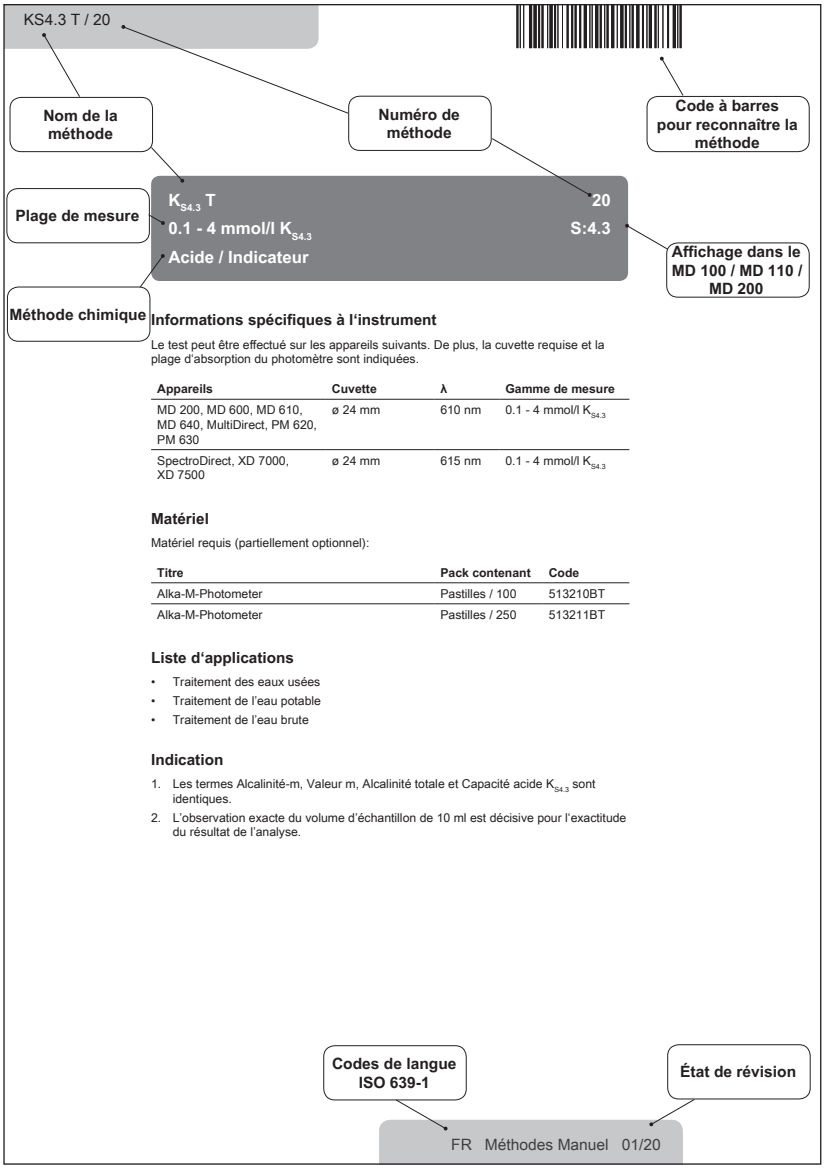
Fluoruro	Valor visualizado: Aluminio [mg/L]					
[mg/L F]	0,05	0,10	0,15	0,20	0,25	0,30
0,2	0,05	0,11	0,16	0,21	0,27	0,32
0,4	0,06	0,11	0,17	0,23	0,28	0,34
0,6	0,06	0,12	0,18	0,24	0,30	0,37
0,8	0,06	0,13	0,20	0,26	0,32	0,40
1,0	0,07	0,13	0,21	0,28	0,36	0,45
1,5	0,09	0,20	0,29	0,37	0,48	---

Bibliografía

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

De acuerdo a

Método APHA 3500-Al B



Informations spécifiques à l'instrument

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

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

Matériel

Matériel requis (partiellement optionnel):

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

Liste d'applications

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

Indication

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

Procédure du test

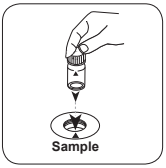
Réalisation de la quantification Capacité acide $K_{S4.3}$ avec pastille

Sélectionnez la méthode sur l'appareil.

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

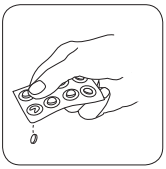
Remplissez une cuvette de 24 mm de **10 ml d'échantillon**.

Fermez la(les) cuvette(s).

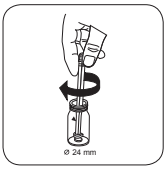


Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.

• • •



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



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

Fermez la(les) cuvette(s).

Aluminium T M40

0.01 - 0.3 mg/L Al AL

Eriochrome cyanine R

FR

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
Aluminium N° 1	Pastilles / 100	515460BT
Aluminium N° 1	Pastilles / 250	515461BT
Aluminium N° 2	Pastilles / 100	515470BT
Aluminium N° 2	Pastilles / 250	515471BT
Kit aluminium N° 1/N° 2#	100 chacun	517601BT
Kit aluminium N° 1/N° 2#	250 chacun	517602BT

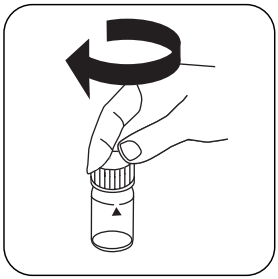
Préparation

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

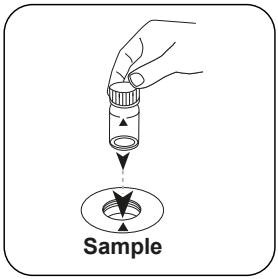
Réalisation de la quantification Aluminium avec pastille

Sélectionnez la méthode sur l'appareil.

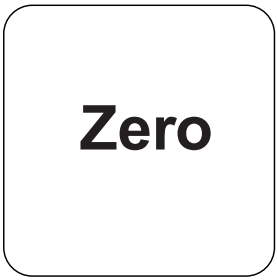
Remplissez une cuvette de 24 mm de **10 mL d'échantillon**.



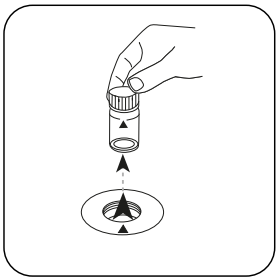
Fermez la(les) cuvette(s).



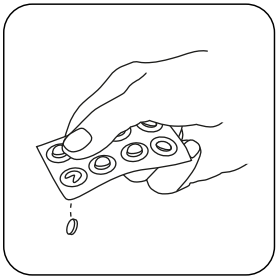
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



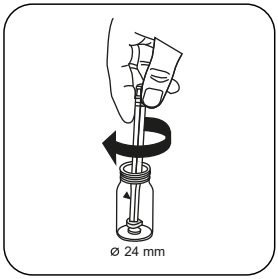
Appuyez sur la touche **ZERO**.



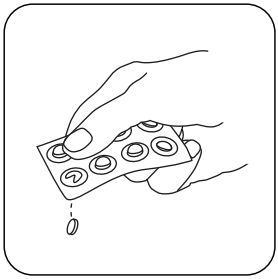
Retirez la cuvette de la chambre de mesure.



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

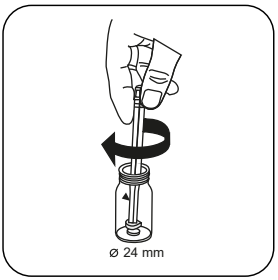


Écrasez et dissolvez la(les) pastille(s) en la(les) tournant un peu.

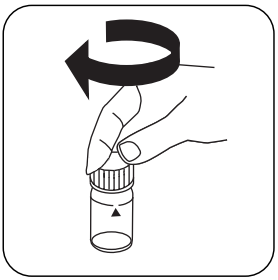


Ajoutez une **pastille de ALUMINIUM No. 2**.

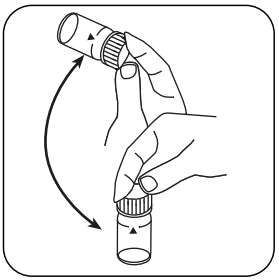
FR



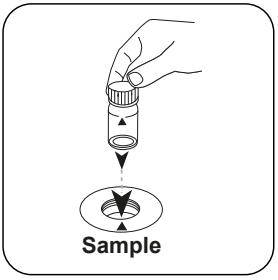
Écrasez la(les) pastille(s) en la(les) tournant un peu.



Fermez la(les) cuvette(s).

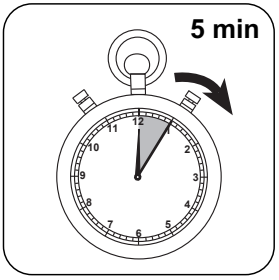


Dissolvez la(les) pastille(s) en mettant le tube plusieurs fois à l'envers.



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

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



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

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

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

Analyses

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

Unité	Formes de citation	Facteur de conversion
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Méthode chimique

Eriochrome cyanine R

Appendice

Interférences

Interférences exclues

- La présence de fluorures et de polyphosphates peut donner des résultats inférieurs à l'analyse. En général, ceci n'est pas important sauf si l'eau est fluorée artificiellement. Dans ce cas, le tableau ci-dessous sera utilisé pour quantifier la concentration réelle d'aluminium.
- Les perturbations causées par le fer et le manganèse sont empêchées par une substance spéciale contenue dans la pastille.

Fluorure	Valeur affichée : Aluminium [mg/L]					
[mg/L F]	0,05	0,10	0,15	0,20	0,25	0,30
0,2	0,05	0,11	0,16	0,21	0,27	0,32
0,4	0,06	0,11	0,17	0,23	0,28	0,34
0,6	0,06	0,12	0,18	0,24	0,30	0,37
0,8	0,06	0,13	0,20	0,26	0,32	0,40
1,0	0,07	0,13	0,21	0,28	0,36	0,45
1,5	0,09	0,20	0,29	0,37	0,48	---

Méthode Validation

Limite de détection	0.02 mg/L
Limite de détermination	0.044 mg/L
Fin de la gamme de mesure	0.3 mg/L
Sensibilité	0.17 mg/L / Abs
Intervalle de confiance	0.014 mg/L
Déviation standard	0.006 mg/L
Coefficient de variation	3.71 %

Bibliographie

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

Selon

Méthode APHA 3500-Al B

)# agitateur inclus

Aluminium PP M50

0.01 - 0.25 mg/L Al AL

Eriochrome cyanine R

FR

Matériel

Matériel requis (partiellement optionnel):

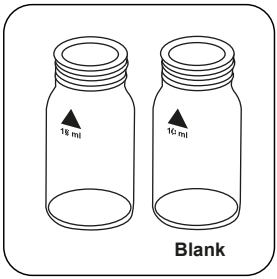
Réactifs	Pack contenant	Code
VARIO kit aluminium 20 ml	1 Pièces	535000

Préparation

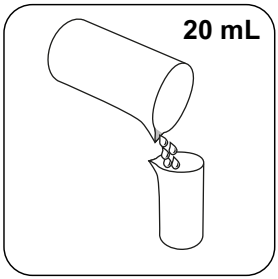
1. Pour obtenir des résultats exacts, la température de l'échantillon sera comprise entre 20 °C et 25 °C.
2. Pour éviter les erreurs causées par des impuretés, lavez la cuvette et les accessoires avant l'analyse en utilisant une solution d'acide chlorhydrique (à 20% env.) puis rincez à l'eau déminéralisée.

Réalisation de la quantification Aluminium avec sachet de poudre Vario

Sélectionnez la méthode sur l'appareil.

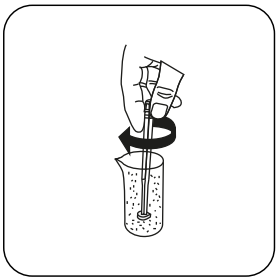


Préparez deux cuvettes propres de 24 mm. L'une des deux cuvettes sera la cuvette du blanc. Étiquetez-la.

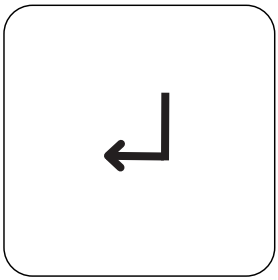


Versez **20 mL d'échantillon** dans un bécher de mesure de 100 mL.

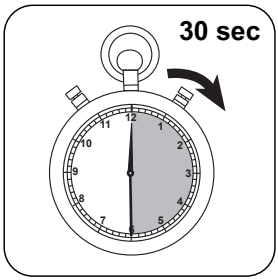
Ajoutez un **sachet de poudre Vario ALUMINIUM ECR F20**.



Dissolvez la poudre en mélangeant.

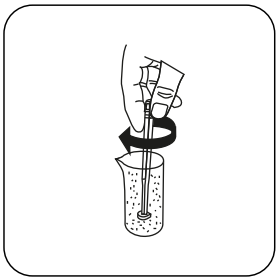


Appuyez sur la touche **ENTER**.

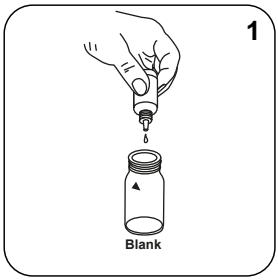


Attendez la fin du **temps de réaction de 30 secondes** .

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



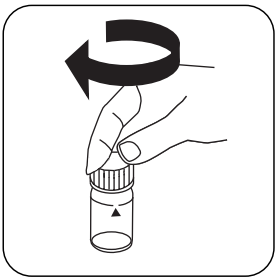
Dissolvez la poudre en mélangeant.



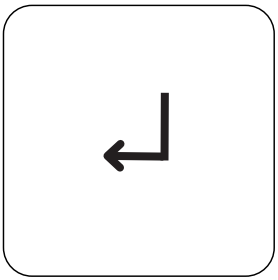
Ajoutez **1 gouttes de Vario ALUMINIUM ECR Masking Reagent** dans la cuvette du blanc.

FR

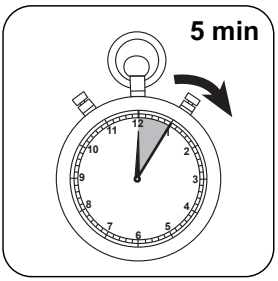
Dans chaque cuvette, versez **10 mL d'échantillon préparé**.



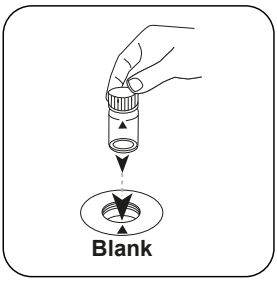
Fermez la(les) cuvette(s).



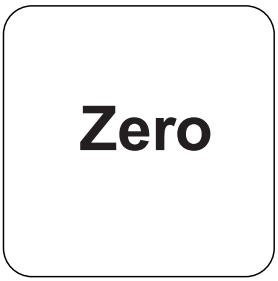
Appuyez sur la touche **ENTER**.



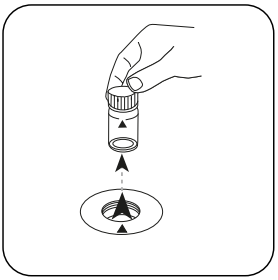
Attendez la fin du **temps de réaction de 5 minute(s)** .



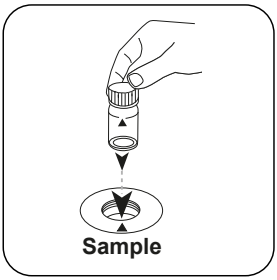
Placez la **cuvette du blanc** dans la chambre de mesure. Attention à la positionner correctement.



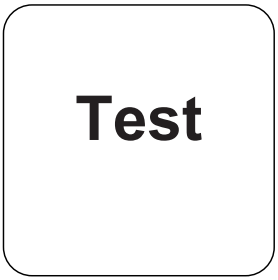
Appuyez sur la touche **ZERO**.



Retirez la cuvette de la chambre de mesure.



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



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

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

Analyses

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

Unité	Formes de citation	Facteur de conversion
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Méthode chimique

Eriochrome cyanine R

Appendice

Interférences

Interférences exclues

- La présence de fluorures et de polyphosphates peut donner des résultats inférieurs à l'analyse. En général, ceci n'est pas véritablement important sauf si l'eau est fluorée artificiellement. Dans ce cas, le tableau ci-dessous sera utilisé pour quantifier la concentration réelle d'aluminium.

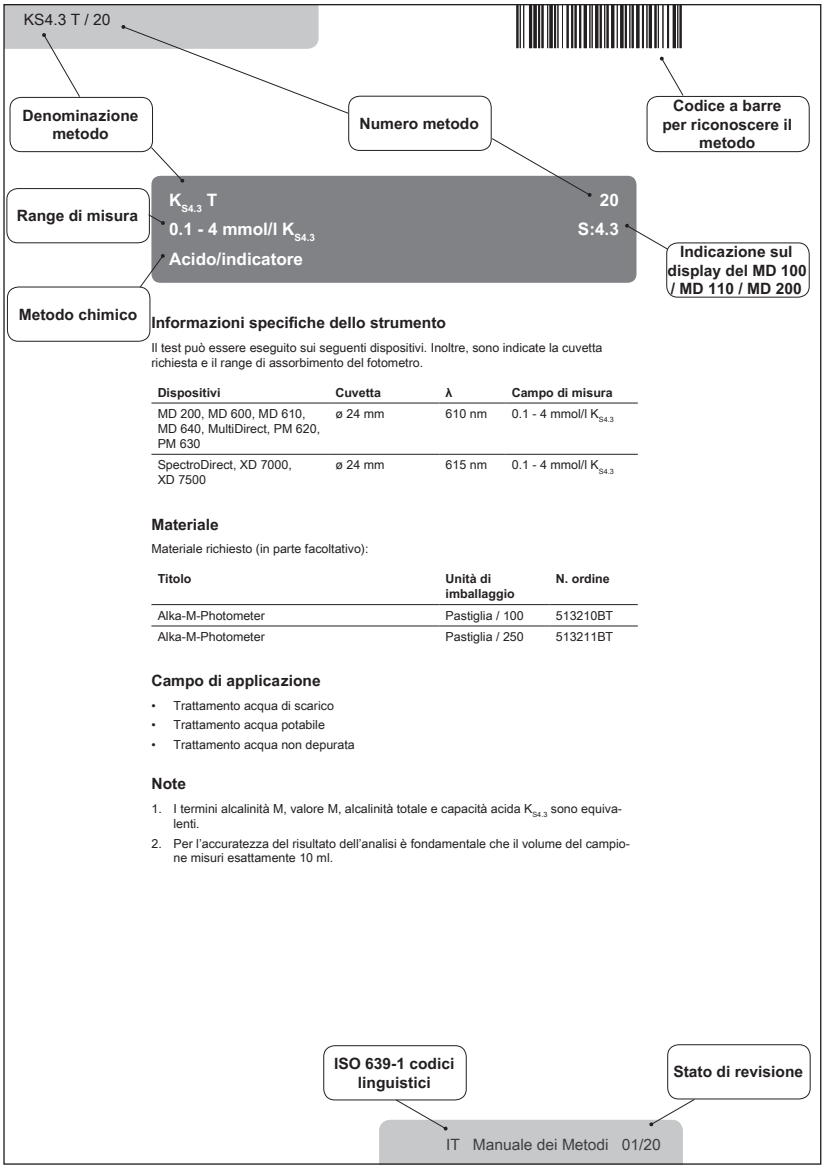
Fluorure	Valeur affichée : Aluminium [mg/L]					
[mg/L F]	0,05	0,10	0,15	0,20	0,25	0,30
0,2	0,05	0,11	0,16	0,21	0,27	0,32
0,4	0,06	0,11	0,17	0,23	0,28	0,34
0,6	0,06	0,12	0,18	0,24	0,30	0,37
0,8	0,06	0,13	0,20	0,26	0,32	0,40
1,0	0,07	0,13	0,21	0,28	0,36	0,45
1,5	0,09	0,20	0,29	0,37	0,48	---

Bibliographie

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

Selon

Méthode APHA 3500-Al B



Informazioni specifiche dello strumento

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

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

Materiale

Materiale richiesto (in parte facoltativo):

Titolo	Unità di imballaggio	N. ordine
Alka-M-Photometer	Pastiglia / 100	513210BT
Alka-M-Photometer	Pastiglia / 250	513211BT

Campo di applicazione

- Trattamento acqua di scarico
- Trattamento acqua potabile
- Trattamento acqua non depurata

Note

1. I termini alcalinità M, valore M, alcalinità totale e capacità acida $K_{S4.3}$ sono equivalenti.
2. Per l'accuratezza del risultato dell'analisi è fondamentale che il volume del campione misuri esattamente 10 ml.

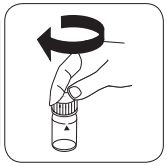
Svolgimento della misurazione

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

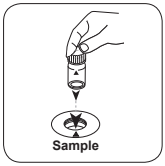
Selezionare il metodo nel dispositivo.

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

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



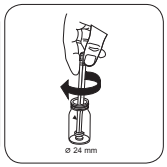
Chiudere la/e cuvetta/e.



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

• • •

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



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

Chiudere la/e cuvetta/e.

Alluminio T M40

0.01 - 0.3 mg/L Al AL

Eriocromocianina R

IT

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
Alluminio No. 1	Pastiglia / 100	515460BT
Alluminio No. 1	Pastiglia / 250	515461BT
Alluminio No. 2	Pastiglia / 100	515470BT
Alluminio No. 2	Pastiglia / 250	515471BT
Set Alluminio No. 1/no. 2#	ciascuna 100	517601BT
Set Alluminio No. 1/no. 2#	ciascuna 250	517602BT

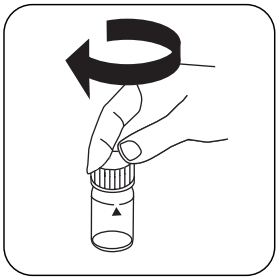
Preparazione

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

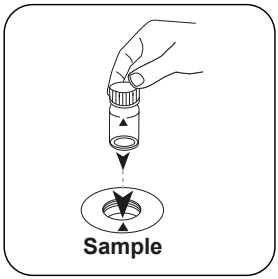
Esecuzione della rilevazione Alluminio con pastiglia

Selezionare il metodo nel dispositivo.

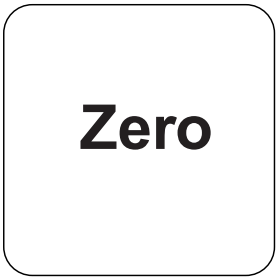
Riempire una cuvetta da 24 mm con **10 mL di campione**.



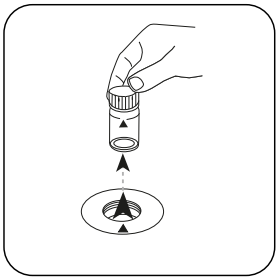
Chiudere la/e cuvetta/e.



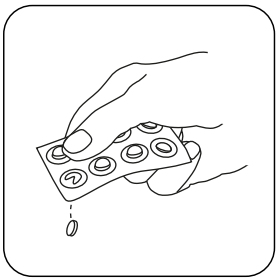
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



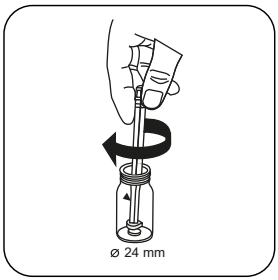
Premere il tasto **ZERO**.



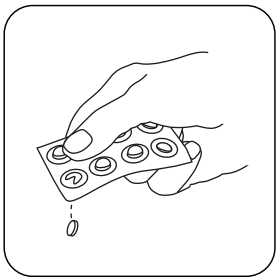
Prelevare la cuvetta dal vano di misurazione.



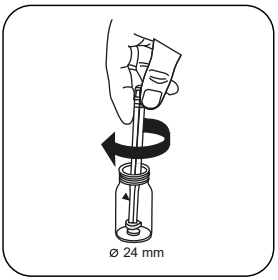
Aggiungere **una pastiglia ALUMINIUM No. 1**.



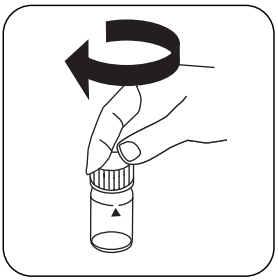
Frantumare e far sciogliere la/e pastiglia/e con una leggera rotazione.



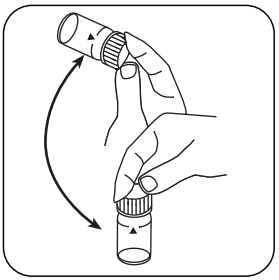
Aggiungere **una pastiglia ALUMINIUM No. 2**.



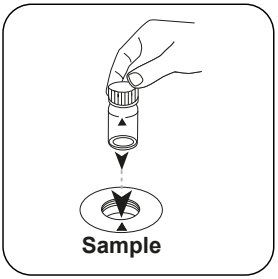
Frantumare la/e pastiglia/e con una leggera rotazione.



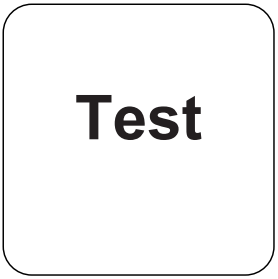
Chiudere la/e cuvetta/e.



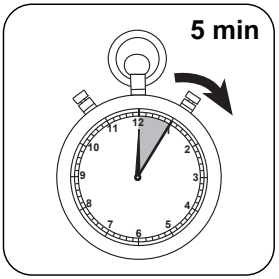
Far sciogliere la/e pastiglia/e agitando.



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



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



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

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

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

Valutazione

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

Unità di misura	Forma di citazione	Fattore di conversione
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Metodo chimico

Eriocromocianina R

Appendice

Interferenze

Interferenze escludibili

- L'eventuale presenza di fluoruri e polifosfati può far sì che l'analisi dia risultati troppo bassi. In generale tale effetto non è rilevante, a meno che l'acqua non venga fluorurata artificialmente. In questo caso è possibile determinare la concentrazione effettiva di alluminio utilizzando la tabella sottostante.
- Le interferenze da parte di ferro e manganese vengono eliminate da uno speciale agente in pastiglie.

Fluoruro	Valore sul display: Alluminio [mg/L]					
[mg/L F]	0,05	0,10	0,15	0,20	0,25	0,30
0,2	0,05	0,11	0,16	0,21	0,27	0,32
0,4	0,06	0,11	0,17	0,23	0,28	0,34
0,6	0,06	0,12	0,18	0,24	0,30	0,37
0,8	0,06	0,13	0,20	0,26	0,32	0,40
1,0	0,07	0,13	0,21	0,28	0,36	0,45
1,5	0,09	0,20	0,29	0,37	0,48	---

Validazione metodo

Limite di rilevabilità	0.02 mg/L
Limite di quantificazione	0.044 mg/L
Estremità campo di misura	0.3 mg/L
Sensibilità	0.17 mg/L / Abs
Intervallo di confidenza	0.014 mg/L
Deviazione standard della procedura	0.006 mg/L
Coefficiente di variazione della procedura	3.71 %

Riferimenti bibliografici

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

Secondo

APHA Method 3500-Al B

[1] #Bacchetta compresa

Alluminio PP M50

0.01 - 0.25 mg/L Al AL

Eriocromocianina R

IT

Materiale

Materiale richiesto (in parte facoltativo):

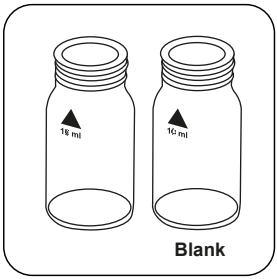
Reagenti	Unità di imballaggio	N. ordine
VARIO Aluminium Set 20 ml	1 pz.	535000

Preparazione

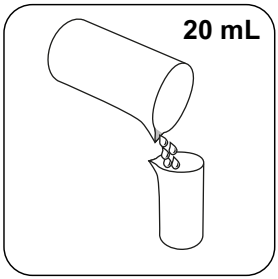
1. Perché i risultati dell'analisi siano accurati è necessario che il campione abbia una temperatura compresa tra 20 °C e 25 °C.
2. Per evitare errori dovuti alla presenza di impurità, prima dell'analisi sciacquare la cuvetta e gli accessori con una soluzione di acido cloridrico (al 20% circa) e successivamente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

Esecuzione della rilevazione Alluminio con polvere in bustine Vario

Selezionare il metodo nel dispositivo.

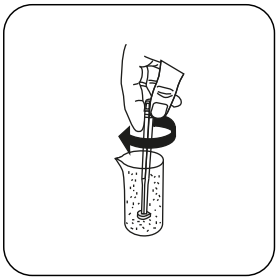


Preparare due cuvette pulite da 24 mm. Contrassegnare una cuvetta come cuvetta zero.

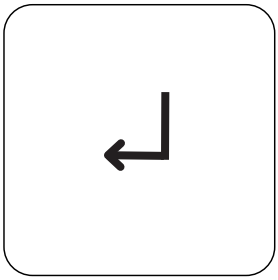


Immettere **20 mL di campione** in un misurino da 100 mL.

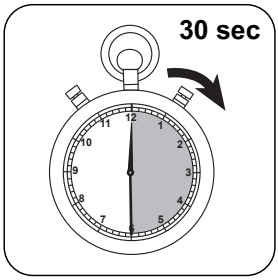
Aggiungere **una bustina di polvere Vario ALUMINIUM ECR F20**.



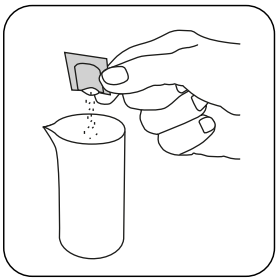
Far sciogliere la polvere agitando.



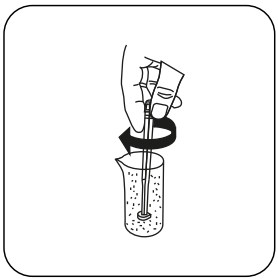
Premere il tasto **ENTER**.



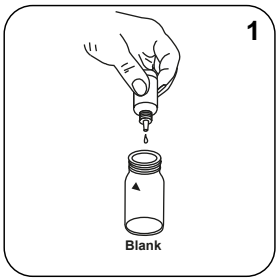
Attendere un **tempo di reazione di 30 secondi** .



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



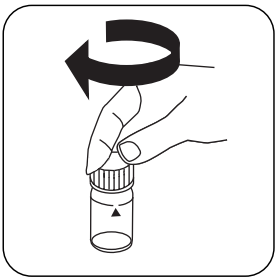
Far sciogliere la polvere agitando.



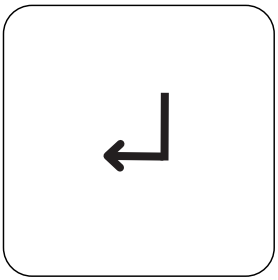
Introdurre **1 gocce di Vario ALUMINIUM ECR Masking Reagent** nella cuvetta zero.

IT

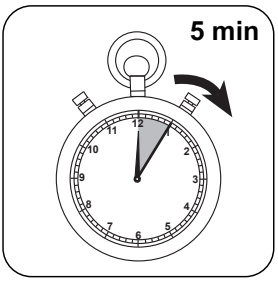
Immettere **10 mL di campione pretrattato** in ogni cuvetta.



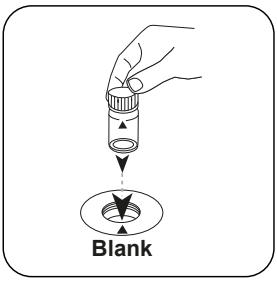
Chiudere la/e cuvetta/e.



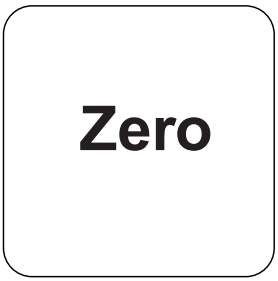
Premere il tasto **ENTER**.



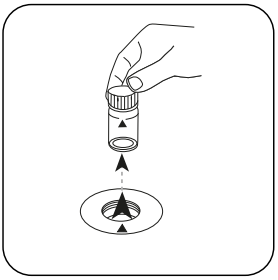
Attendere un **tempo di reazione di 5 minuto/i** .



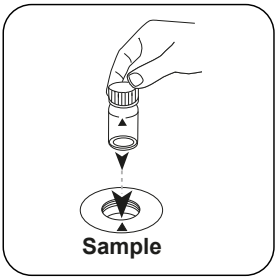
Posizionare la **cuvetta zero** nel vano di misurazione. Fare attenzione al posizionamento.



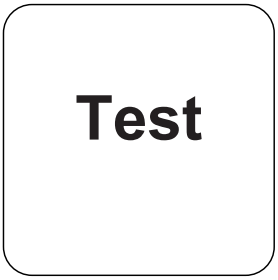
Premere il tasto **ZERO**.



Prelevare la cuvetta dal vano di misurazione.



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



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

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

Valutazione

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

Unità di misura	Forma di citazione	Fattore di conversione
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Metodo chimico

Eriocromocianina R

Appendice

Interferenze

Interferenze escludibili

- L'eventuale presenza di fluoruri e polifosfati può far sì che l'analisi dia risultati troppo bassi. In generale tale effetto non è rilevante, a meno che l'acqua non venga fluorurata artificialmente. In questo caso è possibile determinare la concentrazione effettiva di alluminio utilizzando la tabella sottostante.

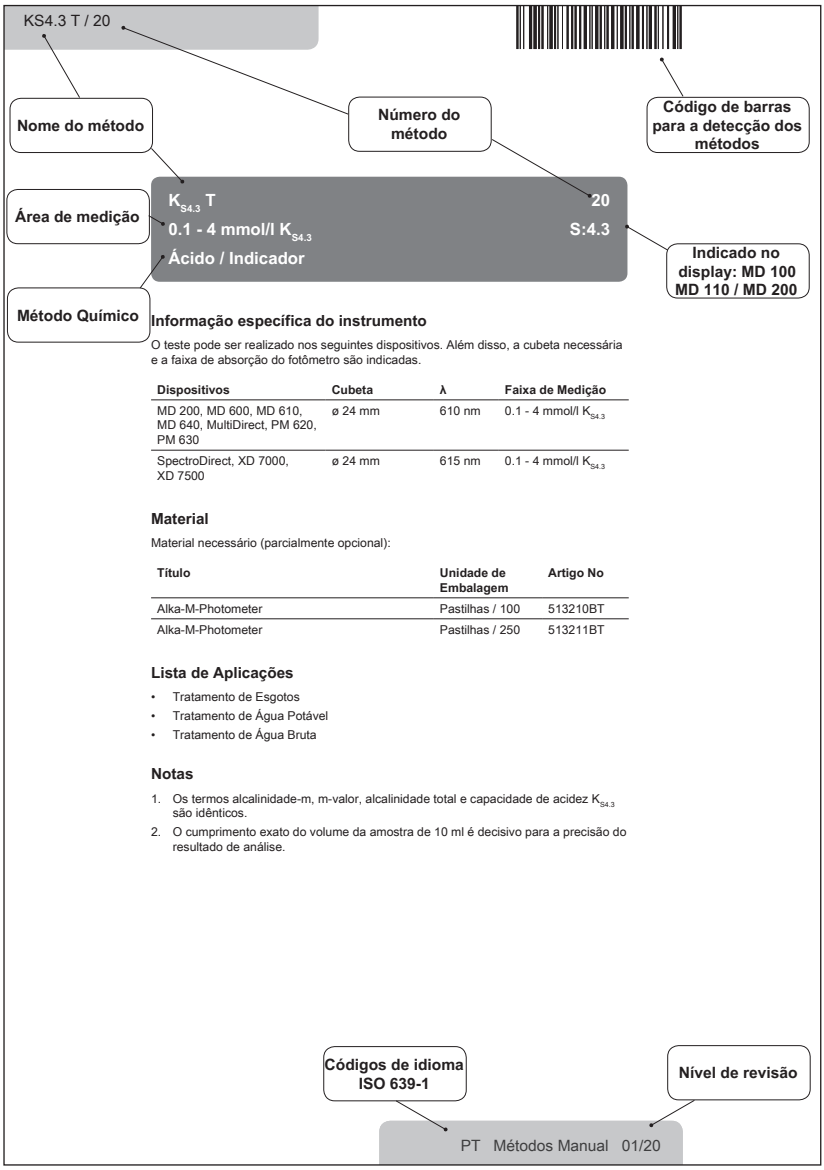
Fluoruro	Valore sul display: Alluminio [mg/L]					
[mg/L F]	0,05	0,10	0,15	0,20	0,25	0,30
0,2	0,05	0,11	0,16	0,21	0,27	0,32
0,4	0,06	0,11	0,17	0,23	0,28	0,34
0,6	0,06	0,12	0,18	0,24	0,30	0,37
0,8	0,06	0,13	0,20	0,26	0,32	0,40
1,0	0,07	0,13	0,21	0,28	0,36	0,45
1,5	0,09	0,20	0,29	0,37	0,48	---

Riferimenti bibliografici

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

Secondo

APHA Method 3500-Al B


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

Efetuar a medição

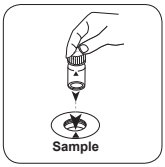
Realização da determinação Capacidade de acidez $K_{S4.3}$ com pastilha

Escolher o método no equipamento.

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

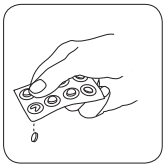
Encher a célula de 24 mm com **10 ml de amostra** .

Fechar a(s) célula(s).

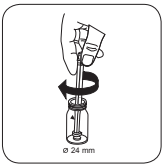


Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

• • •



Pastilha ALKA-M-PHOTOMETER.



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

Fechar a(s) célula(s).

Alumínio T M40

0.01 - 0.3 mg/L Al AL

Eriochrom Cyanine R

PT

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
Alumínio Não. 1	Pastilhas / 100	515460BT
Alumínio Não. 1	Pastilhas / 250	515461BT
Alumínio Não. 2	Pastilhas / 100	515470BT
Alumínio Não. 2	Pastilhas / 250	515471BT
Set Alumínio No. 1/Não. 2#	cada 100	517601BT
Set Alumínio No. 1/Não. 2#	cada 250	517602BT

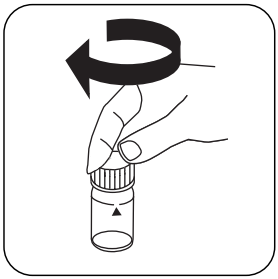
Preparação

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

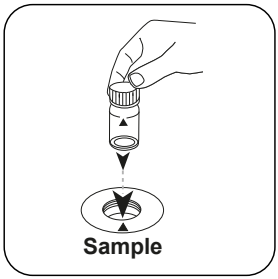
Realização da determinação Alumínio com pastilha

Escolher o método no equipamento.

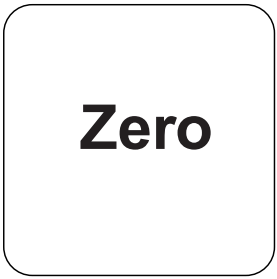
Encher a célula de 24 mm com **10 mL de amostra** .



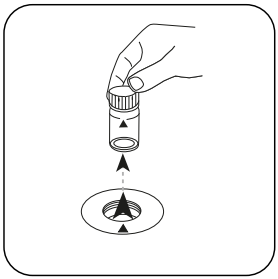
Fechar a(s) célula(s).



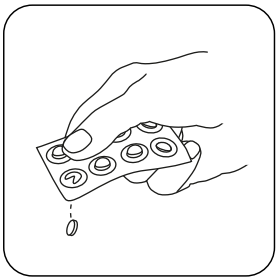
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



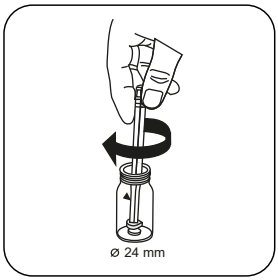
Premir a tecla **ZERO**.



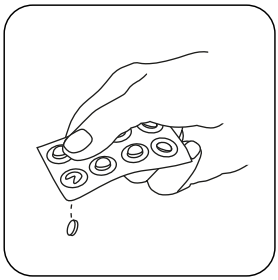
Retirar a célula do compartimento de medição.



Pastilha ALUMINIUM No. 1.

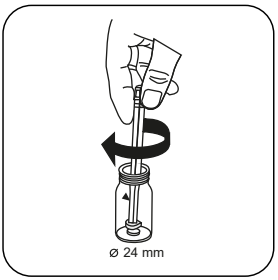


Esmagar a(s) pastilha(s) rodando ligeiramente e dissolver.

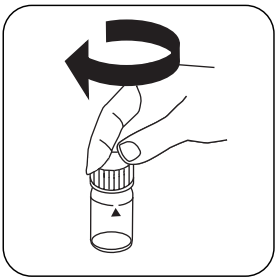


Pastilha ALUMINIUM No. 2.

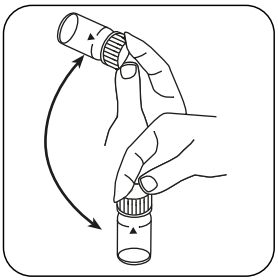
PT



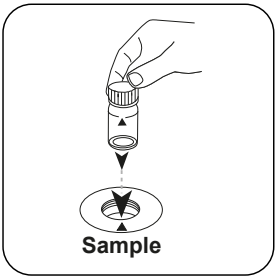
Esmagar a(s) pastilha(s) rodando ligeiramente.



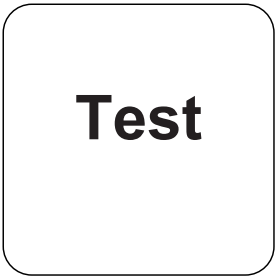
Fechar a(s) célula(s).



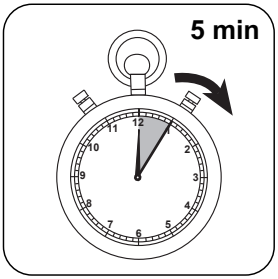
Dissolver a(s) pastilha(s) girando.



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 em mg/L Alumínio.

Análises

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

Unidade	Forma de citação	Fator de conversão
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Método Químico

Eriochrom Cyanine R

Apêndice

Texto de Interferências

Interferências Removíveis

- A presença de fluoretos e polifosfatos pode origina resultados de análise baixos. Esta influência tem geralmente um significado importante, a não ser que a água seja artificialmente fluorada. Neste caso, pode usar a tabela indicada em baixo para determinar a concentração real de alumínio.
- As interferências por ferro e manganês são impedidas por um componente especial da pastilha.

Fluoreto	Valor no visor: Alumínio [mg/L]					
[mg/L F]	0.05	0.10	0.15	0.20	0.25	0.30
0.2	0.05	0.11	0.16	0.21	0.27	0.32
0.4	0.06	0.11	0.17	0.23	0.28	0.34
0.6	0.06	0.12	0.18	0.24	0.30	0.37
0.8	0.06	0.13	0.20	0.26	0.32	0.40
1.0	0.07	0.13	0.21	0.28	0.36	0.45
1.5	0.09	0.20	0.29	0.37	0.48	---

Validação de método

Limite de Detecção	0.02 mg/L
Limite de Determinação	0.044 mg/L
Fim da Faixa de Medição	0.3 mg/L
Sensibilidade	0.17 mg/L / Abs
Faixa de Confiança	0.014 mg/L
Desvio Padrão	0.006 mg/L
Coeficiente de Variação	3.71 %

Bibliografia

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

De acordo com

APHA Method 3500-Al B

*incluindo vareta de agitação

Alumínio PP M50

0.01 - 0.25 mg/L Al AL

Eriochrom Cyanine R

PT

Material

Material necessário (parcialmente opcional):

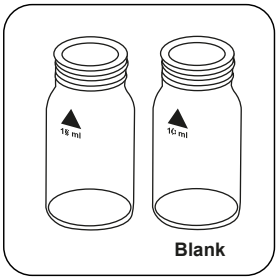
Reagentes	Unidade de Embalagem	Código do Produto
Jogo de alumínio VARIO 20 ml	1 pc.	535000

Preparação

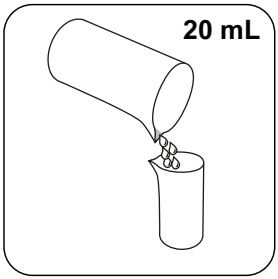
1. Para conseguir resultados de análise precisos, a temperatura da amostra deve ser mantida entre 20 °C e 25 °C.
2. Para evitar erros por causa da sujidade, deve enxaguar a célula e o acessório antes da análise com solução de ácido clorídrico (aprox. de 20 %) e depois com água desmineralizada.

Realização da determinação Alumínio com pacote de pó Vario

Escolher o método no equipamento.

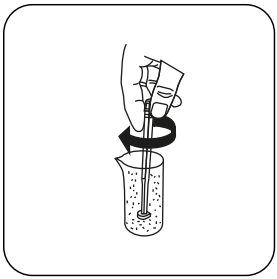


Preparar duas células de 24 mm limpas. Identificar uma célula como célula zero.

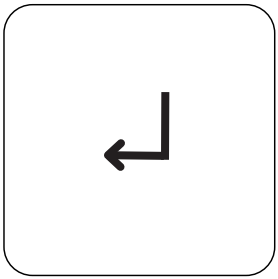


Introduzir **20 mL de amostra** num copo medida de 100 mL.

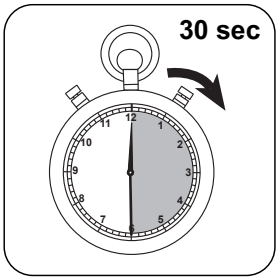
Adicionar um **pacote de pó Vario ALUMINIUM ECR F20** .



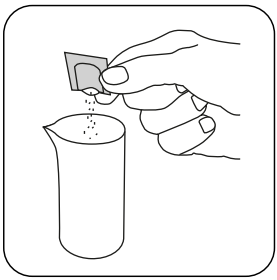
Soltar o pó por agitação.



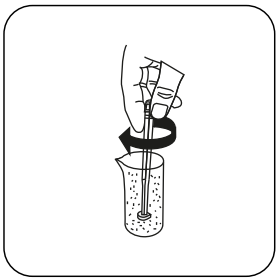
Premir a tecla **ENTER**.



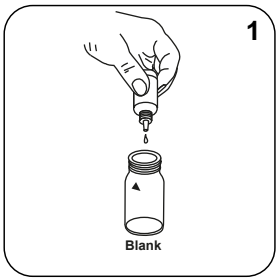
Aguardar **30 segundos de tempo de reação**.



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



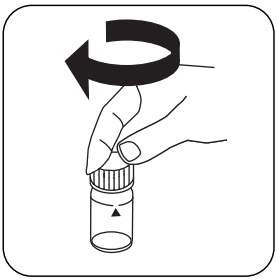
Soltar o pó por agitação.



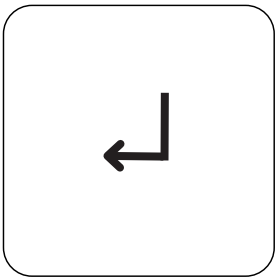
Adicionar **1 gotas Vario ALUMINIUM ECR Masking Reagent** à célula zero.

PT

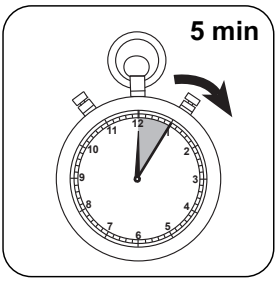
Introduzir em cada célula **10 mL de amostra preparada** .



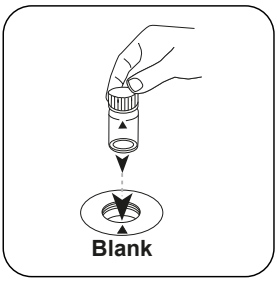
Fechar a(s) célula(s).



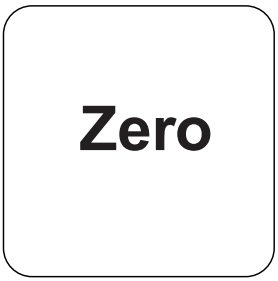
Premir a tecla **ENTER**.



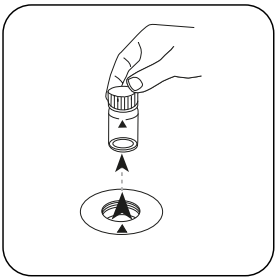
Aguardar **5 minuto(s) de tempo de reação**.



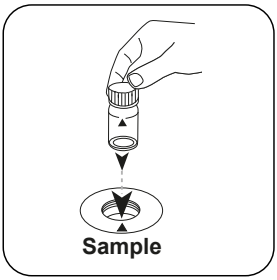
Colocar a **célula zero** no compartimento de medição. Observar o posicionamento.



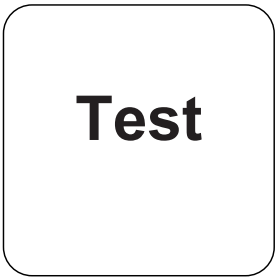
Premir a tecla **ZERO**.



Retirar a célula do compartimento de medição.



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



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

No visor aparece o resultado em mg/L Alumínio.

Análises

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

Unidade	Forma de citação	Fator de conversão
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Método Químico

Eriochrom Cyanine R

Apêndice

Texto de Interferências

Interferências Removíveis

- A presença de fluoretos e polifosfatos pode origina resultados de análise baixos. Esta influência tem geralmente um significado importante, a não ser que a água seja artificialmente fluorada. Neste caso, pode usar a tabela indicada em baixo para determinar a concentração real de alumínio.

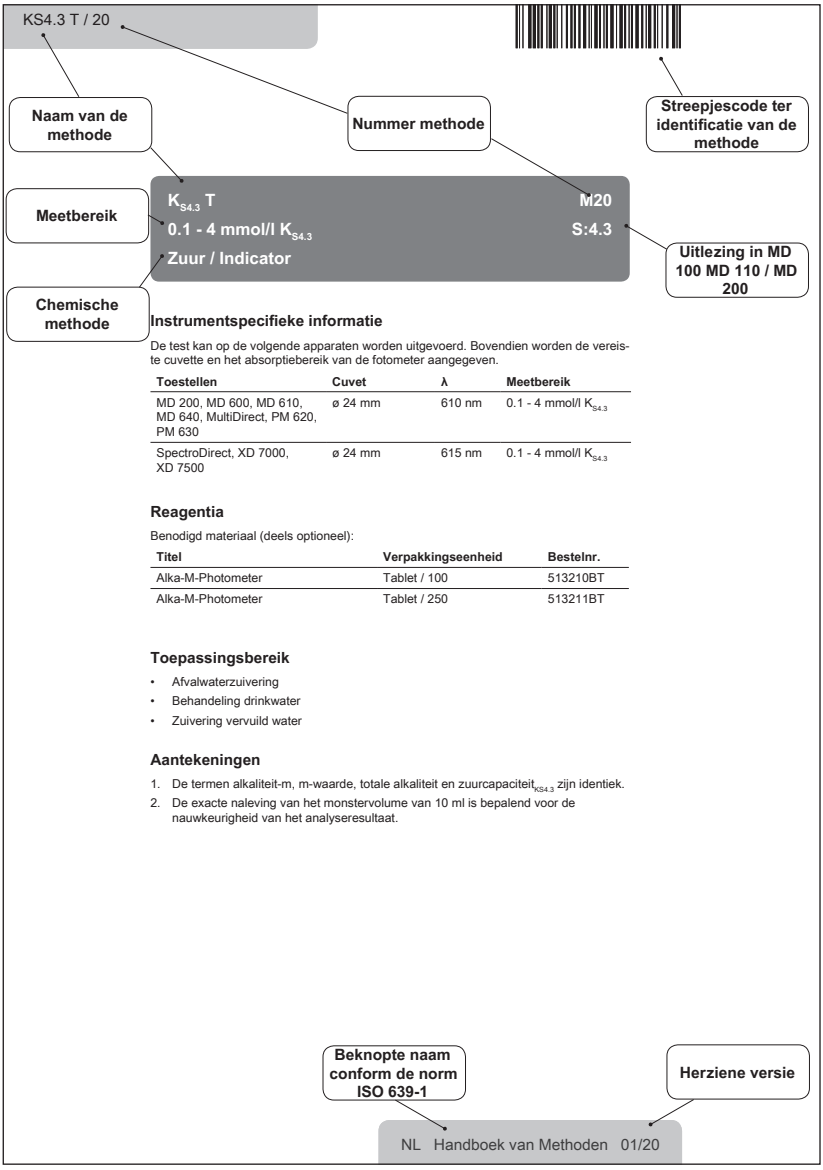
Fluoreto	Valor no visor: Alumínio [mg/L]					
[mg/L F]	0.05	0.10	0.15	0.20	0.25	0.30
0.2	0.05	0.11	0.16	0.21	0.27	0.32
0.4	0.06	0.11	0.17	0.23	0.28	0.34
0.6	0.06	0.12	0.18	0.24	0.30	0.37
0.8	0.06	0.13	0.20	0.26	0.32	0.40
1.0	0.07	0.13	0.21	0.28	0.36	0.45
1.5	0.09	0.20	0.29	0.37	0.48	---

Bibliografia

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

De acordo com

APHA Method 3500-Al B



Instrumentspecifieke informatie

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

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

Reagentia

Benodigd materiaal (deels optioneel):

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

Toepassingsbereik

- Afvalwaterzuivering
- Behandeling drinkwater
- Zuivering vervuild water

Aantekeningen

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

Uitvoering van de meting

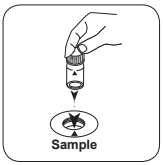
Uitvoering van de bepaling Zuurcapaciteit $K_{S4.3}$ met tablet

De methode in het apparaat selecteren.

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

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

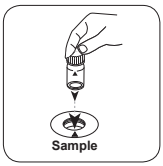
De spoelbakjes afsluiten.



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

• • •

Tabletten oplossen door om te draaien



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

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

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

Aluminium T M40

0.01 - 0.3 mg/L Al AL

Eriochromocyanine R

NL

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
Aluminium Nr. 1	Tablet / 100	515460BT
Aluminium Nr. 1	Tablet / 250	515461BT
Aluminium Nr. 2	Tablet / 100	515470BT
Aluminium Nr. 2	Tablet / 250	515471BT
Set aluminium nr. 1/Nr. 2#	per 100	517601BT
Set aluminium nr. 1/Nr. 2#	per 250	517602BT

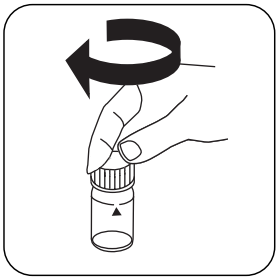
Voorbereiding

1. Om nauwkeurige analyseresultaten te bekomen, moet een monstertemperatuur van 20 tot 25 °C worden aangehouden.
2. Om fouten als gevolg van onzuiverheden te voorkomen, spoelt u het spoelbakje en toebehoren voor de analyse met zoutzuuroplossing (ca. 20 %) en vervolgens met gedeïoniseerd water.

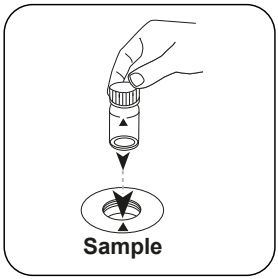
Uitvoering van de bepaling Aluminium met tablet

De methode in het apparaat selecteren.

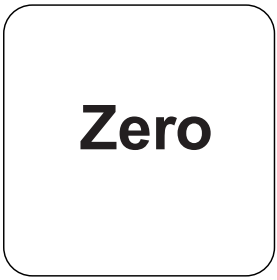
Spoelbakje van 24 mm met **10 mL staal** vullen.



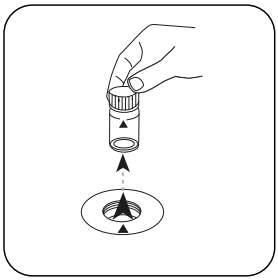
De spoelbakjes afsluiten.



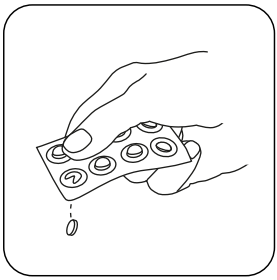
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



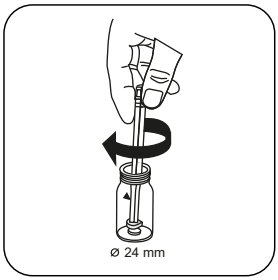
De toets **NUL** indrukken.



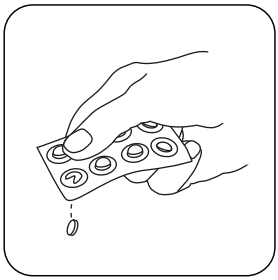
Het spoelbakje uit de meetschacht nemen.



Een ALUMINIUM Nr. 1 tablet toevoegen.

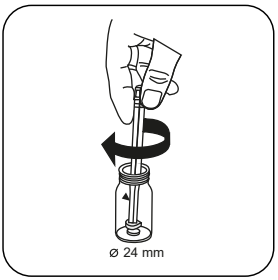


De tabletten onder lichte rotatie verpletteren en oplossen.

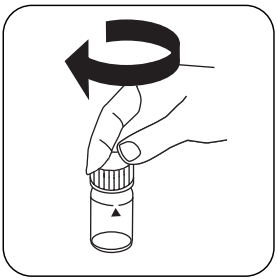


Een ALUMINIUM Nr. 2 tablet toevoegen.

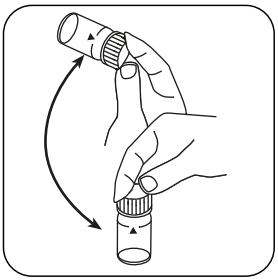
NL



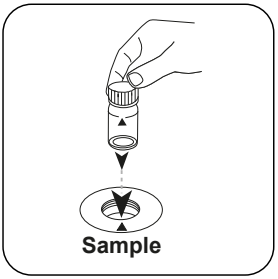
De tabletten onder lichte rotatie verpletteren.



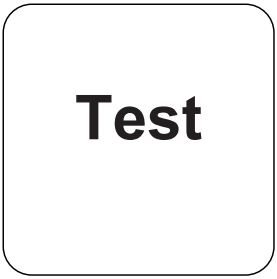
De spoelbakjes afsluiten.



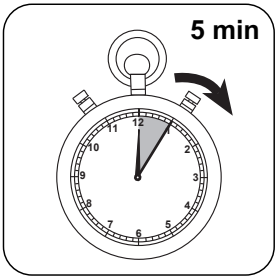
Tabletten oplossen door om te draaien



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



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



De reactietijd van 5 minuten afwachten.

Na afloop van de reactietijd wordt de meting automatisch uitgevoerd.

De display toont het resultaat in mg/L Aluminium.

Evaluatie

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

Eenheid	Dagvaardingsformulier	Omrekeningsfactor
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Chemische methode

Eriochromocyanine R

Aanhangsel

Verstoringen

Uit te sluiten verstoringen

- Door de aanwezigheid van fluoriden en polyfosfaten kunnen de analyseresultaten te laag zijn. Deze invloed is over het algemeen niet significant, tenzij het water kunstmatig gefluoreerd is. In dit geval kan de onderstaande tabel worden gebruikt om de werkelijke aluminiumconcentratie te bepalen.
- Storingen door ijzer en mangaan worden voorkomen door een speciaal tablet-ingrediënt.

Fluoride	Waarde in het display: Aluminium [mg/L]					
[mg/L F]	0,05	0,10	0,15	0,20	0,25	0,30
0,2	0,05	0,11	0,16	0,21	0,27	0,32
0,4	0,06	0,11	0,17	0,23	0,28	0,34
0,6	0,06	0,12	0,18	0,24	0,30	0,37
0,8	0,06	0,13	0,20	0,26	0,32	0,40
1,0	0,07	0,13	0,21	0,28	0,36	0,45
1,5	0,09	0,20	0,29	0,37	0,48	---

Validatie van de methodes

Aantoonbaarheidsgrens	0.02 mg/L
Bepaalbaarheidsgrens	0.044 mg/L
Einde meetbereik	0.3 mg/L
Gevoeligheid	0.17 mg/L / Abs
Betrouwbaarheidsgrenzen	0.014 mg/L
Standaardafwijking procedure	0.006 mg/L
Variatiecoefficient procedure	3.71 %

Literatuurverwijzing

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

Overeenkomstig

APHA-methode 3500-Al B

[#] met inbegrip van de mengstaaf

Aluminium PP M50

0.01 - 0.25 mg/L Al AL

Eriochromocyanine R

NL

Reagentia

Benodigd materiaal (deels optioneel):

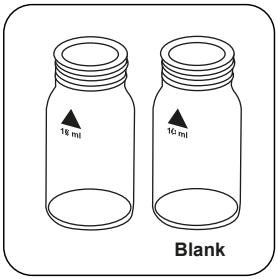
Reagentia	Verpakkingseenheid	Bestelnr.
VARIO aluminium set 20 ml	1 St.	535000

Voorbereiding

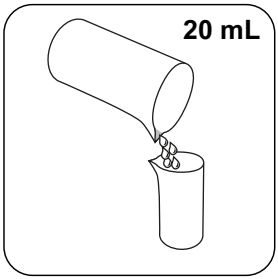
1. Om nauwkeurige analyseresultaten te bekomen, moet een monstertemperatuur van 20 tot 25 °C worden aangehouden.
2. Om fouten als gevolg van onzuiverheden te voorkomen, spoelt u het spoelbakje en toebehoren voor de analyse met zoutzuuroplossing (ca. 20 %) en vervolgens met gedeïoniseerd water.

Uitvoering van de bepaling Aluminium met Vario-poederpakje

De methode in het apparaat selecteren.

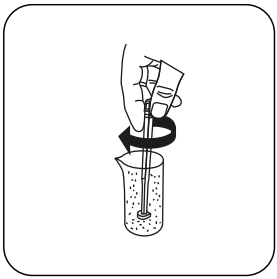


Twee propere spoelbakjes van 24 mm klaarzetten. Een als nulspoelbakje kenmerken.

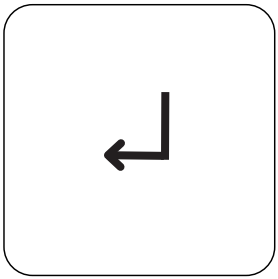


20 mL staal in een maatbeker van 100 mL doen.

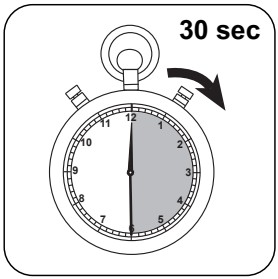
Een **Vario ALUMINIUM ECR F20 poederpakje** toevoegen.



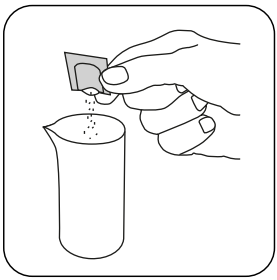
Poeder oplossen door te roeren.



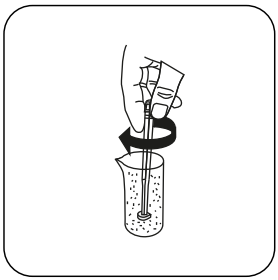
De toets **ENTER** indrukken.



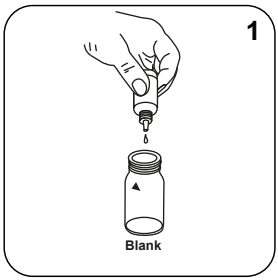
De reactietijd van 30 seconden afwachten.



Een **Vario HEXAMINE F20 poederpakje** toevoegen.



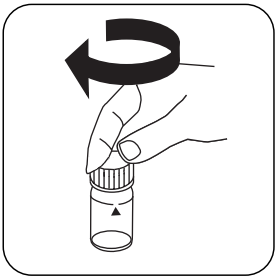
Poeder oplossen door te roeren.



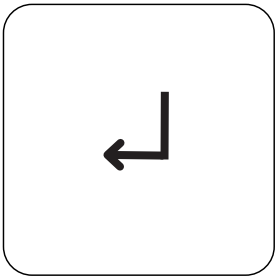
1 druppels Vario ALUMINIUM ECR Masking Reagent in het nulspoelbakje doen.

NL

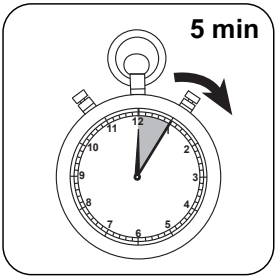
In elk spoelbakje **10 mL voorbehandeld staal** doen.



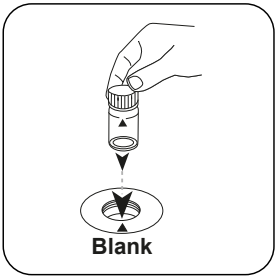
De spoelbakjes afsluiten.



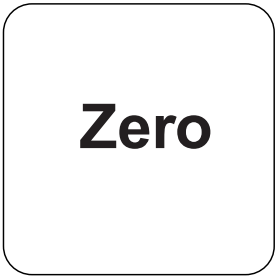
De toets **ENTER** indrukken.



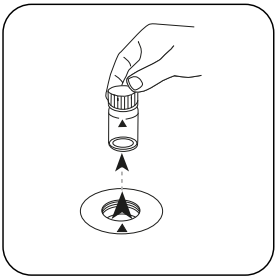
De reactietijd van 5 minuten afwachten.



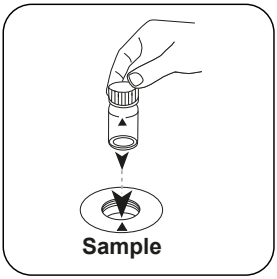
Het **nulspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



De toets **NUL** indrukken.



Het spoelbakje uit de meetschacht nemen.



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

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

De display toont het resultaat in mg/L Aluminium.

Evaluatie

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

Eenheid	Dagvaardingsformulier	Omrekeningsfactor
mg/l	Al	1
mg/l	Al_2O_3	1.8894

Chemische methode

Eriochromocyanine R

Aanhangsel

Verstoringen

Uit te sluiten verstoringen

- Door de aanwezigheid van fluoriden en polyfosfaten kunnen de analyseresultaten te laag zijn. Deze invloed is over het algemeen niet significant, tenzij het water kunstmatig isgefluoreerd. In dit geval kan de onderstaande tabel worden gebruikt om de werkelijke aluminiumconcentratie te bepalen.

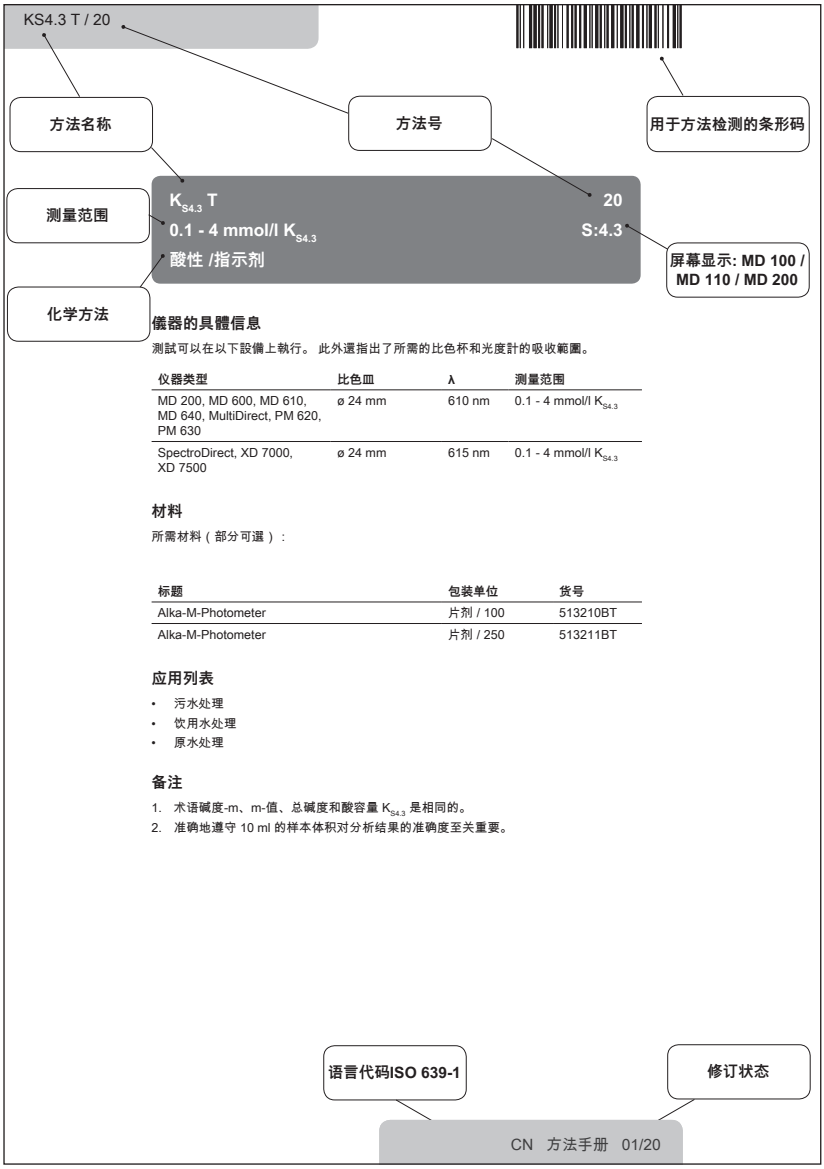
Fluoride	Waarde in het display: Aluminium [mg/L]					
[mg/L F]	0,05	0,10	0,15	0,20	0,25	0,30
0,2	0,05	0,11	0,16	0,21	0,27	0,32
0,4	0,06	0,11	0,17	0,23	0,28	0,34
0,6	0,06	0,12	0,18	0,24	0,30	0,37
0,8	0,06	0,13	0,20	0,26	0,32	0,40
1,0	0,07	0,13	0,21	0,28	0,36	0,45
1,5	0,09	0,20	0,29	0,37	0,48	---

Literatuurverwijzing

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

Overeenkomstig

APHA-methode 3500-Al B



儀器的具體信息

測試可以在以下設備上執行。 此外還指出了所需的比色杯和光度計的吸收範圍。

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

材料

所需材料（部分可選）：

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

应用列表

- 污水处理
- 饮用水处理
- 原水处理

备注

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

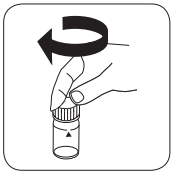
开始测量

进行测定 $K_{S4.3}$ 片剂酸容量

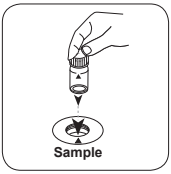
选择设备中的方法。

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

用 **10 ml** 样本填充 24 mm 比色杯。

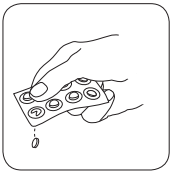


密封比色杯。

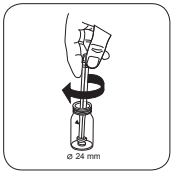


将样本比色杯放入测量轴中。注意定位。

• • •



加入 **ALKA-M-PHOTOMETER** 片剂。



用轻微的扭转压碎片剂。

密封比色杯。

CN 方法手册 01/20

T 铝 M40

0.01 - 0.3 mg/L Al AL

依来铬氰蓝 R

材料
所需材料（部分可選）：

ZH

试剂	包装单位	货号
铝 No.1	片剂 / 100	515460BT
铝 No.1	片剂 / 250	515461BT
铝 No.2	片剂 / 100	515470BT
铝 No.2	片剂 / 250	515471BT
套件铝 No.1/No.2#	各100次	517601BT
套件铝 No.1/No.2#	各250次	517602BT

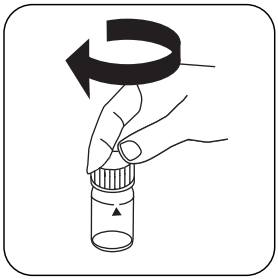
准备

1. 为了获得准确的分析结果，必须保持 20 ℃ 到 25 ℃ 的样本温度。
2. 为避免污染错误，请在分析前用盐酸溶液（约 20%）冲洗比色杯和附件，然后用去离子水冲洗。

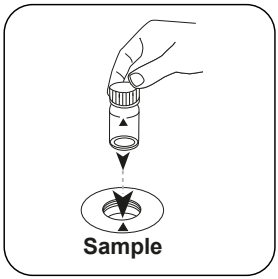
进行测定 铝片剂

选择设备中的方法。

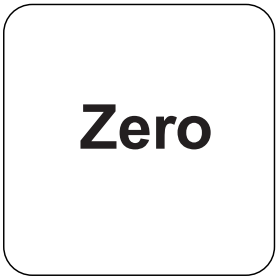
用 **10 mL 样本**填充 24 mm 比色杯。



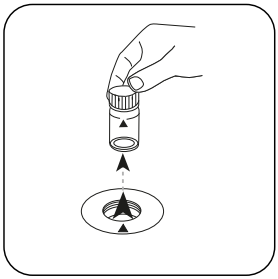
密封比色杯。



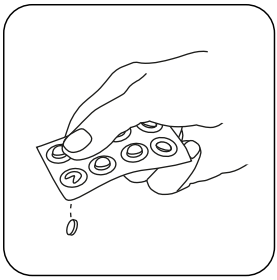
将**样本比色杯**放入测量轴中。注意定位。



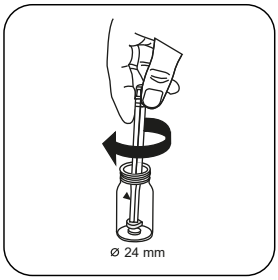
按下 **ZERO** 按钮。



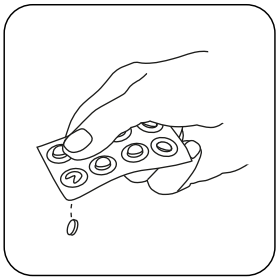
从测量轴上取下比色杯。



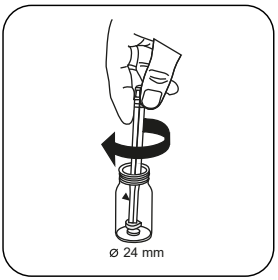
加入 **ALUMINIUM No. 1 片剂** 。



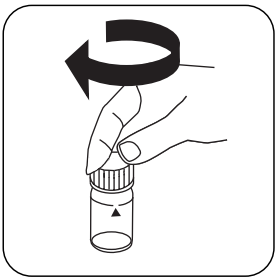
用轻微的扭转压碎片剂并溶解。



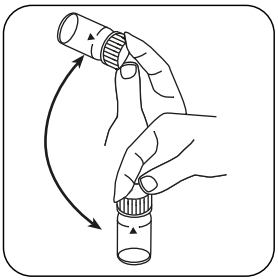
加入 **ALUMINIUM No. 2 片剂** 。



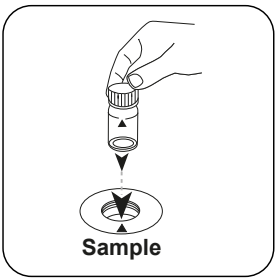
用轻微的扭转压碎片剂。



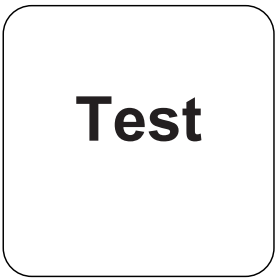
密封比色杯。



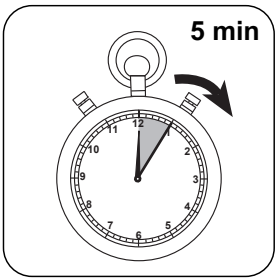
通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。



按下 **TEST** (XD: **START**) 按钮。



等待 **5 分钟反应时间** 。

反应时间结束后，自动进行测量。

结果在显示屏上显示为 mg / l 铝。

分析

下表中输出数据也可转换为其他格式表示.

单位	参考表格	因素
mg/l	Al	1
mg/l	Al_2O_3	1.8894

化学方法

依来铬氰蓝 R

附錄

干扰说明

可消除干扰

- 由于氟化物和多磷酸盐的存在，分析结果可能太低。除非在水中人为加入了少量的氟，否则这种影响一般不重要。在这种情况下，下表可以用来确定实际的铝浓度。
- 可以通过专门的片剂成分防止由铁和锰引起的干扰。

氟化物	显示值：铝 [mg/L]					
[mg/L F]	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**
0.2	0.05	0.11	0.16	0.21	0.27	0.32
0.4	0.06	0.11	0.17	0.23	0.28	0.34
0.6	0.06	0.12	0.18	0.24	0.30	0.37
0.8	0.06	0.13	0.20	0.26	0.32	0.40
1.0	0.07	0.13	0.21	0.28	0.36	0.45
1.5	0.09	0.20	0.29	0.37	0.48	---

方法验证

检出限	0.02 mg/L
测定下限	0.044 mg/L
测量上限	0.3 mg/L
灵敏度	0.17 mg/L / Abs
置信范围	0.014 mg/L
标准偏差	0.006 mg/L
变异系数	3.71 %

参考文献

Richter, F. Fresenius, Zeitschrift f. anal.Chemie (1943) 126: 426

参照

APHA 方法 3500-Al B

[#] i含搅拌棒, 10cm

铝 PP M50

0.01 - 0.25 mg/L Al AL

依来铬氰蓝 R

材料
所需材料（部分可選）：

ZH

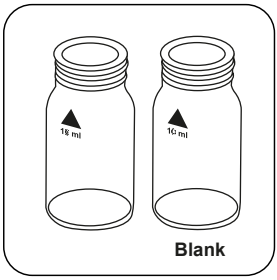
试剂	包装单位	货号
VARIO 铝套件 20 ml	1 片	535000

准备

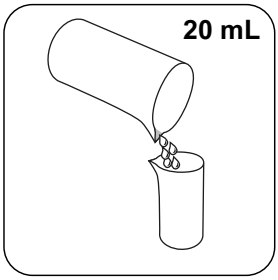
1. 为了获得准确的分析结果，必须保持 20 ℃ 到 25 ℃ 的样本温度。
2. 为避免污染错误，请在分析前用盐酸溶液（约 20%）冲洗比色杯和附件，然后用去离子水冲洗。

进行测定 Vario 铝粉包

选择设备中的方法。

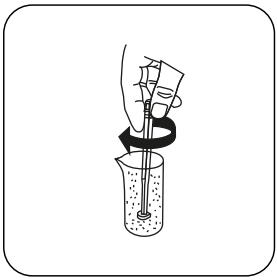


准备两个干净的 24 mm 比色杯。将一个比色杯标记为空白比色杯。

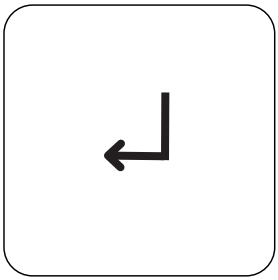


加入 **20 mL 样本**到 100 mL 量杯中。

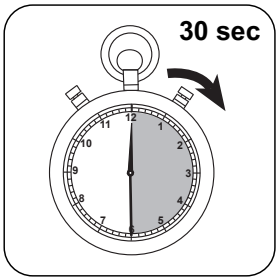
加入 **Vario ALUMINIUM ECR F20 粉包** 。



搅拌溶解粉末。

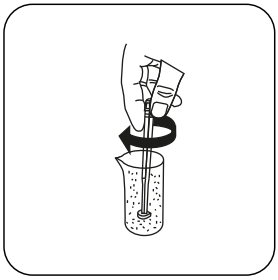


按下 **ENTER** 按钮。

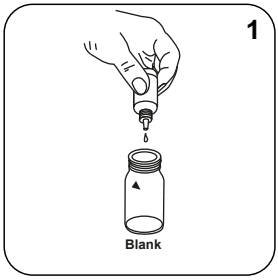


等待 **30 秒反应时间** 。

加入 **Vario HEXAMINE F20 粉包** 。



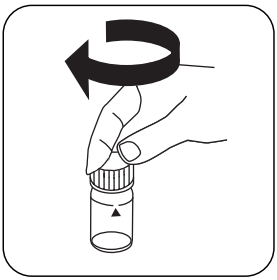
搅拌溶解粉末。



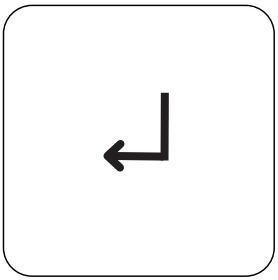
将 **1 滴 Vario ALUMINIUM ECR Masking Reagent** 加入到空白比色杯中。

ZH

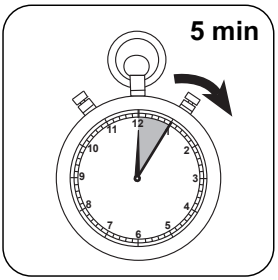
在每个比色杯中加入 **10 mL 预处理的样本。**



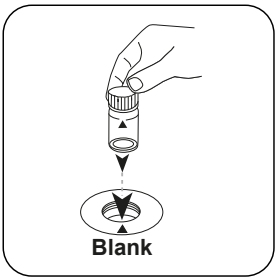
密封比色杯。



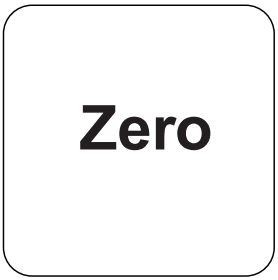
按下 **ENTER** 按钮。



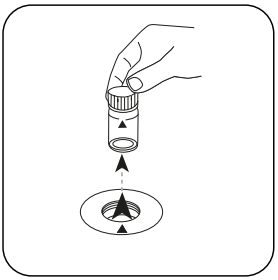
等待 **5 分钟反应时间** 。



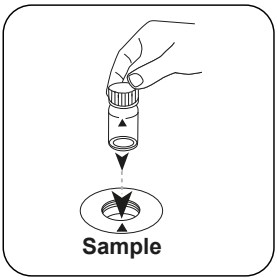
将**空白比色杯**放入测量轴中。注意定位。



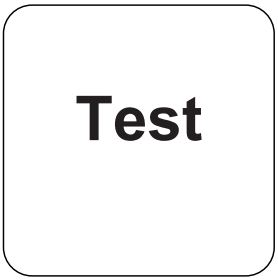
按下 **ZERO** 按钮。



从测量轴上取下比色杯。



将**样本比色杯**放入测量轴中。注意定位。



按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 mg / l 铝。

分析

下表中输出数据也可转换为其他格式表示.

单位	参考表格	因素
mg/l	Al	1
mg/l	Al_2O_3	1.8894

化学方法

依来铬氰蓝 R

附錄

干扰说明

可消除干扰

- 由于氟化物和多磷酸盐的存在，分析结果可能太低。除非在水中人为加入了少量的氟，否则这种影响一般不重要。在这种情况下，下表可以用来确定实际的铝浓度。

氟化物	显示值：铝 [mg/L]					
[mg/L F]	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**
0.2	0.05	0.11	0.16	0.21	0.27	0.32
0.4	0.06	0.11	0.17	0.23	0.28	0.34
0.6	0.06	0.12	0.18	0.24	0.30	0.37
0.8	0.06	0.13	0.20	0.26	0.32	0.40
1.0	0.07	0.13	0.21	0.28	0.36	0.45
1.5	0.09	0.20	0.29	0.37	0.48	---

参考文献

Richter, F. Fresenius, Zeitschrift f. anal.Chemie (1943) 126: 426

参照

APHA 方法 3500-Al B

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

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

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

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

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

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

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

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

Technical changes without notice
Printed in Germany 02/24
No.: 00386440
Lovibond® and Tintometer® are Trademarks of
the Tintometer Group of Companies