

Lovibond® Water Testing

Tintometer® Group



Manual of Methods

MD 100 • MD 110 • MD 200

Molybdate

(EN) Manual of Methods

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(ES) Manual de Métodos

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(IT) Manuale dei Metodi

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(NL) Handboek Methoden

Zijde 100

(DE) Methodenhandbuch

Seite 20

(FR) Méthodes Manuel

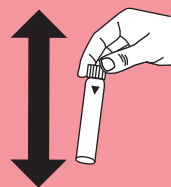
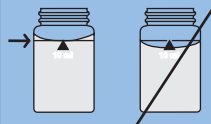
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(PT) Métodos Manual

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(ZH) 方法手册

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KS4.3 T / 20


Method name

Method number

Bar code for the detection of the methods

Measuring range

20

S:4.3

$K_{S4.3 T}$
 0.1 - 4 mmol/l $K_{S4.3}$
 Acid / Indicator

Chemical Method

Instrument specific information

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

Instrument Type	Cuvette	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.

Language codes
ISO 639-1

Revision status

EN Handbook of Methods 01/20

Performing test procedure

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

Select the method on the device

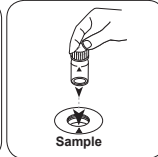
For this method, no ZERO measurements are to be carried out with the following devices: XD 7000, XD 7500



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.

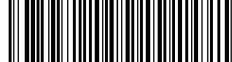


Place **sample vial** in the sample chamber. • Pay attention to the positioning.



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

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



Molybdate T

M250

1 - 50 mg/L MoO₄

Mo3

Thioglycolate

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Molybdate HR No. 1	Tablet / 100	513060BT
Molybdate HR No. 1	Tablet / 250	513061BT
Molybdate HR No. 2	Tablet / 100	513070BT
Molybdate HR No. 2	Tablet / 250	513071BT
Set Molybdate No. 1/No. 2 100 Pc.#	100 each	517631BT
Set Molybdate No. 1/No. 2 250 Pc.#	250 each	517632BT

Notes

1. The tablets must be added in the correct sequence.

Determination of Molybdate HR with Tablet

Select the method on the device.



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



Close vial(s).



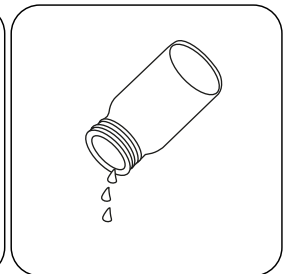
Place **sample vial** in the sample chamber. Pay attention to the positioning.



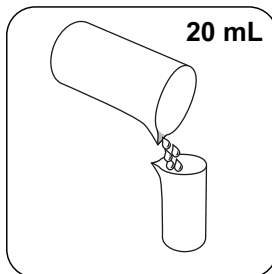
Press the **ZERO** button.



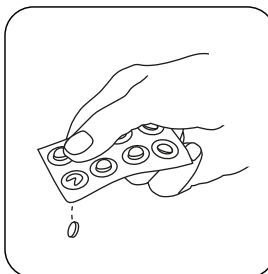
Remove the vial from the sample chamber.



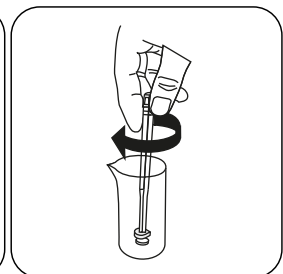
Empty vial.



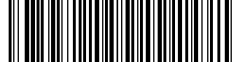
Put **20 mL sample** in 100 mL measuring beaker



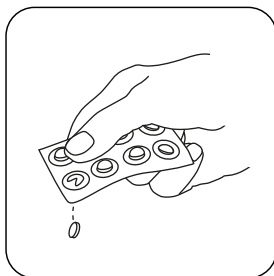
Add **MOLYBDATE HR No. 1 tablet**.



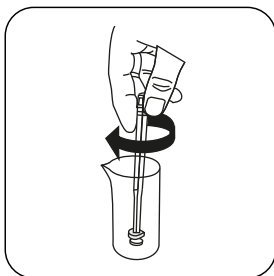
Crush tablet(s) by rotating slightly.



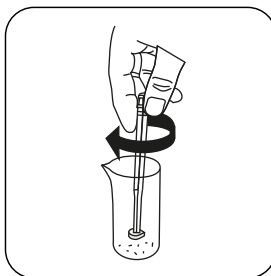
EN



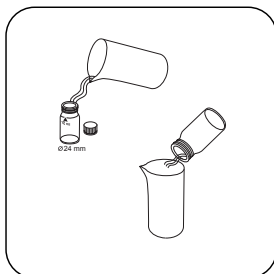
Add **MOLYBDATE HR No. 2 tablet** .



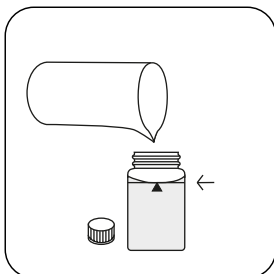
Crush tablet(s) by rotating slightly.



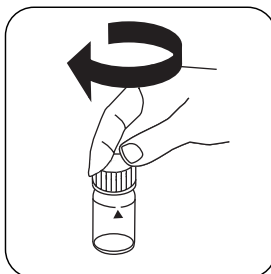
Dissolve the tablets using a clean stirring rod.



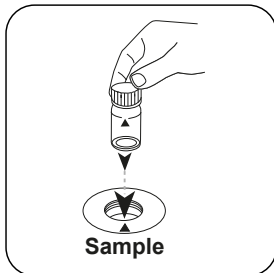
Rinse out vial with prepared sample .



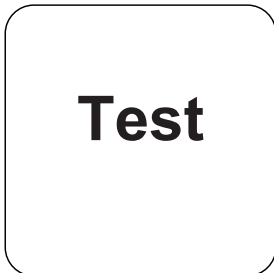
Fill up vial with **sample** to the **10 mL mark**.



Close vial(s).



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



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

The result in mg/L Molybdate/ Molybdenum 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	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

EN

Chemical Method

Thioglycolate

Appendix

Interferences

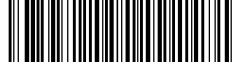
Removeable Interferences

1. Interference from niobium, tantalum, titanium, and zirconium are masked with citric acid.
2. Interference from vanadium(V) is masked with potassium fluoride.
3. Under test conditions (pH 3.8 – 3.9) iron does not react. Other metals at levels likely to be found in industrial water systems do not interfere at any significant level either.

Bibliography

Photometrische Analyse, Lange/ Vjedelek, Verlag Chemie 1980

* including stirring rod, 10 cm



Molybdate LR PP

M251

0.03 - 3 mg/L Mo

Mo1

Ternary Complex

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
VARIO Molybdenum LR, Set F10	1 pc.	535450

The following accessories are required.

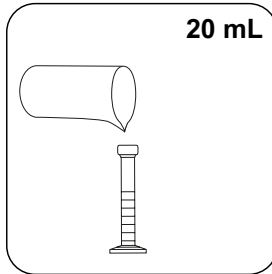
Accessories	Packaging Unit	Part Number
Mixing cylinder, 25 ml	1 pc.	19802650

Preparation

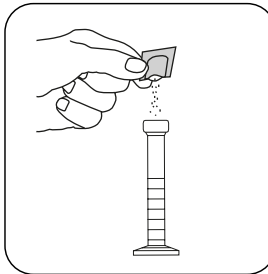
1. Strong alkaline or acidic water samples must be adjusted between pH 3 and pH 5 before the analysis (use 0.5 mol/l Sulphuric acid or 1 mol/l Sodium hydroxide).
2. To avoid errors caused by deposits, rinse the glassware with Hydrochloric acid (approx. 20%) before the analysis and then rinse with deionised water.

Determination of Molybdate LR with Vario Powder Packs

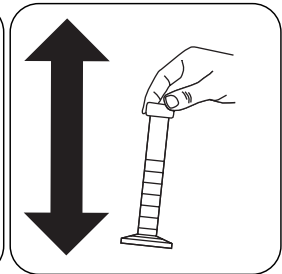
Select the method on the device.



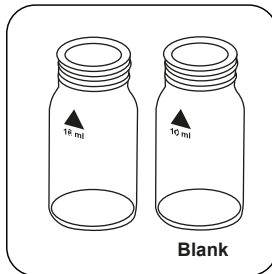
Put **20 mL sample** in 25 mL measuring cylinder.



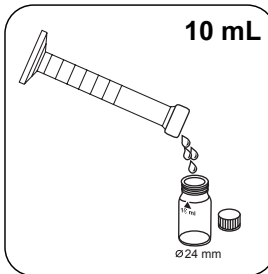
Add **Vario Molybdenum 1 LR F20 powder pack**.



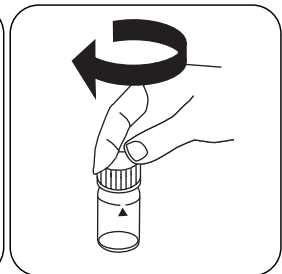
Stopper the mixing cylinder. Shake to dissolve the powder.



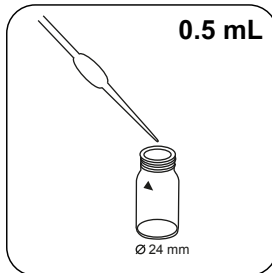
Prepare two clean 24 mm vials. Mark one as a blank.



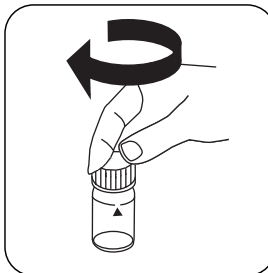
Place **10 mL sample** in each vial.



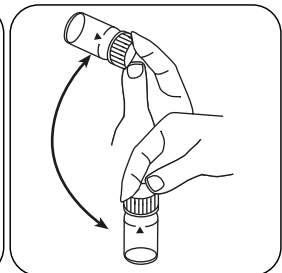
Firmly close the **blank**.



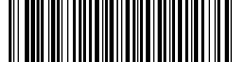
Place **0.5 mL Molybdenum 2 LR solution** in the sample cuvette.



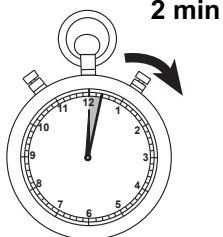
Close vial(s).



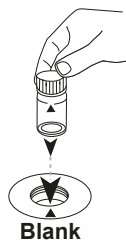
Invert several times to mix the contents.



Press the **ENTER** button.



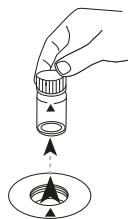
Wait for **2 minute(s)** reaction time.



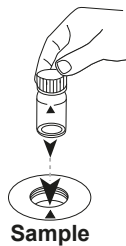
Place **blank** in the sample chamber. Pay attention to the positioning.

Zero

Press the **ZERO** button.



Remove the vial from the sample chamber.



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

Test

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

The result in mg/L Molybdate/ Molybdenum 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	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

EN

Chemical Method

Ternary Complex

Appendix

Interferences

Interference	from / [mg/L]	Influence
Al	50	
Cr	1000	
Fe	50	
Ni	50	
NO ₂ ⁻	in all quantities	
Cu	10	Leads to higher readings with a response time of more than 5 minutes

Bibliography

Analytical Chemistry, 25(9) 1363 (1953)



Molybdate HR PP

M252

0.3 - 40 mg/L Mo

MO2

Mercaptoacetic Acid

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
VARIO Molybdenum HR, Set F10	1 Set	535300

Preparation

1. Turbid water samples should be passed through a membrane filter prior to analysis.
2. Strongly buffered samples or samples with extreme pH values should, prior to analysis, be set to a pH of about 7 with 1 mol/l nitric acid or 1 mol/l sodium hydroxide solution.

Determination of Molybdate HR with Vario Powder Packs

Select the method on the device.



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



Close vial(s).



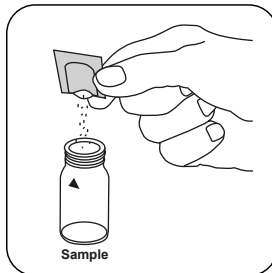
Place **sample vial** in the sample chamber. Pay attention to the positioning.



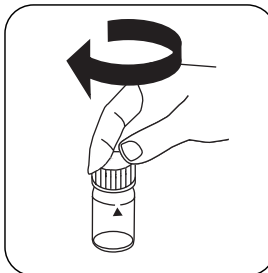
Press the **ZERO** button.



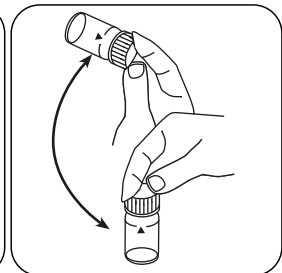
Remove the vial from the sample chamber.



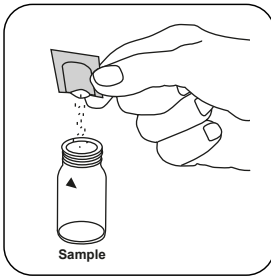
Add **Vario Molybdenum HR 1 F10 powder pack**.



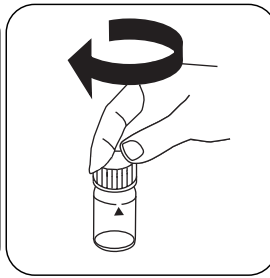
Close vial(s).



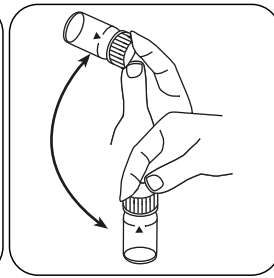
Swirl around to dissolve the powder.



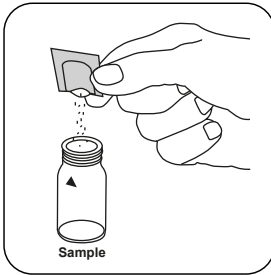
Add **Vario Molybdenum HR 2 F10 powder pack**.



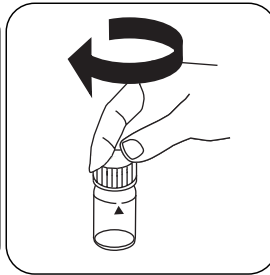
Close vial(s).



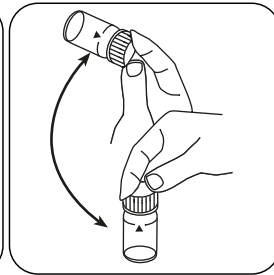
Invert several times to mix the contents.



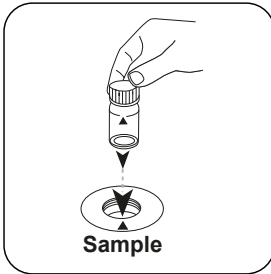
Add **Vario Molybdenum HR 3 F10 powder pack**.



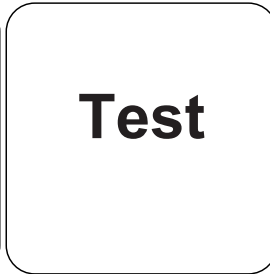
Close vial(s).



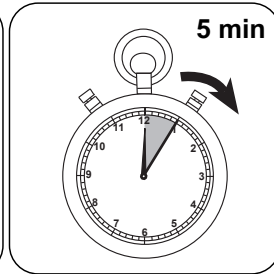
Swirl around to dissolve the powder.



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 Molybdate/ Molybdenum 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	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

EN

Chemical Method

Mercaptoacetic Acid

Appendix

Interferences

Persistent Interferences

- At concentrations of 10 mg/L Cu, more than the specified 5 minute response time leads to higher values. A rapid test performance is therefore particularly important.

Interference	from / [mg/L]
Al	50
Cr	1000
Fe	50
Ni	50
NO ₂ ⁻	in all quantities

Method Validation

Limit of Detection	0.16 mg/L
Limit of Quantification	0.47 mg/L
End of Measuring Range	40 mg/L
Sensitivity	25.04 mg/L / Abs
Confidence Intervall	0.712 mg/L
Standard Deviation	0.294 mg/L
Variation Coefficient	1.46 %



Bibliography

Analytical Chemistry, 25(9) 1363 (1953)

EN

KS4.3 T / 20


Methoden Name

Methodennummer

Barcode zur Methodenerkennung

Messbereich

20

S:4.3

Chemische Methode

$K_{S_{4.3} T}$
0,1 - 4 mmol/l $K_{S_{4.3}}$
Säure / Indikator

Instrumentenspezifische 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 $K_{S_{4.3}}$
SpectroDirect, XD 7000, XD 7500	ø 24 mm	615 nm	0,1 - 4 mmol/l $K_{S_{4.3}}$

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 $K_{S_{4.3}}$ sind identisch.
2. Die exakte Einhaltung des Probevolumens von 10 ml ist für die Genauigkeit des Analyseergebnisses entscheidend.

Sprachkürzel nach ISO 639-1

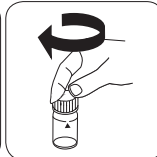
Revisionsstand

DE Methodenhandbuch 01/20

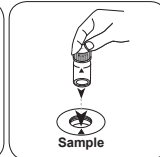
Durchführung der
Messung**Durchführung der Bestimmung Säurekapazität $K_{s4,3}$ mit Tablette**

Die Methode im Gerät auswählen.

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

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

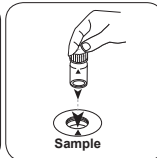
Küvette(n) verschließen.

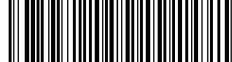
Die **Probeküvette** in den Messschacht stellen. Positionierung beachten.

• • •



Tablette(n) durch Umschwenken lösen.

Die **Probeküvette** in den Messschacht stellen. Positionierung beachten.Taste **TEST** (XD: **START**) drücken.In der Anzeige erscheint das Ergebnis als Säurekapazität $K_{s4,3}$.



Molybdat T

M250

1 - 50 mg/L MoO₄

Mo3

Thioglycolat

DE

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
Molybdate HR No. 1	Tablette / 100	513060BT
Molybdate HR No. 1	Tablette / 250	513061BT
Molybdate HR No. 2	Tablette / 100	513070BT
Molybdate HR No. 2	Tablette / 250	513071BT
Set Molybdate No. 1/No. 2 [#]	je 100	517631BT
Set Molybdate No. 1/No. 2 [#]	je 250	517632BT

Anmerkungen

1. Die Reihenfolge der Tablettenzugabe ist unbedingt einzuhalten.

Durchführung der Bestimmung Molybdat HR mit Tablette

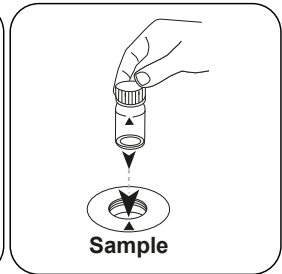
Die Methode im Gerät auswählen.



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



Küvette(n) verschließen.



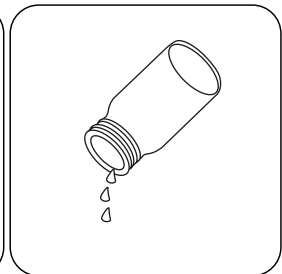
Die **Probenküvette** in den Messschacht stellen. Positionierung beachten.



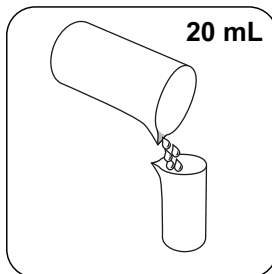
Taste **ZERO** drücken.



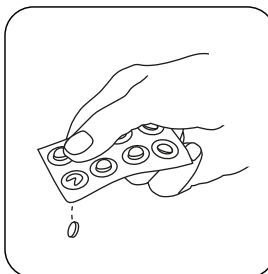
Küvette aus dem Messschacht nehmen.



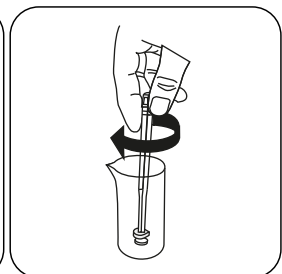
Küvette entleeren.



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

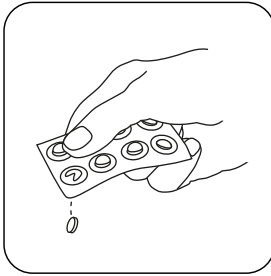


Eine **MOLYBDATE HR No. 1 Tablette** zugeben.

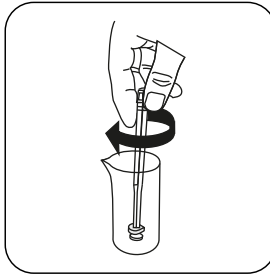


Tablette(n) unter leichter Drehung zerdrücken.

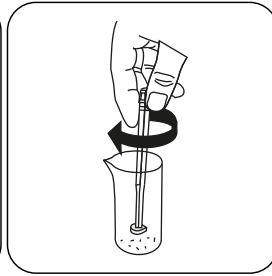
DE



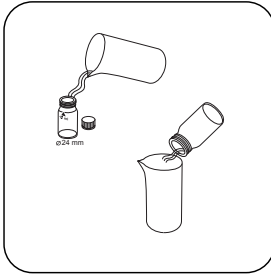
Eine **MOLYBDATE HR No. 2** Tablette zugeben.



Tablette(n) unter leichter Drehung zerdrücken.



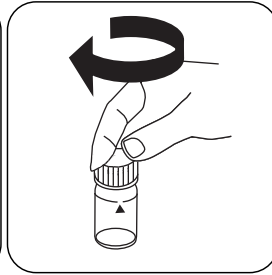
Tablette(n) durch Rühren mit einem sauberen Rührstab lösen.



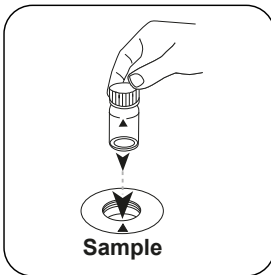
Küvette mit vorbereiteter Probe ausspülen.



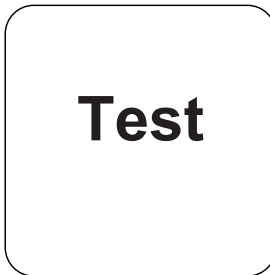
Küvette bis zur **10-mL-Marke** mit der **Probe** auffüllen.



Küvette(n) verschließen.



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



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

In der Anzeige erscheint das Ergebnis in mg/L Molybdat/ Molybdän.

Auswertung

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

Einheit	Zitierform	Umrechnungsfaktor
mg/l	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

DE

Chemische Methode

Thioglycolat

Appendix

Störungen

Ausschließbare Störungen

1. Die Störung von Niob, Tantal, Titanium und Zirkonium werden mit Citronensäure maskiert.
2. Die Störung von Vanadium(V) wird mit Kaliumfluorid maskiert.
3. Unter den Reaktionsbedingungen (pH 3,8 - 3,9) reagiert Eisen nicht. Auch andere Metalle in Konzentrationen, wie sie für Kesselwasser üblich sind, stören nicht signifikant.

Literaturverweise

Photometrische Analyse, Lange/ Vjedelek, Verlag Chemie 1980

* inklusive Rührstab



Molybdat LR PP

M251

0,03 - 3 mg/L Mo

Mo1

Ternärer Komplex

Material

DE

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
VARIO Molybdenum LR, Set	1 St.	535450

Es wird außerdem folgendes Zubehör benötigt.

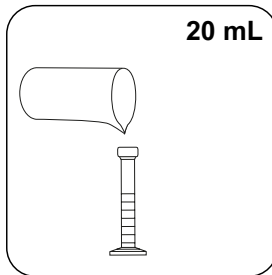
Zubehör	Verpackungseinheit	Bestell-Nr.
Mischzylinder mit Stopfen notwendiges Zubehör zu Bestimmung von Molybdän LR mit MD 100 (276140)	1 St.	19802650

Vorbereitung

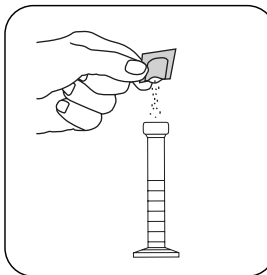
1. Stark alkalische oder saure Wässer müssen vor der Analyse in einen pH-Bereich zwischen 3 und 5 gebracht werden (mit 0,5 mol/l Schwefelsäure bzw. 1 mol/l Natronlauge).
2. Zur Vermeidung von Fehlern durch Ablagerungen, die Glasgeräte vor der Analyse mit Salzsäurelösung (ca. 20% ig) und anschließend mit VE-Wasser spülen.

Durchführung der Bestimmung Molybdat LR mit Vario Pulverpäckchen

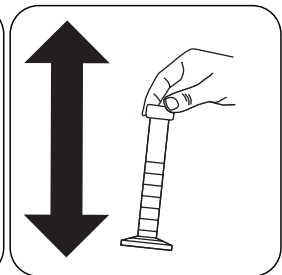
Die Methode im Gerät auswählen.



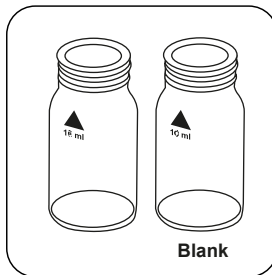
20 mL Probe in einen 25-mL-Mischzylinder geben.



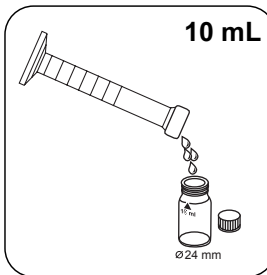
Ein **Vario Molybdenum 1 LR F20 Pulverpäckchen** zugeben.



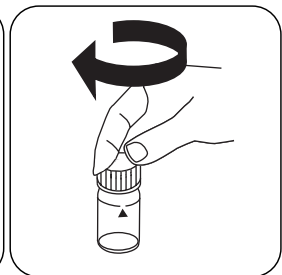
Mischzylinder mit einem Stopfen verschließen. Pulver durch Schütteln lösen.



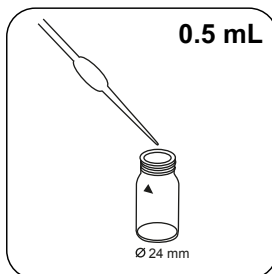
Zwei saubere 24-mm-Küvetten bereitstellen. Eine als Nullküvette kennzeichnen.



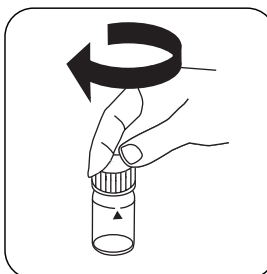
In jede Küvette **10 mL Probe** geben.



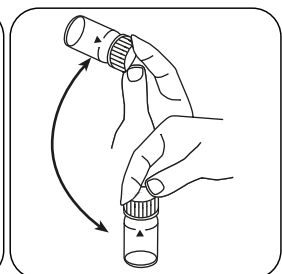
Nullküvette fest verschließen.



0.5 mL Molybdenum 2 LR Lösung in die Probenküvette geben.



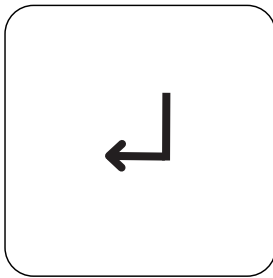
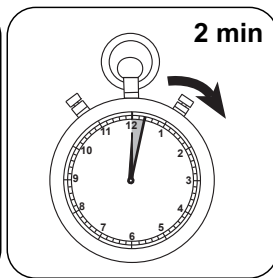
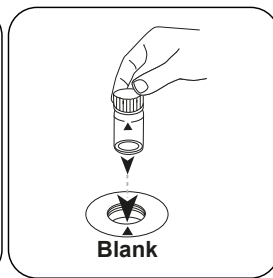
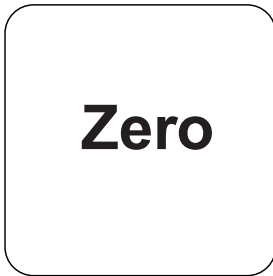
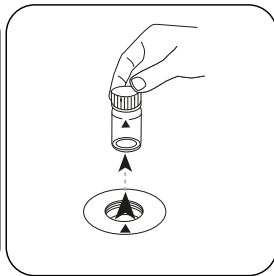
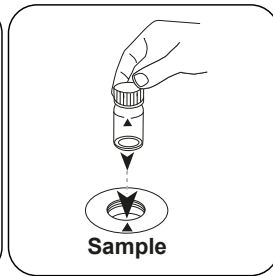
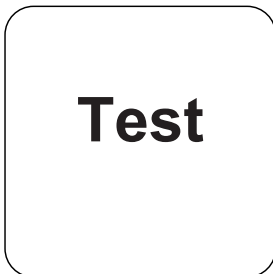
Küvette(n) verschließen.



Inhalt durch Umschwenken mischen.



DE

Taste **ENTER** drücken.**2 Minute(n) Reaktionszeit**
abwarten.Die **Nullküvette** in den
Messschacht stellen.
Positionierung beachten.Taste **ZERO** drücken.Küvette aus dem
Messschacht nehmen.Die **Probeküvette** in
den Messschacht stellen.
Positionierung beachten.Taste **TEST (XD: START)**
drücken.

In der Anzeige erscheint das Ergebnis in mg/L Molybdat/ Molybdän.

Auswertung

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

Einheit	Zitierform	Umrechnungsfaktor
mg/l	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

DE

Chemische Methode

Ternärer Komplex

Appendix

Störungen

Störung	Stört ab / [mg/L]	Einfluss
Al	50	
Cr	1000	
Fe	50	
Ni	50	
NO ₂ ⁻	in allen Mengen	
Cu	10	Führt bei einer Reaktionszeit von mehr als 5 Minuten zu höheren Messwerten

Literaturverweise

Analytical Chemistry, 25(9) 1363 (1953)



Molybdat HR PP

M252

0,3 - 40 mg/L Mo

MO2

Mercaptoessigsäure

DE

Material

Benötigtes Material (zum Teil optional):

Reagenzien	Form/Menge	Bestell-Nr.
VARIO Molybdenum HR, Set F10	1 Satz	535300

Vorbereitung

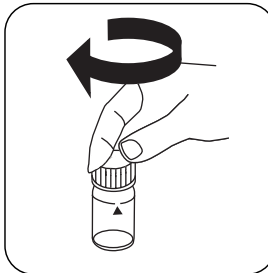
1. Trübe Wasserproben vor der Analyse über einen Faltenfilter filtrieren.
2. Stark gepufferte Proben oder Proben mit extremen pH-Werten sollten vor der Analyse mit 1 mol/l Salpetersäure oder 1 mol/l Natronlauge auf einen pH von etwa 7 eingestellt werden.

Durchführung der Bestimmung Molybdat HR mit Vario Pulverpäckchen

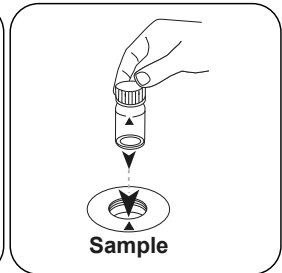
Die Methode im Gerät auswählen.



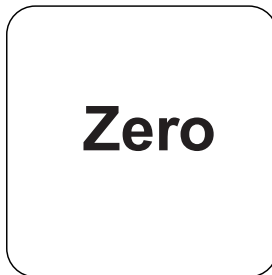
24-mm-Küvette mit **10 mL Probe** füllen.



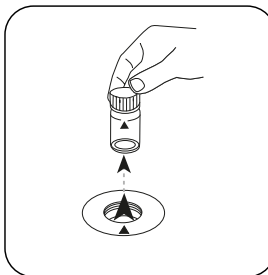
Küvette(n) verschließen.



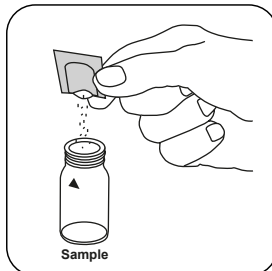
Die **Probeküvette** in den Messschacht stellen. Positionierung beachten.



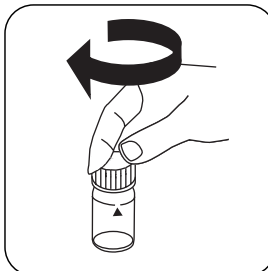
Taste **ZERO** drücken.



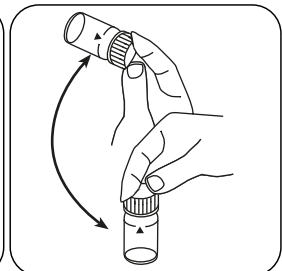
Küvette aus dem Messschacht nehmen.



Ein **Vario Molybdenum HR 1 F10 Pulverpäckchen** zugeben.



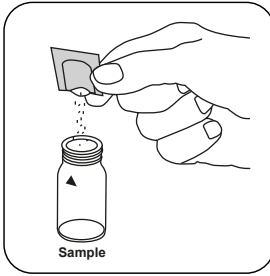
Küvette(n) verschließen.



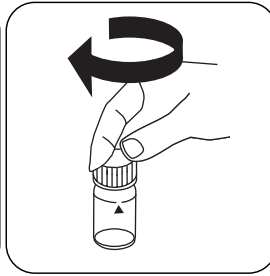
Das Pulver durch Umschwenken lösen.



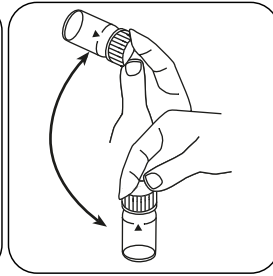
DE



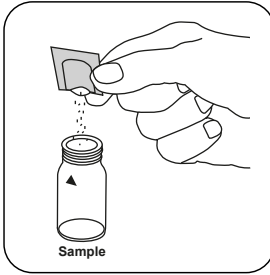
Ein **Vario Molybdenum HR 2 F10 Pulverpäckchen** zugeben.



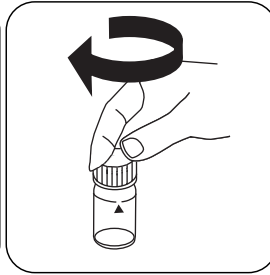
Küvette(n) verschließen.



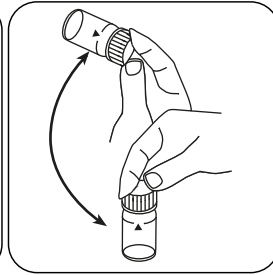
Inhalt durch Umschwenken mischen.



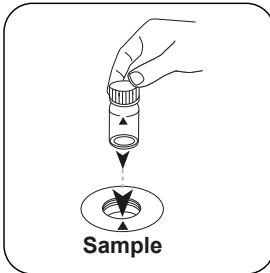
Ein **Vario Molybdenum HR 3 F10 Pulverpäckchen** zugeben.



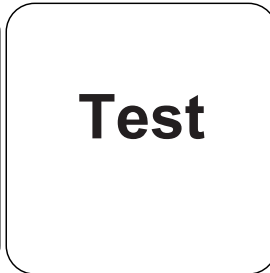
Küvette(n) verschließen.



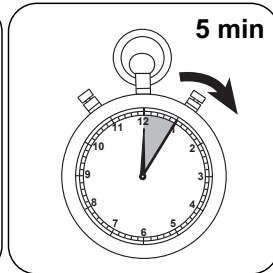
Das Pulver durch Umschwenken lösen.



Die **Probeküvette** 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 Molybdat/ Molybdän.

Auswertung

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

Einheit	Zitierform	Umrechnungsfaktor
mg/l	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

DE

Chemische Methode

Mercaptoessigsäure

Appendix

Störungen

Permanente Störungen

- Bei Konzentrationen ab 10 mg/L Cu führen mehr als die angegebenen 5 Minuten Reaktionszeit zu höheren Messwerten. Eine zügige Durchführung des Tests ist daher besonders wichtig.

Störung	Stört ab / [mg/L]
Al	50
Cr	1000
Fe	50
Ni	50
NO ₂ ⁻	in allen Mengen

Methodenvalidierung

Nachweisgrenze	0.16 mg/L
Bestimmungsgrenze	0.47 mg/L
Messbereichsende	40 mg/L
Empfindlichkeit	25.04 mg/L / Abs
Vertrauensbereich	0.712 mg/L
Verfahrensstandardabweichung	0.294 mg/L
Verfahrensvariationskoeffizient	1.46 %



Literaturverweise

Analytical Chemistry, 25(9) 1363 (1953)

DE

KS4.3 T / 20

Nombre del método

Número de método

Código de barras para reconocer el método

Rango de medición

20

S:4.3

Método químico

Ácido / Indicador

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

Información específica del instrumento

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

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

Material

Material requerido (parcialmente opcional):

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

Lista de aplicaciones

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

Notas

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

Códigos de idioma ISO 639-1

Estado de revisión

ES Manual de Métodos 01/20

Realización de la determinación

Ejecución de la determinación Capacidad ácida $K_{s4.3}$ con tableta

Seleccionar el método en el aparato.

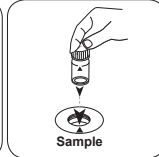
Para este método no es necesario realizar medición CERO en los aparatos siguientes: XD 7000, XD 7500



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

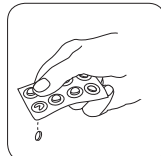


Cerrar la(s) cubeta(s).



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

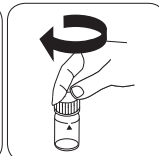
• • •



Añadir **tableta ALKA-M-PHOTOMETER**.



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



Cerrar la(s) cubeta(s).



Molibdato T

M250

1 - 50 mg/L MoO₄

Mo3

Tioglicolato

Material

ES

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Molibdato HR n° 1	Tabletas / 100	513060BT
Molibdato HR n° 1	Tabletas / 250	513061BT
Molibdato HR n° 2	Tabletas / 100	513070BT
Molibdato HR n° 2	Tabletas / 250	513071BT
Juego molibdato n° 1/n° 2 [#]	100 cada	517631BT
Juego molibdato n° 1/n° 2 [#]	250 cada	517632BT

Notas

1. Debe seguirse estrictamente el orden de adición de las tabletas.

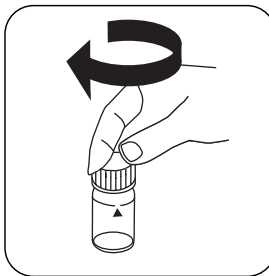


Ejecución de la determinación Molibdato HR con tableta

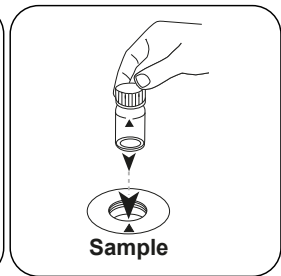
Seleccionar el método en el aparato.



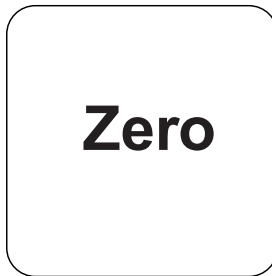
Llenar la cubeta de 24 mm con **10 mL de muestra**.



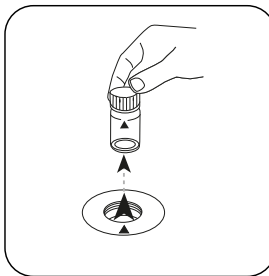
Cerrar la(s) cubeta(s).



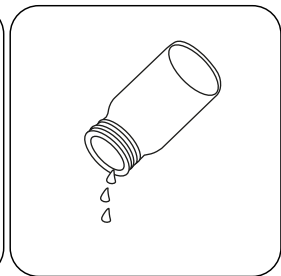
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



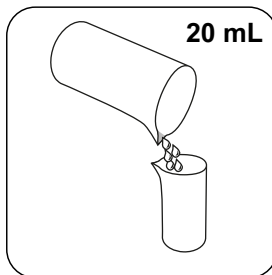
Pulsar la tecla **ZERO**.



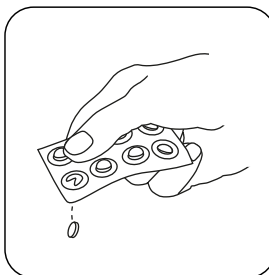
Extraer la cubeta del compartimiento de medición.



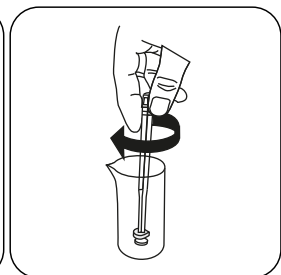
Vaciar la cubeta.



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



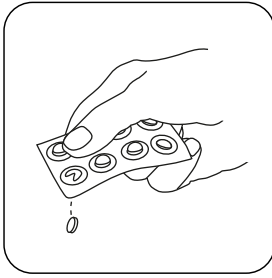
Añadir **tableta MOLYBDATE HR No. 1**.



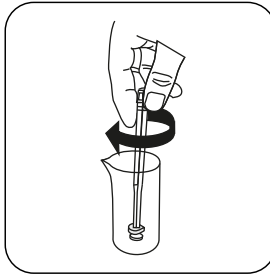
Triturar la(s) tableta(s) girando ligeramente.



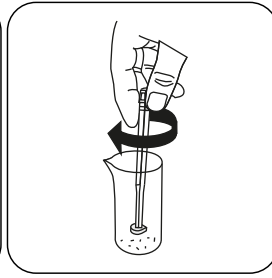
ES



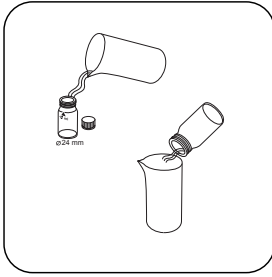
Añadir **tableta**
MOLYBDATE HR No. 2.



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



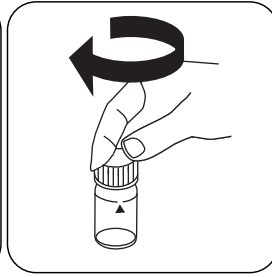
Disolver la(s) tableta(s)
agitando con una varilla
limpia.



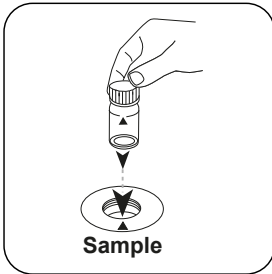
Lavar la cubeta con la
muestra preparada.



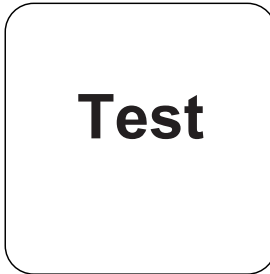
Llenar la cubeta con la
**muestra hasta la marca
de 10 mL .**



Cerrar la(s) cubeta(s).



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 Molibdato.

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	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

ES

Método químico

Tioglicolato

Apéndice

Interferencia

Interferencias extraíbles

1. La perturbación de niobio, tántalo, titanio y circonio se enmascara con ácido cítrico.
2. La perturbación de vanadio (V) se enmascara con fluoruro potásico.
3. El hierro no interfiere bajo las condiciones del test (pH 3,8 - 3,9). Otros metales con concentraciones normales bajo aguas industriales tampoco perturban la determinación.

Bibliografía

Photometrische Analyse, Lange/ Vjedelek, Verlag Chemie 1980


Molibdato LR PP
M251
0.03 - 3 mg/L Mo
Mo1
Complejo Ternario

Material

ES

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Molibdeno LR, juego VARIO	1 Cantidad	535450

Se requieren los siguientes accesorios.

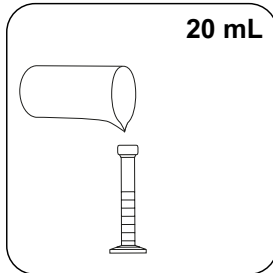
Accesorios	Unidad de embalaje	No. de referencia
Cilindro de mezcla con tapón, accesorio necesario para la determinación de molibdeno LR con MD 100 (276140)	1 Cantidad	19802650

Preparación

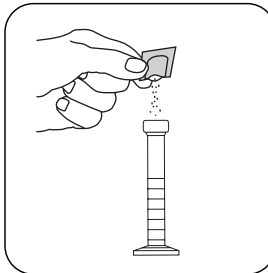
1. Las muestras acuosas muy ácidas o muy básicas se deberán neutralizar a un valor de pH entre 3 y 5 antes de realizar el análisis (con 0,5 mol/l de ácido sulfúrico o 1 mol/l de hidróxido sódico).
2. Para minimizar errores por residuos, lavar antes de usarlos los aparatos de vidrio necesarios con una solución de ácido clorhídrico (aprox. 20%), enjuagándolos a continuación con agua desionizada.

Ejecución de la determinación Molibdato LR con sobres de polvos Vario

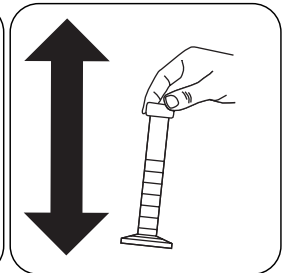
Seleccionar el método en el aparato.



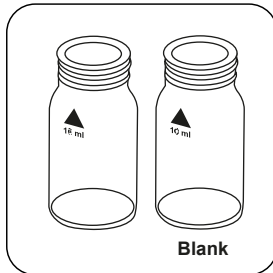
Añadir **20 mL de muestra** en un cilindro de mezcla de 25 mL.



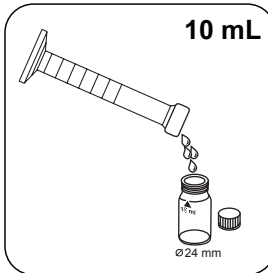
Añadir un **sobre de polvos Vario Molybdenum 1 LR F20**.



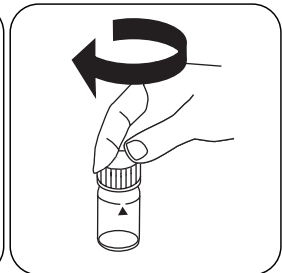
Cerrar el cilindro de mezcla con un tapón. Disolver los polvos agitando.



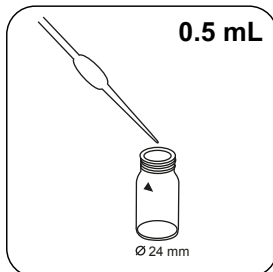
Preparar dos cubetas limpias de 24 mm. Identificar una como cubeta en blanco.



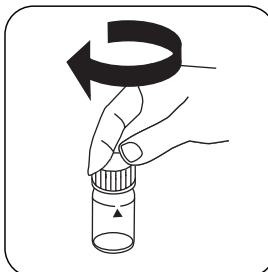
Añadir en cada cubeta **10 mL de muestra**.



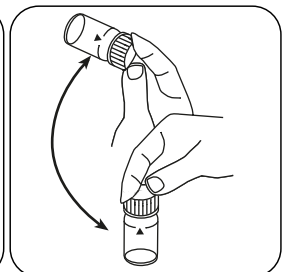
Cerrar firmemente la **cubeta en blanco**.



Añadir **0.5 mL de solución Molybdenum 2 LR** en la cubeta de muestra.



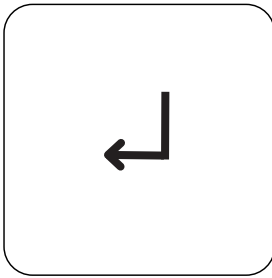
Cerrar la(s) cubeta(s).



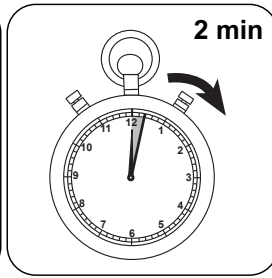
Mezclar el contenido girando.



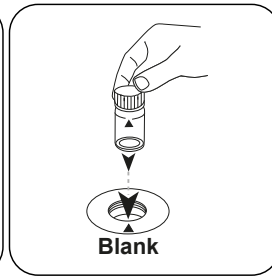
ES



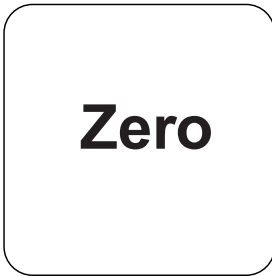
Pulsar la tecla **ENTER**.



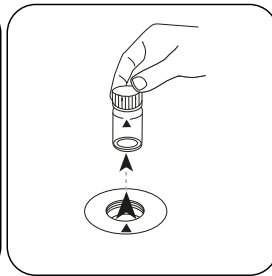
Esperar **2 minutos como periodo de reacción**.



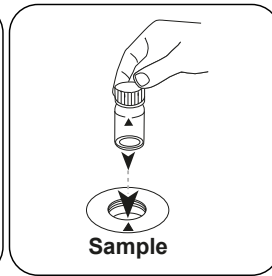
Poner la **cuveleta en blanco** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



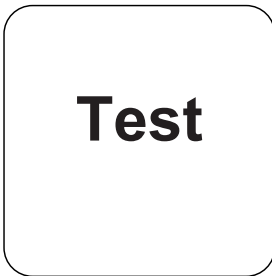
Pulsar la tecla **ZERO**.



Extraer la cuveleta del compartimiento de medición.



Poner la **cuveleta 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 Molibdato.

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	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

ES

Método químico

Complejo Ternario

Apéndice

Interferencia

Interferencia	de / [mg/L]	Influencia
Al	50	
Cr	1000	
Fe	50	
Ni	50	
NO ₂ ⁻	en todas las cantidades	
Cu	10	Leads to higher readings with a response time of more than 5 minutes

Bibliografía

Analytical Chemistry, 25(9) 1363 (1953)


Molibdato HR PP
M252
0.3 - 40 mg/L Mo
MO2
Mercapto-ácido acético

ES

Material

Material requerido (parcialmente opcional):

Reactivos	Unidad de embalaje	No. de referencia
Molibdeno HR VARIO, juego F10	1 Set	535300

Preparación

1. Las muestras turbias deberán filtrarse antes de la determinación con un filtro de papel.
2. Las muestras acuosas altamente tamponadas con valores de pH extremos deberán neutralizarse a un valor aprox. de pH 7 con 1 mol/l de ácido nítrico o 1 mol/l de hidróxido sódico.

Ejecución de la determinación Molibdato HR con sobres de polvos Vario

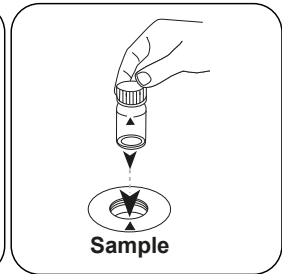
Seleccionar el método en el aparato.



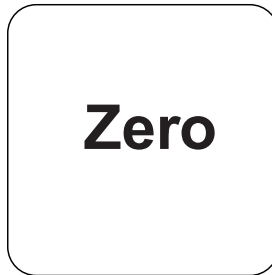
Llenar la cubeta de 24 mm con **10 mL de muestra** .



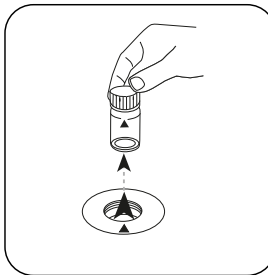
Cerrar la(s) cubeta(s).



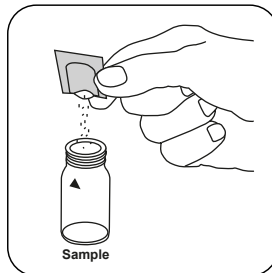
Poner la **cubeta de muestra** en el compartimiento de medición. ¡Debe tenerse en cuenta el posicionamiento!



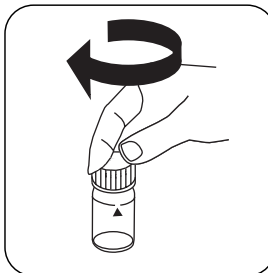
Pulsar la tecla **ZERO**.



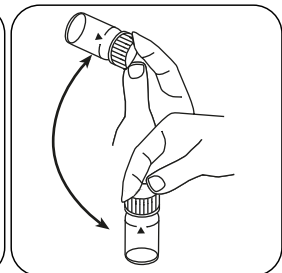
Extraer la cubeta del compartimiento de medición.



Añadir un **sobre de polvos Vario Molybdenum HR 1 F10** .



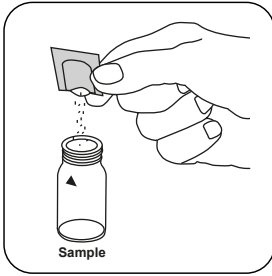
Cerrar la(s) cubeta(s).



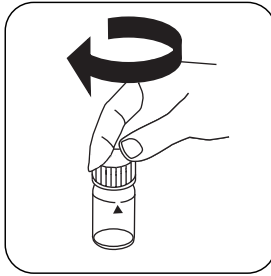
Disolver los polvos girando.



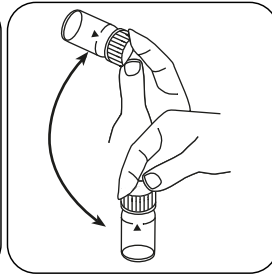
ES



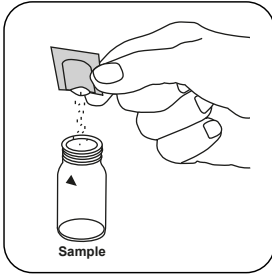
Añadir un **sobre de polvos Vario Molybdenum HR 2 F10** .



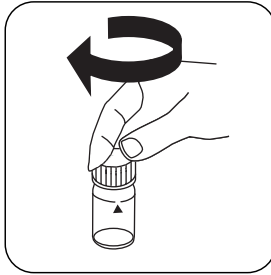
Cerrar la(s) cubeta(s).



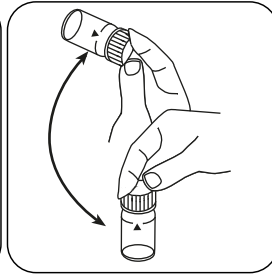
Mezclar el contenido girando.



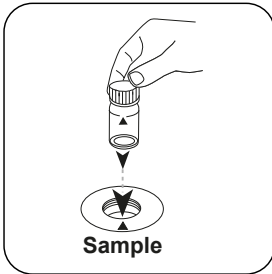
Añadir un **sobre de polvos Vario Molybdenum HR 3 F10** .



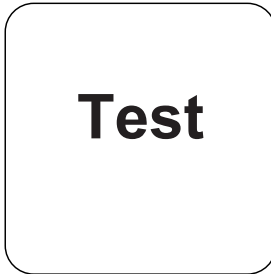
Cerrar la(s) cubeta(s).



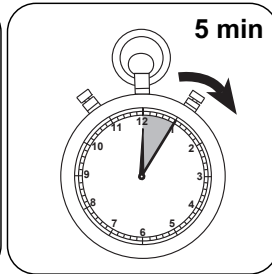
Disolver los polvos girando.



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 Molibdato.

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	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

ES

Método químico

Mercapto-ácido acético

Apéndice

Interferencia

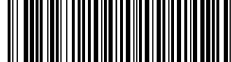
Interferencias persistentes

1. Con concentraciones mayores a 10 mg/L de cobre aumentará el resultado cuando se sobrepasen los 5 minutos de periodo de reacción indicados. Por ello es muy importante realizar la determinación lo más rápido posible.

Interferencia	de / [mg/L]
Al	50
Cr	1000
Fe	50
Ni	50
NO ₂ ⁻	en todas las cantidades

Validación del método

Límite de detección	0.16 mg/L
Límite de determinación	0.47 mg/L
Límite del rango de medición	40 mg/L
Sensibilidad	25.04 mg/L / Abs
Intervalo de confianza	0.712 mg/L
Desviación estándar	0.294 mg/L
Coficiente de variación	1.46 %




Bibliografia

Analytical Chemistry, 25(9) 1363 (1953)

ES

KS4.3 T / 20



Nom de la méthode → KS4.3 T

Numéro de méthode → 20

Code à barres pour reconnaître la méthode → [Barcode]

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

Méthode chimique → Acide / Indicateur

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

Informations spécifiques à l'instrument

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

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

Matériel

Matériel requis (partiellement optionnel):

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

Liste d'applications

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

Indication

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

Codes de langue ISO 639-1 → FR

État de révision → 01/20

FR Méthodes Manuel 01/20

Procédure du test

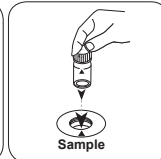
Réalisation de la quantification Capacité acide $K_{s4.3}$ avec pastille

Sélectionnez la méthode sur l'appareil.

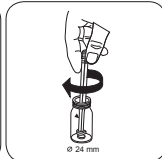
Cette méthode ne nécessite aucune mesure du zéro sur les appareils suivants : XD 7000, XD 7500

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

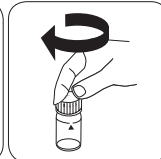
Fermez la(les) cuvette(s).

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

• • •

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

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



Fermez la(les) cuvette(s).



Molybdate T

M250

1 - 50 mg/L MoO₄

Mo3

Thioglycolate

FR

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
Molybdate HR N° 1	Pastilles / 100	513060BT
Molybdate HR N° 1	Pastilles / 250	513061BT
Molybdate HR N° 2	Pastilles / 100	513070BT
Molybdate HR N° 2	Pastilles / 250	513071BT
Kit molybdate N° 1/N° 2 [#]	100 chacun	517631BT
Kit molybdate N° 1/N° 2 [#]	250 chacun	517632BT

Indication

1. Respectez obligatoirement l'ordre d'apport de la pastille indiqué.

Réalisation de la quantification Molybdate HR avec pastille

Sélectionnez la méthode sur l'appareil.



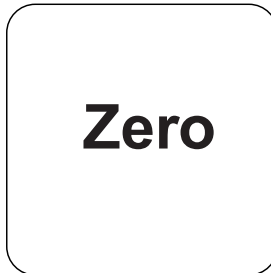
Remplissez une cuvette de 24 mm de **10 mL** d'échantillon.



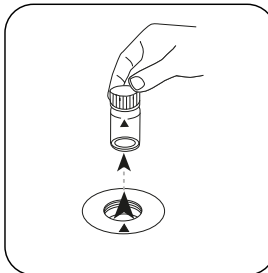
Fermez la(les) cuvette(s).



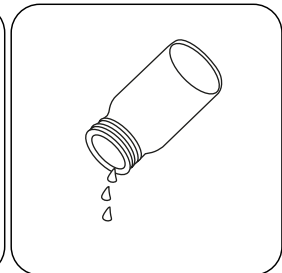
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



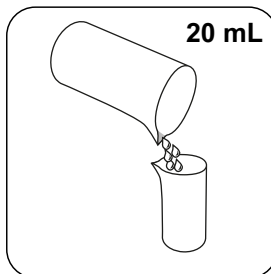
Appuyez sur la touche **ZERO**.



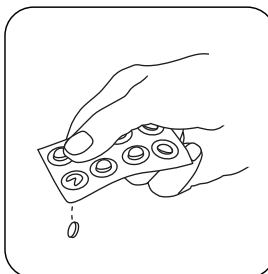
Retirez la cuvette de la chambre de mesure.



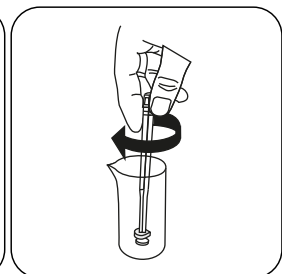
Videz la cuvette.



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



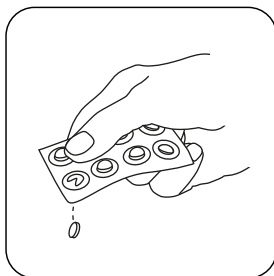
Ajoutez une **pastille de MOLYBDATE HR No. 1**.



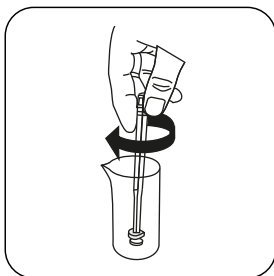
Écrasez la(les) pastille(s) en la(les) tournant un peu.



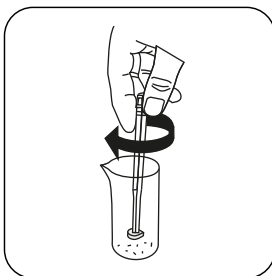
FR



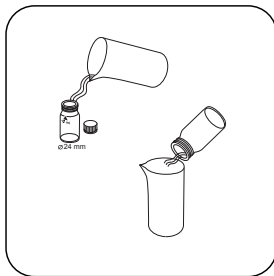
Ajoutez une **pastille de MOLYBDATE HR No. 2**.



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



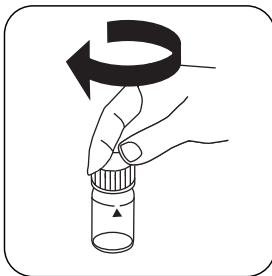
Dissolvez la(les) pastille(s) en mélangeant à l'aide d'une spatule propre.



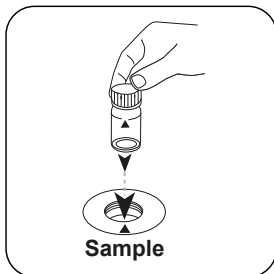
Remplissez la cuvette en y versant l'échantillon préparé.



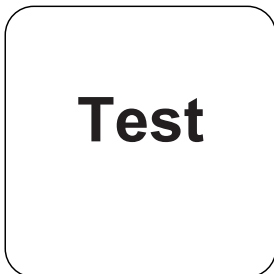
Remplissez la cuvette jusqu'au **repère de 10 mL** en y versant l'échantillon.



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 **TEST (XD: START)**.

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

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	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

FR

Méthode chimique

Thioglycolate

Appendice

Interférences

Interférences exclues

1. La perturbation du niobium, tantale, titane et du zirconium est masquée avec de l'acide citrique.
2. La perturbation du vanadium (V) est masquée avec du fluorure de potassium.
3. Dans les conditions de réaction (pH 3,8 - 3,9), le fer ne réagit pas. Les autres métaux présents dans des concentrations typiques de l'eau de chaudière, ne perturbent pas de manière significative.

Bibliographie

Photometrische Analyse, Lange/ Vjedelek, Verlag Chemie 1980

ii# agitateur inclus



Molybdate LR PP

M251

0.03 - 3 mg/L Mo

Mo1

Complexe Ternaire

FR

Matériel

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
VARIO molybdène LR, kit	1 Pièces	535450

Les accessoires suivants sont requis.

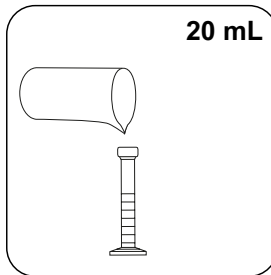
Accessoires	Pack contenant	Code
Tube gradué à bouchon, accessoires nécessaires à déterminer le molybdène LR avec MD 100 (276140)	1 Pièces	19802650

Préparation

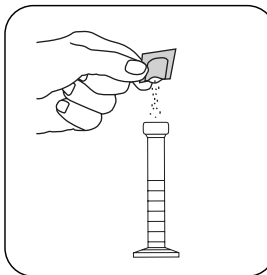
1. Avant l'analyse, les eaux fortement alcalines ou acides devraient être ajustées sur un pH compris entre 3 et 5 (avec 0,5 mol/l d'acide sulfurique ou 1 mol/l de soude caustique).
2. Pour éviter les erreurs causées par les dépôts, lavez les instruments en verre avant l'analyse en utilisant une solution d'acide chlorhydrique (à 20% env.) puis rincez à l'eau déminéralisée.

Réalisation de la quantification Molybdate LR avec sachet de poudre Vario

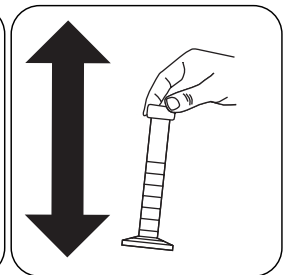
Sélectionnez la méthode sur l'appareil.



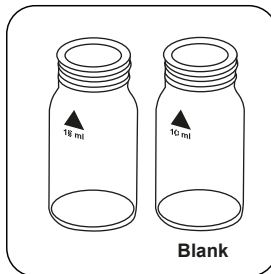
Versez **20 mL d'échantillon** dans une fiole volumétrique de 25 mL.



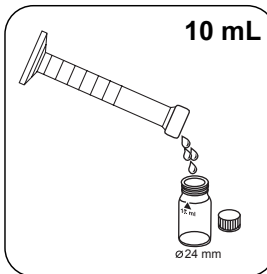
Ajoutez un **sachet de poudre Vario Molybdenum 1 LR F20**.



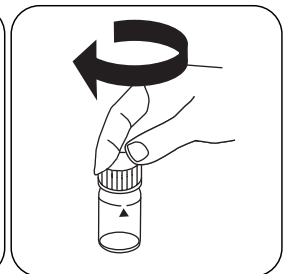
Fermez la fiole volumétrique avec un bouchon. Dissolvez la poudre en agitant.



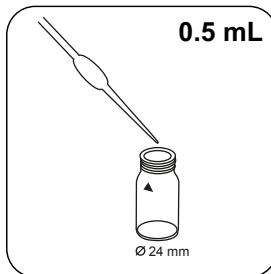
Préparez deux cuvettes propres de 24 mm. L'une des deux cuvettes sera la cuvette du blanc. Étiquetez-la.



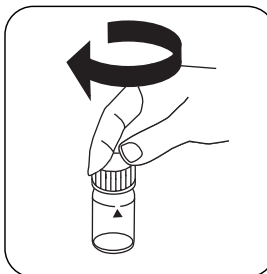
Dans chaque cuvette, versez **10 mL d'échantillon**.



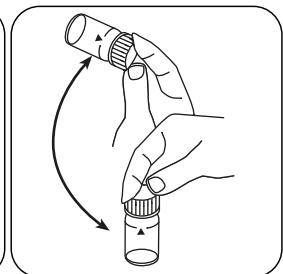
Obturez à fond la **cuvette du blanc**.



Ajoutez **0.5 mL de solution Molybdenum 2 LR** dans la cuvette réservée à l'échantillon.



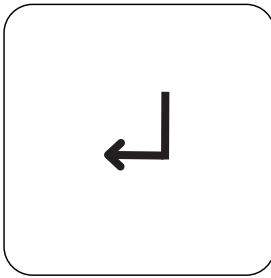
Fermez la(les) cuvette(s).



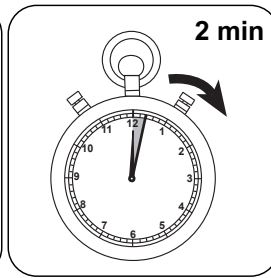
Mélangez le contenu en mettant le tube plusieurs fois à l'envers puis à l'endroit.



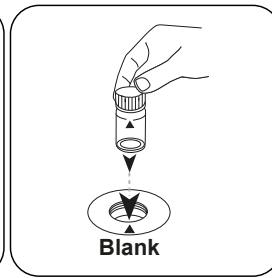
FR



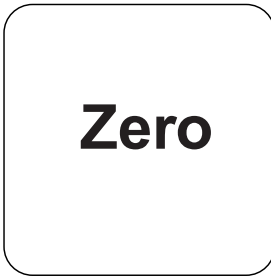
Appuyez sur la touche **ENTER**.



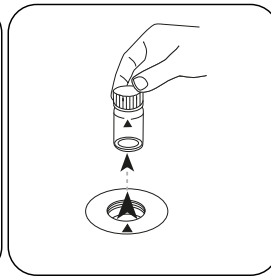
Attendez la fin du **temps de réaction de 2 minute(s)**.



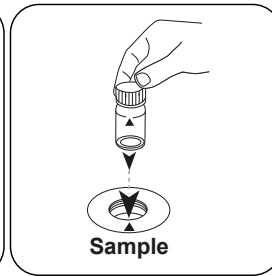
Placez la **cuvette du blanc** dans la chambre de mesure. Attention à la positionner correctement.



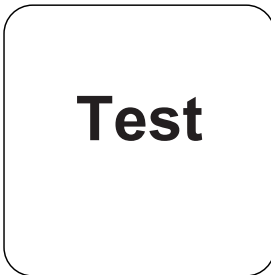
Appuyez sur la touche **ZERO**.



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 Molybdate/ Molybdenum.

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	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

FR

Méthode chimique

Complexe Ternaire

Appendice

Interférences

Interférences	de / [mg/L]	Influence
Al	50	
Cr	1000	
Fe	50	
Ni	50	
NO ₂ ⁻	en toutes les quantités	
Cu	10	Entraîne des valeurs plus élevées avec un temps de réponse supérieur à 5 minutes

Bibliographie

Analytical Chemistry, 25(9) 1363 (1953)



Molybdate HR PP

M252

0.3 - 40 mg/L Mo

MO2

Acide mercaptoacétique

Matériel

FR

Matériel requis (partiellement optionnel):

Réactifs	Pack contenant	Code
VARIO molybdène HR, kit F10	1 Kit	535300

Préparation

1. Avant l'analyse, filtrez les échantillons d'eau trouble en utilisant un filtre plissé.
2. Avant l'analyse, les échantillons très tamponnés ou à valeurs pH extrêmes devraient être ajustés sur un pH d'env. 7 par apport d'1 mol/l d'acide nitrique ou d'1 mol/l de soude caustique.

Réalisation de la quantification Molybdate HR avec sachet de poudre Vario

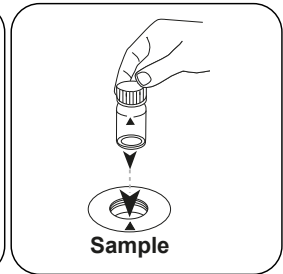
Sélectionnez la méthode sur l'appareil.



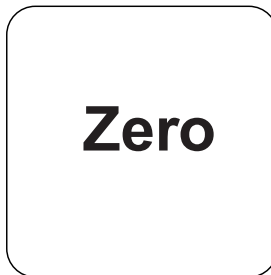
Remplissez une cuvette de 24 mm de **10 mL** d'échantillon.



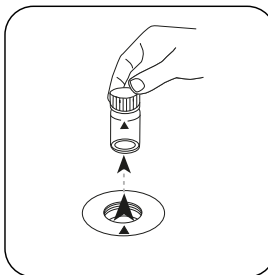
Fermez la(les) cuvette(s).



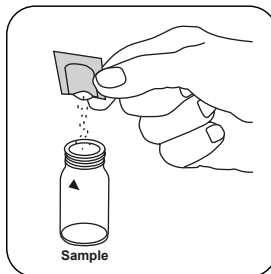
Placez la **cuvette réservée à l'échantillon** dans la chambre de mesure. Attention à la positionner correctement.



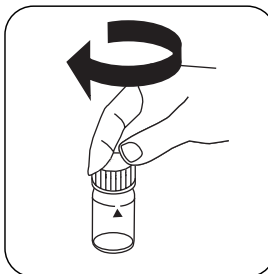
Appuyez sur la touche **ZERO**.



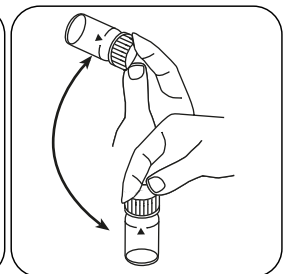
Retirez la cuvette de la chambre de mesure.



Ajoutez un **sachet de poudre Vario Molybdenum HR 1 F10**.



Fermez la(les) cuvette(s).

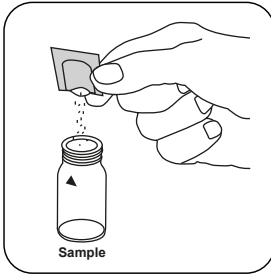


Dissolvez la poudre en mettant plusieurs fois le tube à l'envers puis à l'endroit.

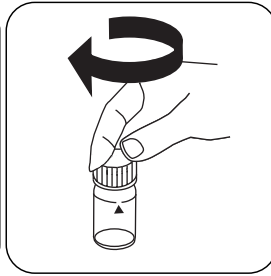
FR



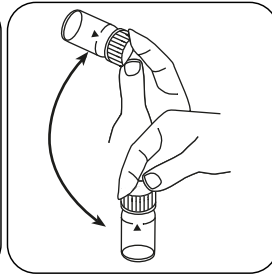
FR



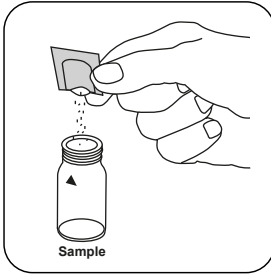
Ajoutez un **sachet de poudre Vario Molybdenum HR 2 F10** .



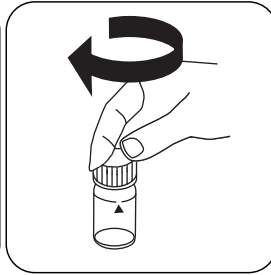
Fermez la(les) cuvette(s).



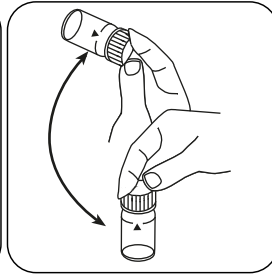
Mélangez le contenu en mettant le tube plusieurs fois à l'envers puis à l'endroit.



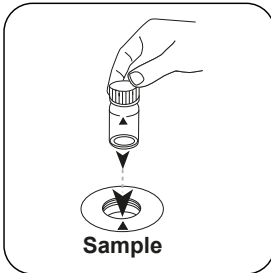
Ajoutez un **sachet de poudre Vario Molybdenum HR 3 F10** .



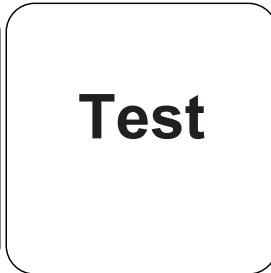
Fermez la(les) cuvette(s).



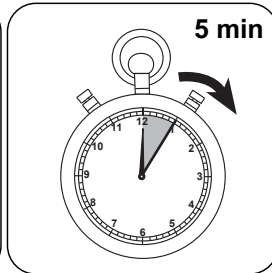
Dissolvez la poudre en mettant plusieurs fois le tube à l'envers puis à l'endroit.



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



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



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 Molybdate/ Molybdenum.

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	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

FR

Méthode chimique

Acide mercaptoacétique

Appendice

Interférences

Interférences persistantes

- À partir des concentrations de 10 mg/L Cu, toute durée supérieure au temps de réaction de 5 minutes indiqué entraîne une augmentation des valeurs mesurées. C'est pourquoi, il est particulièrement important d'effectuer rapidement le test.

Interférences	de / [mg/L]
Al	50
Cr	1000
Fe	50
Ni	50
NO ₂ ⁻	en toutes les quantités

Méthode Validation

Limite de détection	0.16 mg/L
Limite de détermination	0.47 mg/L
Fin de la gamme de mesure	40 mg/L
Sensibilité	25.04 mg/L / Abs
Intervalle de confiance	0.712 mg/L
Déviatiion standard	0.294 mg/L
Coefficient de variation	1.46 %



Bibliographie

Analytical Chemistry, 25(9) 1363 (1953)

FR

KS4.3 T / 20



Denominazione metodo

Numero metodo

Codice a barre per riconoscere il metodo

Range di misura

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

Acido/indicatore

20
S:4.3

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

Metodo chimico

Informazioni specifiche dello strumento

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

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

Materiale

Materiale richiesto (in parte facoltativo):

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

Campo di applicazione

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

Note

1. I termini alcalinità M, valore M, alcalinità totale e capacità acida $K_{S_{4.3}}$ sono equivalenti.
2. Per l'accuratezza del risultato dell'analisi è fondamentale che il volume del campione misuri esattamente 10 ml.

ISO 639-1 codici linguistici

Stato di revisione

IT Manuale dei Metodi 01/20

**Svolgimento della
misurazione**

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

Selezionare il metodo nel dispositivo.

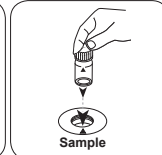
Con i seguenti dispositivi, per questo metodo non è necessario eseguire una misurazione ZERO: XD 7000, XD 7500



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



Chiudere la/e cuvetta/e.

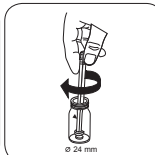


Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.

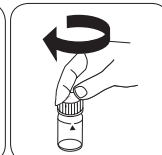
• • •



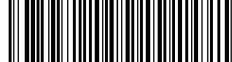
Aggiungere una **pastiglia ALKA-M-PHOTOMETER**.



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



Chiudere la/e cuvetta/e.

**Molibdato T****M250****1 - 50 mg/L MoO₄****Mo3****Tioglicolato**

IT

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
Molibdato HR No. 1	Pastiglia / 100	513060BT
Molibdato HR No. 1	Pastiglia / 250	513061BT
Molibdato HR No. 2	Pastiglia / 100	513070BT
Molibdato HR No. 2	Pastiglia / 250	513071BT
Set Molibdato No. 1/no. 2 [#]	ciascuna 100	517631BT
Set Molibdato No. 1/no. 2 [#]	ciascuna 250	517632BT

Note

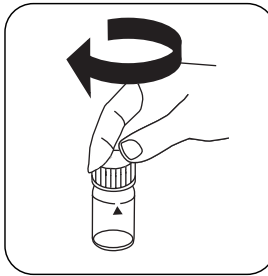
1. Attenersi scrupolosamente all'ordine con cui aggiungere le pastiglie.

Esecuzione della rilevazione Molibdato HR con pastiglia

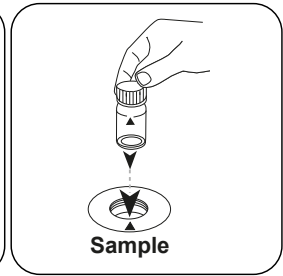
Selezionare il metodo nel dispositivo.



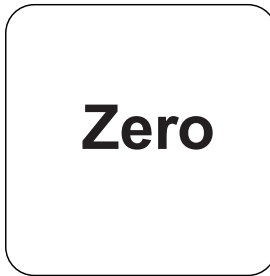
Riempire una cuvetta da 24 mm con **10 mL di campione**.



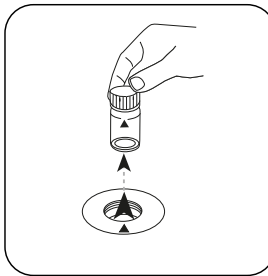
Chiudere la/e cuvetta/e.



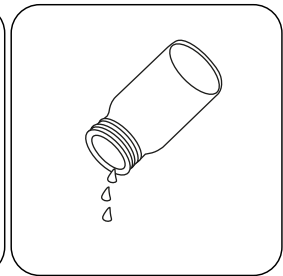
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



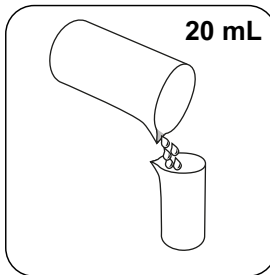
Premere il tasto **ZERO**.



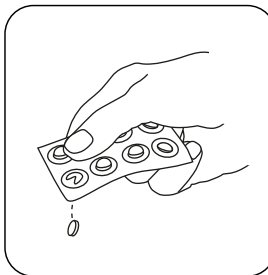
Prelevare la cuvetta dal vano di misurazione.



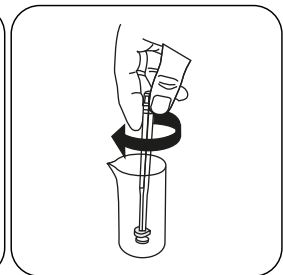
Svuotare la cuvetta.



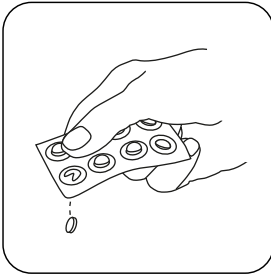
Immettere **20 mL di campione** in un misurino da 100 mL.



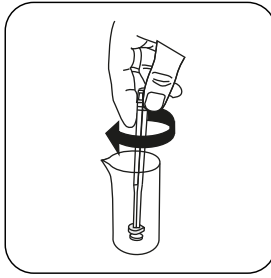
Aggiungere **una pastiglia MOLYBDATE HR No. 1**.



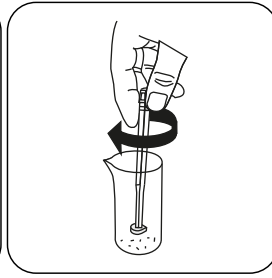
Frantumare la/e pastiglia/e con una leggera rotazione.



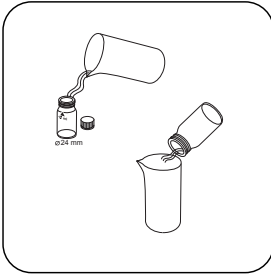
Aggiungere **una pastiglia MOLYBDATE HR No. 2**.



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



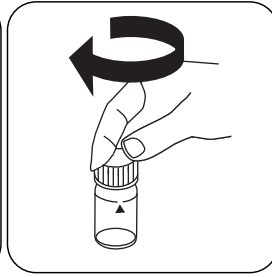
Far sciogliere la/e pastiglia/e mescolando con una barretta di agitazione pulita.



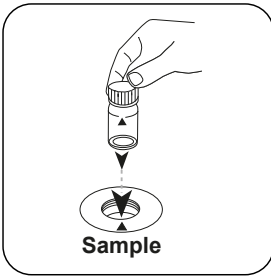
Sciacquare internamente la cuvetta con il campione preparato.



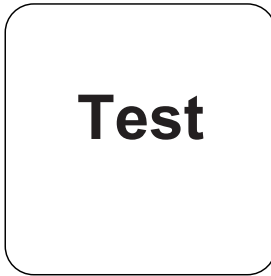
Immettere il **campione** nella cuvetta fino a raggiungere la **tacca dei 10 mL**.



Chiudere la/e cuvetta/e.



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 Molibdato.

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	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

IT

Metodo chimico

Tioglicolato

Appendice

Interferenze

Interferenze escludibili

1. L'interferenza da parte di niobio, tantalio, titanio e zirconio può essere mascherata con acido citrico.
2. L'interferenza da parte del vanadio(V) viene mascherata con fluoruro di potassio.
3. Nelle condizioni di reazione (pH 3,8 - 3,9) il ferro non reagisce. Anche gli altri metalli, nelle normali concentrazioni presenti nell'acqua di caldaia, non producono interferenze significative.

Riferimenti bibliografici

Photometrische Analyse, Lange/Vjedelek, Verlag Chemie 1980

[#]Bacchetta compresa


Molibdato LR PP
M251
0.03 - 3 mg/L Mo
Mo1
Complesso Ternario

IT

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
VARIO Molibdeno LR, Set	1 pz.	535450

Sono necessari inoltre i seguenti accessori.

Accessori	Unità di imballaggio	N. ordine
Cilindro di miscelazione con tappo accessorio necessario per la determinazione del molibdeno LR con MD 100 (276140)	1 pz.	19802650

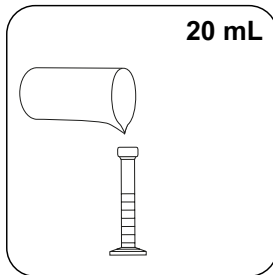
Preparazione

1. Le acque fortemente alcaline o acide devono essere portate prima dell'analisi entro un range di pH compreso tra 3 e 5 (con 0,5 mol/l di acido solforico o 1 mol/l di liscivia).
2. Per evitare errori dovuti a depositi, prima dell'analisi sciacquare i dispositivi in vetro con una soluzione di acido cloridrico (al 20% circa) e successivamente con acqua demineralizzata.

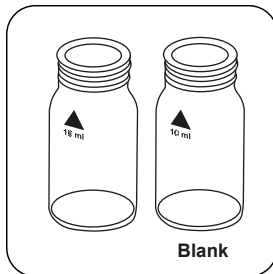
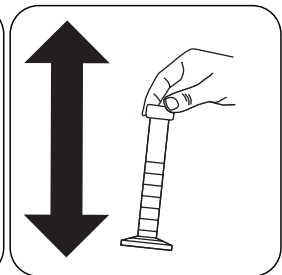
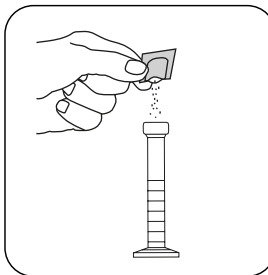


Esecuzione della rilevazione Molibdato LR con polvere in bustine Vario

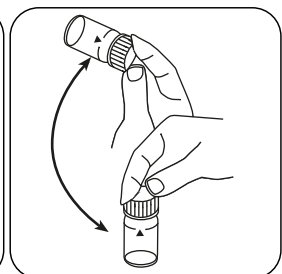
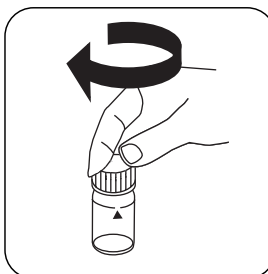
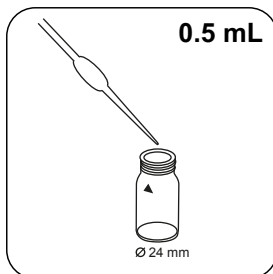
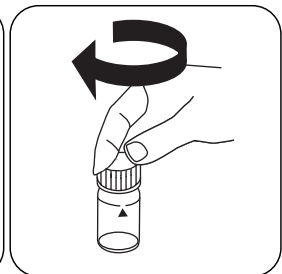
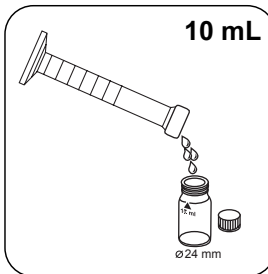
Selezionare il metodo nel dispositivo.

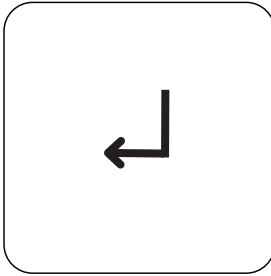


Immettere **20 mL di campione** in un cilindro di miscelazione da 25 mL.

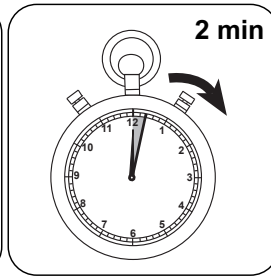


Preparare due cuvette pulite da 24 mm. Contrassegnare una cuvetta come cuvetta zero.

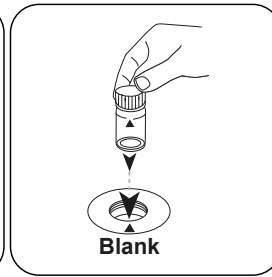




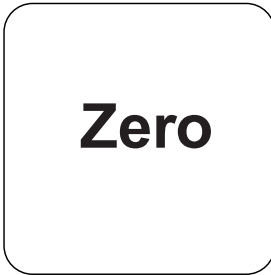
Premere il tasto **ENTER**.



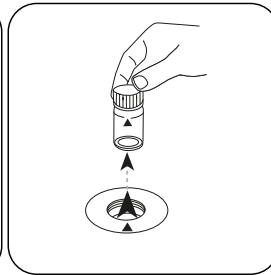
Attendere un **tempo di reazione di 2 minuti**.



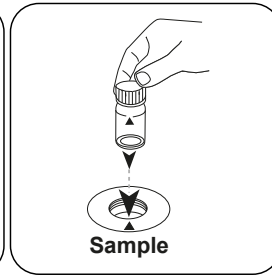
Posizionare la **cuvetta zero** nel vano di misurazione. Fare attenzione al posizionamento.



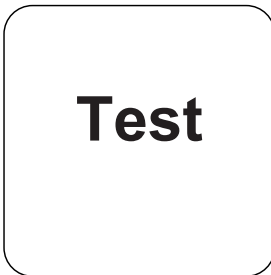
Premere il tasto **ZERO**.



Prelevare la cuvette 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 Molibdato.

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	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

IT

Metodo chimico

Complesso Ternario

Appendice

Interferenze

Interferenze	da / [mg/L]	Influenza
Al	50	
Cr	1000	
Fe	50	
Ni	50	
NO ₂ ⁻	in tutte le quantità	
Cu	10	Porta a letture più elevate con un tempo di risposta superiore a 5 minuti

Riferimenti bibliografici

Analytical Chemistry, 25(9) 1363 (1953)

**Molibdato HR PP****M252****0.3 - 40 mg/L Mo****MO2****Acido tioglicolico**

IT

Materiale

Materiale richiesto (in parte facoltativo):

Reagenti	Unità di imballaggio	N. ordine
VARIO Molibdeno HR, set F10	1 set	535300

Preparazione

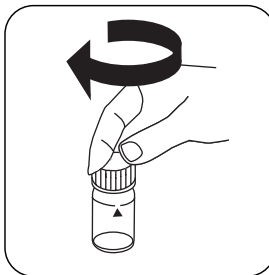
1. Prima dell'analisi filtrare i campioni di acqua torbidi con un filtro a pieghe.
2. I campioni fortemente tamponati o i campioni con valori di pH estremi dovrebbero essere regolati prima dell'analisi su un pH di 7 circa con 1 mol/l di acido nitrico o 1 mol/l di liscivia.

Esecuzione della rilevazione Molibdato HR con polvere in bustine Vario

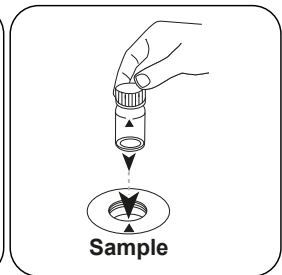
Selezionare il metodo nel dispositivo.



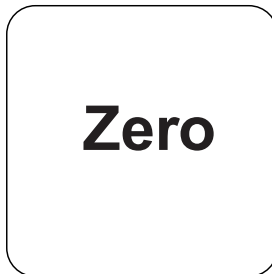
Riempire una cuvetta da 24 mm con **10 mL di campione**.



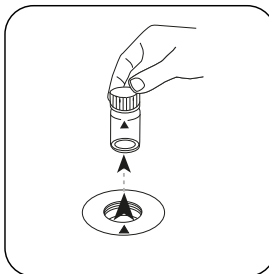
Chiudere la/e cuvetta/e.



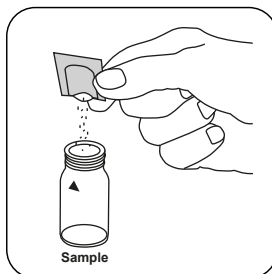
Posizionare la **cuvetta del campione** nel vano di misurazione. Fare attenzione al posizionamento.



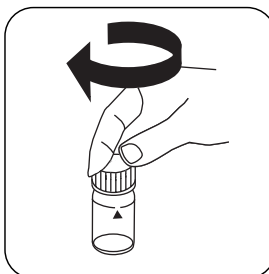
Premere il tasto **ZERO**.



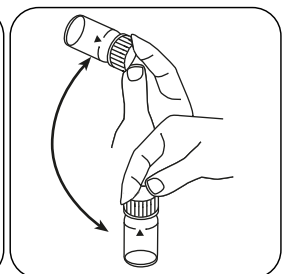
Prelevare la cuvetta dal vano di misurazione.



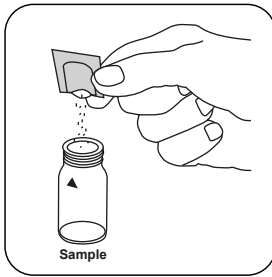
Aggiungere **una bustina di polvere Vario Molybdenum HR 1 F10**.



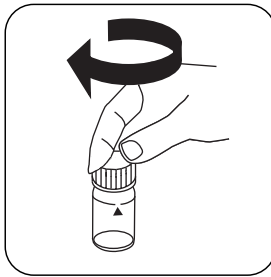
Chiudere la/e cuvetta/e.



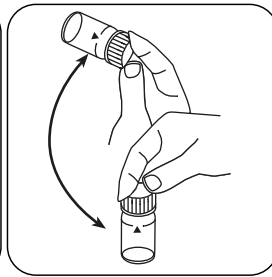
Far sciogliere la polvere capovolgendo.



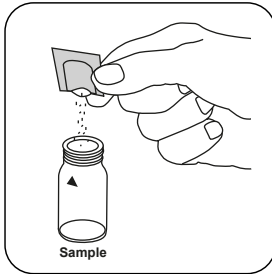
Aggiungere **una bustina di polvere Vario Molybdenum HR 2 F10** .



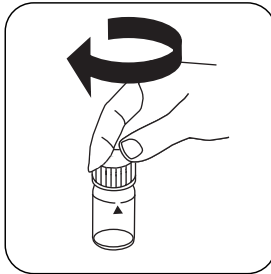
Chiudere la/e cuvetta/e.



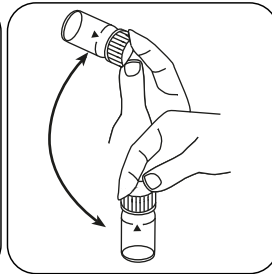
Miscelare il contenuto capovolgendo.



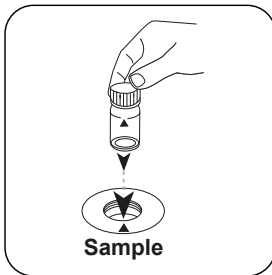
Aggiungere **una bustina di polvere Vario Molybdenum HR 3 F10** .



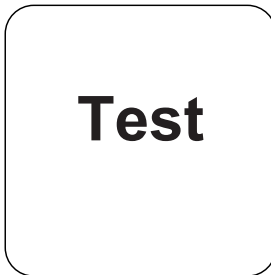
Chiudere la/e cuvetta/e.



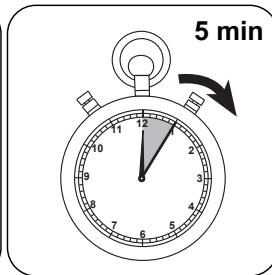
Far sciogliere la polvere capovolgendo.



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 minuti/i** .

Allo scadere del tempo di reazione viene effettuata automaticamente la misurazione. Sul display compare il risultato in mg/L di Molibdato.

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	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

IT

Metodo chimico

Acido tioglicolico

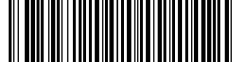
Appendice

Interferenze

Interferenze permanenti

1. A partire da una concentrazione di 10 mg/L di Cu, oltrepassando il tempo di reazione di 5 minuti indicato si ottengono valori di misura troppo elevati. È quindi particolarmente importante eseguire il test rapidamente.

Interferenze	da / [mg/L]
Al	50
Cr	1000
Fe	50
Ni	50
NO ₂ ⁻	in tutte le quantità




Validazione metodo

Limite di rilevabilità	0.16 mg/L
Limite di quantificazione	0.47 mg/L
Estremità campo di misura	40 mg/L
Sensibilità	25.04 mg/L / Abs
Intervallo di confidenza	0.712 mg/L
Deviazione standard della procedura	0.294 mg/L
Coefficiente di variazione della procedura	1.46 %

Riferimenti bibliografici

Analytical Chemistry, 25(9) 1363 (1953)

KS4.3 T / 20



Nome do método

Número do método

Código de barras para a detecção dos métodos

Área de medição

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

20
S:4.3

Método Químico

Indicado no display: MD 100 MD 110 / MD 200

Informação específica do instrumento

O teste pode ser realizado nos seguintes dispositivos. Além disso, a cubeta necessária e a faixa de absorção do fotómetro são indicadas.

Dispositivos	Cubeta	λ	Faixa de Medição
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630	\varnothing 24 mm	610 nm	0.1 - 4 mmol/l $K_{S_{4.3}}$
SpectroDirect, XD 7000, XD 7500	\varnothing 24 mm	615 nm	0.1 - 4 mmol/l $K_{S_{4.3}}$

Material

Material necessário (parcialmente opcional):

Título	Unidade de Embalagem	Artigo No
Alka-M-Photometer	Pastilhas / 100	513210BT
Alka-M-Photometer	Pastilhas / 250	513211BT

Lista de Aplicações

- Tratamento de Esgotos
- Tratamento de Água Potável
- Tratamento de Água Bruta

Notas

1. Os termos alcalinidade-m, m-valor, alcalinidade total e capacidade de acidez $K_{S_{4.3}}$ são idênticos.
2. O cumprimento exato do volume da amostra de 10 ml é decisivo para a precisão do resultado de análise.

Códigos de idioma ISO 639-1

Nível de revisão

PT Métodos Manual 01/20

Efetuar a medição

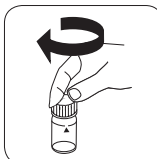
Realização da determinação Capacidade de acidez $K_{s4.3}$ com pastilha

Escolher o método no equipamento.

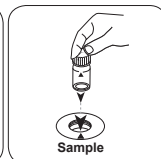
Para este método não tem de ser efetuada uma medição ZERO nos seguintes equipamentos: XD 7000, XD 7500



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

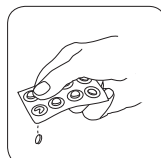


Fechar a(s) célula(s).

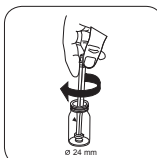


Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.

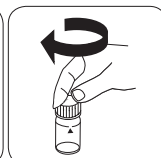
• • •



Pastilha ALKA-M-PHOTO-METER.



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



Fechar a(s) célula(s).

PT Métodos Manual 01/20

PT



Molibdénio T

M250

1 - 50 mg/L MoO₄

Mo3

Thioglycolate

PT

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
Molibdato HR Não. 1	Pastilhas / 100	513060BT
Molibdato HR Não. 1	Pastilhas / 250	513061BT
Molibdato HR Não. 2	Pastilhas / 100	513070BT
Molibdato HR Não. 2	Pastilhas / 250	513071BT
Definir nº Molibdato 1/Não. 2 [#]	cada 100	517631BT
Definir nº Molibdato 1/Não. 2 [#]	cada 250	517632BT

Notas

1. A sequência da adição de pastilhas tem de ser cumprida.

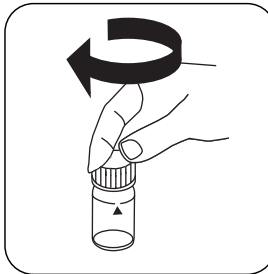


Realização da determinação Molibdénio HR com pastilha

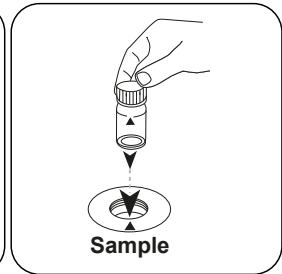
Escolher o método no equipamento.



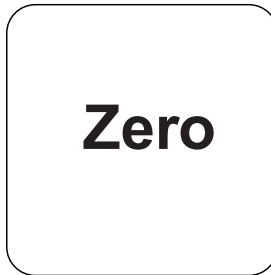
Encher a célula de 24 mm com **10 mL de amostra**.



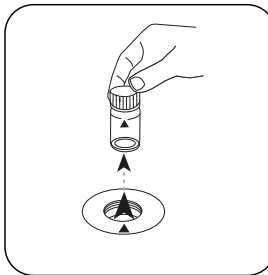
Fechar a(s) célula(s).



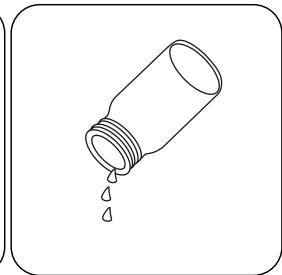
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



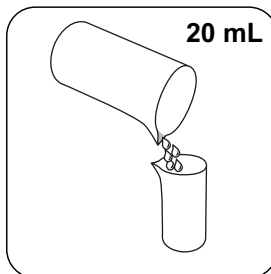
Premir a tecla **ZERO**.



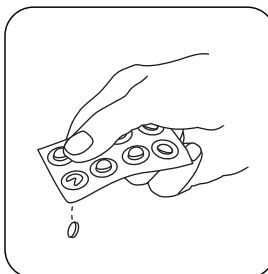
Retirar a célula do compartimento de medição.



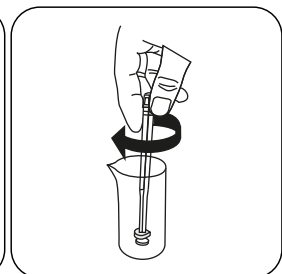
Esvaziar a célula.



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



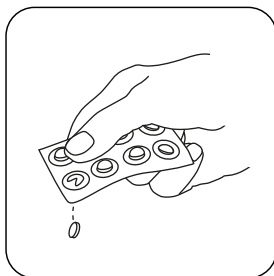
Pastilha MOLYBDATE HR No. 1.



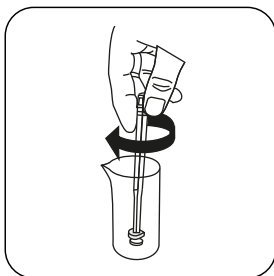
Esmagar a(s) pastilha(s) rodando ligeiramente.



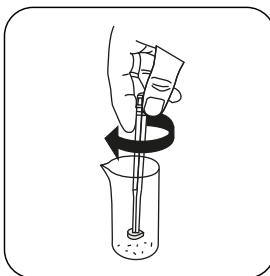
PT



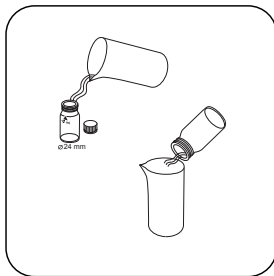
Pastilha MOLYBDATE HR No. 2.



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



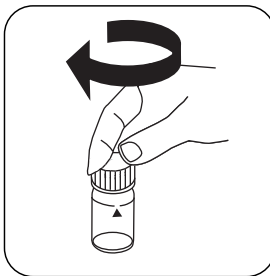
Agitar a(s) pastilha(s) para dissolver com uma vareta agitadora limpa.



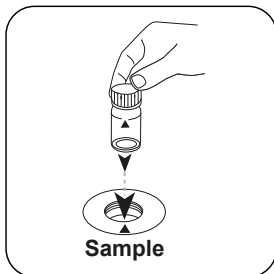
Enxaguar a célula com amostra preparada.



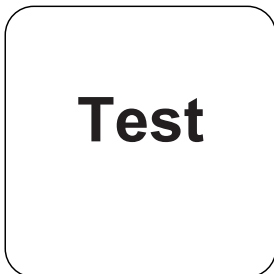
Encher a célula até à **marca de 10 mL** com a amostra .



Fechar a(s) célula(s).



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 Molibdênio.

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	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

PT

Método Químico

Thioglycolate

Apêndice

Texto de Interferências

Interferências Removíveis

1. A interferência de nióbio, tântalo, titânio e zircônio é mascarada com ácido cítrico.
2. A interferência de vanádio (V) é mascarada com fluoreto de potássio.
3. O ferro não reage sob condições de reação (pH 3,8 - 3,9). Mesmo outros metais em concentrações habituais para a água da caldeira não interferem significativamente.

Bibliografia

Análise fotométrica, Lange/ Vjedelek, Verlag Chemie 1980

*incluindo vareta de agitação


Molibdénio LR PP
M251
0.03 - 3 mg/L Mo
Mo1
Complexo Ternário

Material

PT

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
VARIO Molibdénio LR, Set	1 pc.	535450

São necessários os seguintes acessórios.

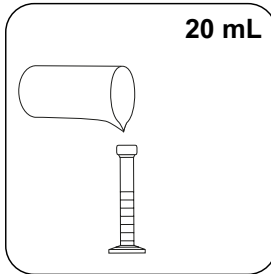
Acessórios	Unidade de Embalagem	Código do Produto
Cilindro misturador com rolha acessório necessário para a determinação do molibdato LR com MD 100 (276140)	1 pc.	19802650

Preparação

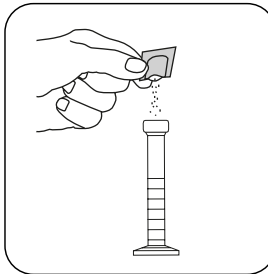
1. As águas fortemente alcalinas ou ácidas devem, antes da análise, ser ajustadas para um valor pH entre 3 e 5 (com 0,5 mol/l de ácido sulfúrico ou 1 mol/l soda cáustica).
2. Para evitar erros por depósito, deve enxaguar os equipamentos de vidro antes da análise com solução de ácido clorídrico (aprox. de 20%) e depois com água desmineralizada.

Realização da determinação Molibdénio LR com pacote de pó Vario

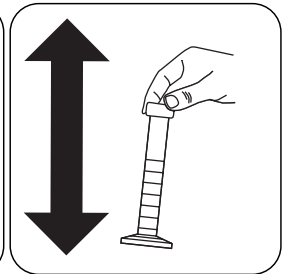
Escolher o método no equipamento.



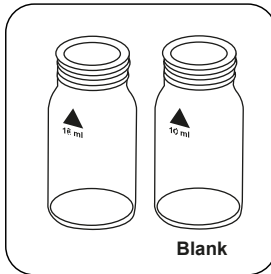
Introduzir **20 mL de amostra** num cilindro misturador de 25 mL.



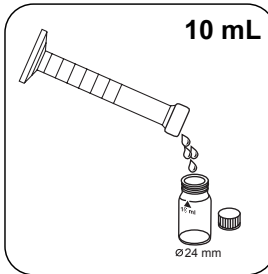
Adicionar um **pacote de pó Vario Molybdenum 1 LR F20**.



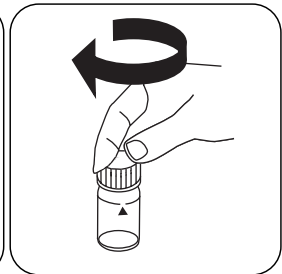
Fechar o cilindro misturador com um tampão. Dissolver o pó agitando.



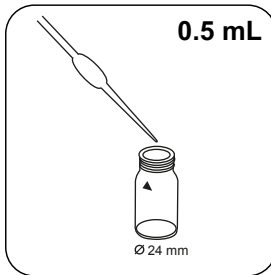
Preparar duas células de 24 mm limpas. Identificar uma célula como célula zero.



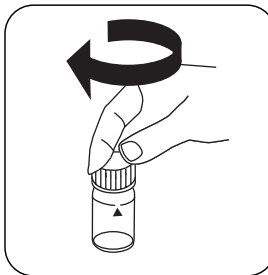
Introduzir em cada célula **10 mL de amostra**.



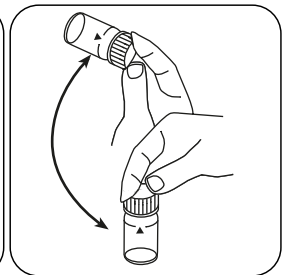
Fechar bem a **célula zero**.



Adicionar **0.5 mL Molybdenum 2 LR de solução** à célula de amostra.



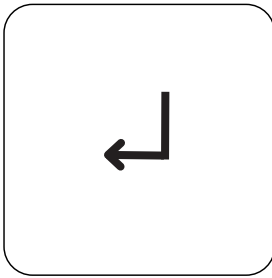
Fechar a(s) célula(s).



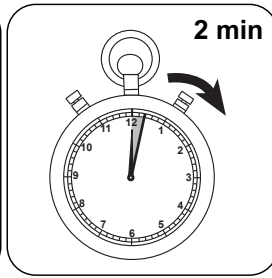
Misturar o conteúdo girando.



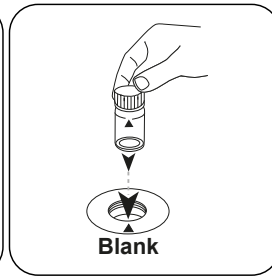
PT



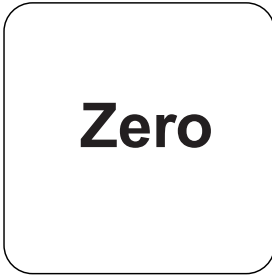
Premir a tecla **ENTER**.



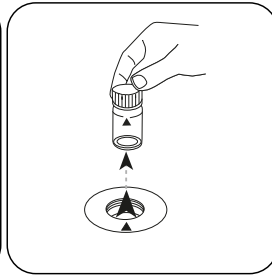
Aguardar **2 minuto(s) de tempo de reação**.



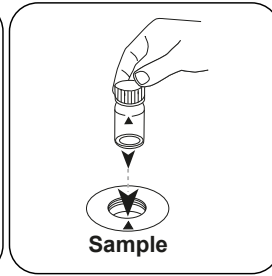
Colocar a **célula zero** no compartimento de medição. Observar o posicionamento.



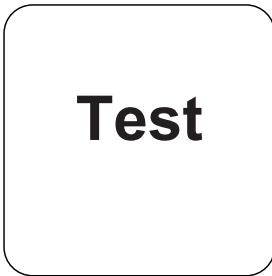
Premir a tecla **ZERO**.



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 Molibdénio.

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	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

PT

Método Químico

Complexo Ternário

Apêndice

Texto de Interferências

Interferências	a partir de / [mg/L]	Influência
Al	50	
Cr	1000	
Fe	50	
Ni	50	
NO ₂ ⁻	em todas as quantidades	
Cu	10	Leva a leituras mais altas com um tempo de resposta de mais de 5 minutos

Bibliografia

Analytical Chemistry, 25(9) 1363 (1953)

**Molibdénio HR PP****M252****0.3 - 40 mg/L Mo****MO2****Mercaptoacetic Acid**

PT

Material

Material necessário (parcialmente opcional):

Reagentes	Unidade de Embalagem	Código do Produto
VARIO Molibdénio HR, Set F10	1 Conjunto	535300

Preparação

1. Filtrar com um filtro dobrado as amostras de água turvas antes da análise.
2. As amostras muito tamponadas ou as amostras com valores pH extremos deviam, antes da análise, ser ajustadas para um pH aproximado de 7 com 1 mol/l de ácido nítrico ou 1 mol/l de soda cáustica.

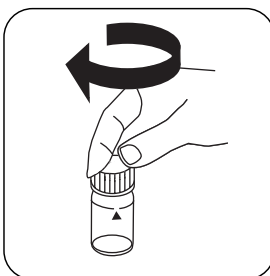


Realização da determinação Molibdénio HR com pacote de pó Vario

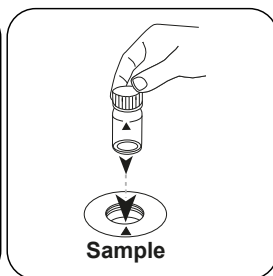
Escolher o método no equipamento.



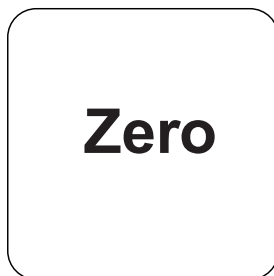
Encher a célula de 24 mm com **10 mL de amostra**.



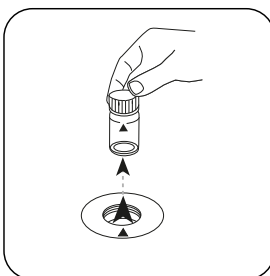
Fechar a(s) célula(s).



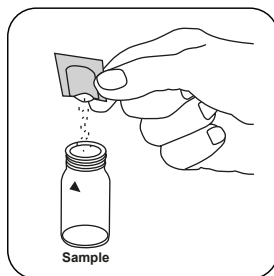
Colocar a **célula de amostra** no compartimento de medição. Observar o posicionamento.



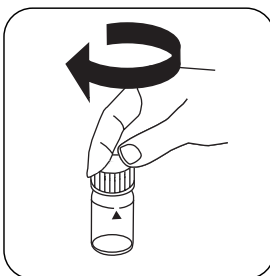
Premir a tecla **ZERO**.



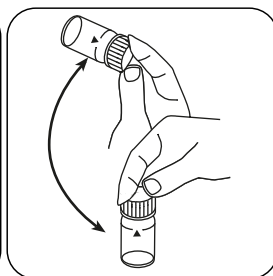
Retirar a célula do compartimento de medição.



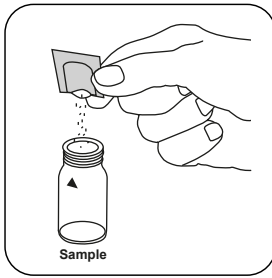
Adicionar um **pacote de pó Vario Molybdenum HR 1 F10**.



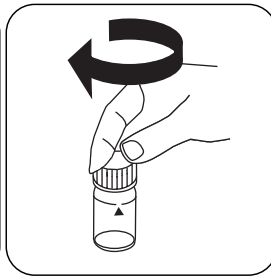
Fechar a(s) célula(s).



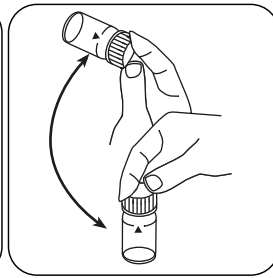
Dissolver o pó girando.



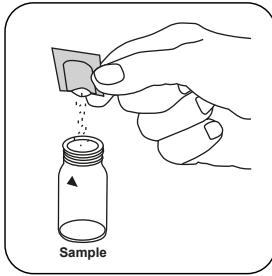
Adicionar um pacote de pó Vario Molybdenum HR 2 F10 .



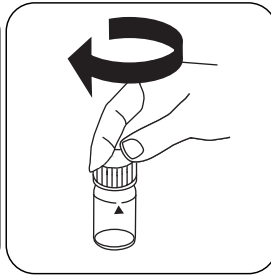
Fechar a(s) célula(s).



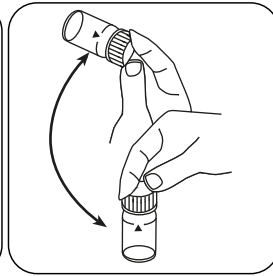
Misturar o conteúdo girando.



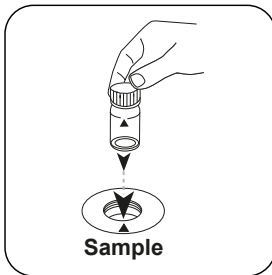
Adicionar um pacote de pó Vario Molybdenum HR 3 F10 .



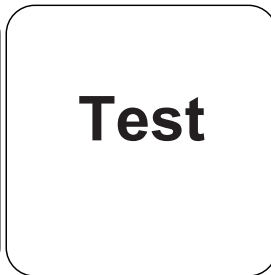
Fechar a(s) célula(s).



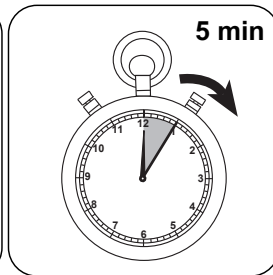
Dissolver o pó girando.



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 Molibdénio.

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	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

PT

Método Químico

Mercaptoacetic Acid

Apêndice

Texto de Interferências

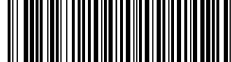
Interferências Persistentes

- Em concentrações a partir de 10 mg/L Cu, um tempo de reação superior aos 5 minutos indicados causam valores de medição mais altos. É, por isso, muito importante que o teste seja realizado rapidamente.

Interferências	a partir de / [mg/L]
Al	50
Cr	1000
Fe	50
Ni	50
NO ₂ ⁻	em todas as quantidades

Validação de método

Limite de Detecção	0.16 mg/L
Limite de Determinação	0.47 mg/L
Fim da Faixa de Medição	40 mg/L
Sensibilidade	25.04 mg/L / Abs
Faixa de Confiança	0.712 mg/L
Desvio Padrão	0.294 mg/L
Coefficiente de Variação	1.46 %




Bibliografia

Analytical Chemistry, 25(9) 1363 (1953)

PT

KS4.3 T / 20



Naam van de methode

Nummer methode

Streepjescode ter identificatie van de methode

Meetbereik

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

Chemische methode

Uitlezing in MD
100 MD 110 / MD 200

Instrument specifieke informatie

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

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

Reagentia

Benodigd materiaal (deels optioneel):

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

Toepassingsbereik

- Afvalwaterzuivering
- Behandeling drinkwater
- Zuivering vervuild water

Aantekeningen

1. De termen alkaliteit-m, m-waarde, totale alkaliteit en zuurcapaciteit_{S_{4.3}} zijn identiek.
2. De exacte naleving van het monstervolume van 10 ml is bepalend voor de nauwkeurigheid van het analysesresultaat.

Beknopte naam conform de norm ISO 639-1

Herziene versie

NL Handboek van Methoden 01/20

Uitvoering van de meting

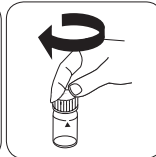
Uitvoering van de bepaling Zuurcapaciteit $K_{s4,3}$ met tablet

De methode in het apparaat selecteren.

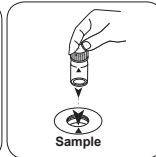
Voor deze methode moet bij de volgende apparaten geen nulmeting worden uitgevoerd:
XD 7000, XD 7500



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

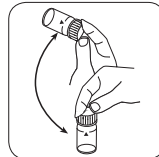


De spoelbakjes afsluiten.



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

• • •



Tabletten oplossen door om te draaien



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



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

De display toont het resultaat als Zuurcapaciteit $K_{s4,3}$.



Molybdaat T

M250

1 - 50 mg/L MoO₄

Mo3

Thioglycoleren

NL

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
Molybdaat HR Nr. 1	Tablet / 100	513060BT
Molybdaat HR Nr. 1	Tablet / 250	513061BT
Molybdaat HR Nr. 2	Tablet / 100	513070BT
Molybdaat HR Nr. 2	Tablet / 250	513071BT
Set molybdaat nr. 1/Nr. 2 [#]	per 100	517631BT
Set molybdaat nr. 1/Nr. 2 [#]	per 250	517632BT

Aantekeningen

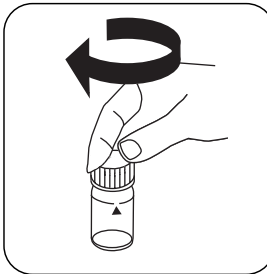
1. De volgorde waarin de tabletten worden toegevoegd, moet strikt in acht worden genomen.

Uitvoering van de bepaling Molybdaat HR met tablet

De methode in het apparaat selecteren.



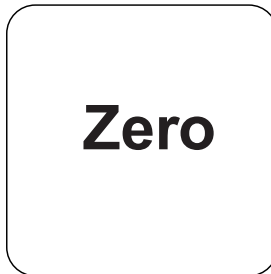
Spoelbakje van 24 mm met **10 mL** staal vullen.



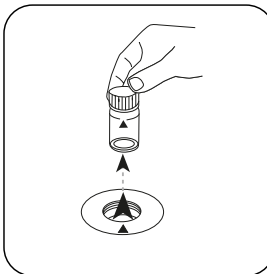
De spoelbakjes afsluiten.



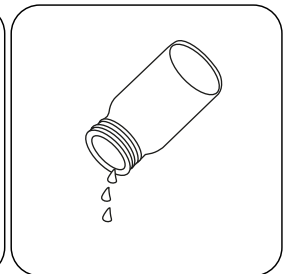
Het **staalspoelbakje** in de meetschacht plaatsen. Op de positionering letten.



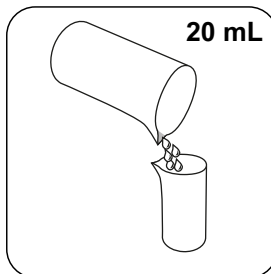
De toets **NUL** indrukken.



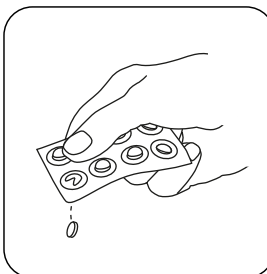
Het spoelbakje uit de meetschacht nemen.



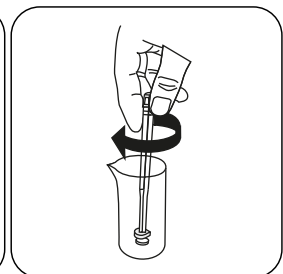
Het spoelbakje ledigen.



20 mL staal in een maatbeker van 100 mL doen.

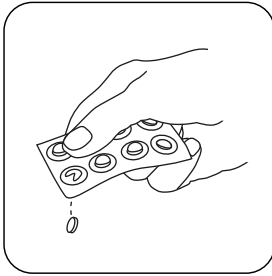


Een **MOLYBDATE HR** Nr. **1** tablet toevoegen.

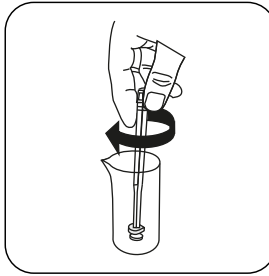


De tabletten onder lichte rotatie verpletteren.

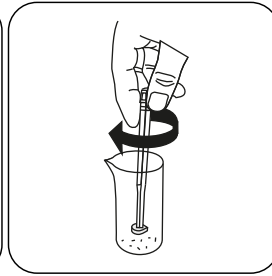
NL



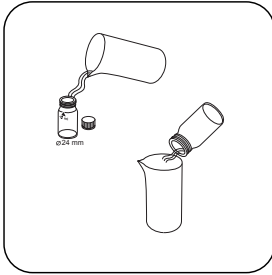
Een **MOLYBDATE HR Nr. 2 tablet** toevoegen.



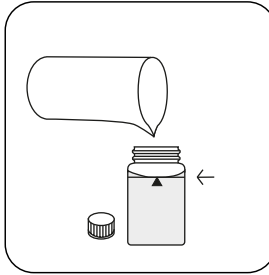
De tabletten onder lichte rotatie verpletteren.



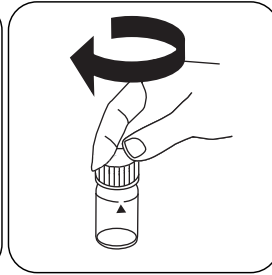
De tabletten oplossen door met een propere roerstok te roeren.



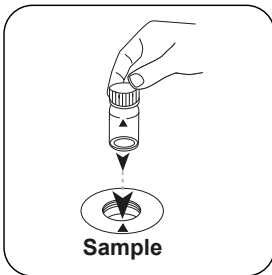
Het spoelbakje met het voorbereide staal uitspoelen.



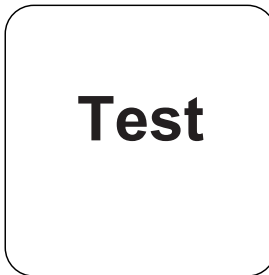
Het spoelbakje tot aan de **markering van 10 mL** met het **staal** vullen.



De spoelbakjes afsluiten.



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



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

De display toont het resultaat in mg/L Molybdaat/Molybdeen.

Evaluatie

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

Eenheid	Dagvaardingsformulier	Omrekeningsfactor
mg/l	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

NL

Chemische methode

Thioglycoleren

Aanhangsel

Verstoringsen

Uit te sluiten verstoringen

1. De verstoring van niobium, tantaal, titanium en zirkonium wordt gemaskeerd met citroenzuur.
2. De verstoring van vanadium(V) wordt gemaskeerd met kaliumfluoride.
3. Onder de reactieomstandigheden (pH 3,8 - 3,9) reageert ijzer niet. Ook andere metalen in concentraties, zoals die gebruikelijk zijn voor ketelwater, storen niet noemenswaardig.

Literatuurverwijzing

Fotometrische analyse, Lange/ Vjedelek, Chemie-uitgeverij 1980

* met inbegrip van de mengstaaf



Molybdaat LR PP

M251

0.03 - 3 mg/L Mo

Mo1

Ternair Complex

NL

Reagentia

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
VARIO molybdeen LR, set	1 St.	535450

De volgende toebehoren zijn eveneens vereist.

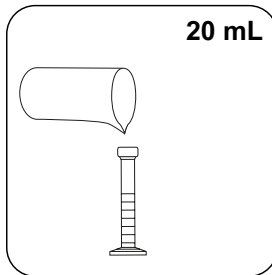
Toebehoren	Verpakkingseenheid	Bestelnr.
Mengcilinder met stop noodzakelijk voor het bepalen van molybdeen LR met MD 100 (276140)	1 St.	19802650

Vorbereiding

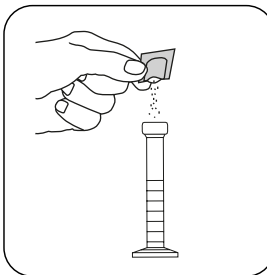
1. Sterk alkalisch of zuur water moet vóór de analyse in een pH-gebied tussen 3 en 5 (met 0,5 mol/l zwavelzuur of 1 mol/l-natriumhydroxideoplossing) worden gebracht.
2. Om fouten als gevolg van afzettingen te voorkomen, spoelt u het laboratoriumglas voor de analyse met zoutzuuroplossing (ca. 20% ig) en vervolgens met gedeïoniseerd water.

Uitvoering van de bepaling Molybdaat LR met Vario-poederpakje

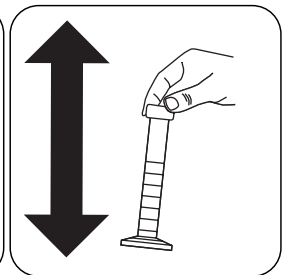
De methode in het apparaat selecteren.



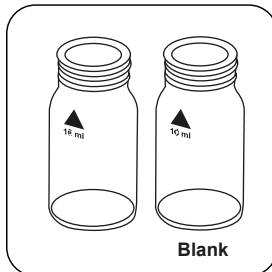
20 mL staal in een mengcilinder van 25 mL doen.



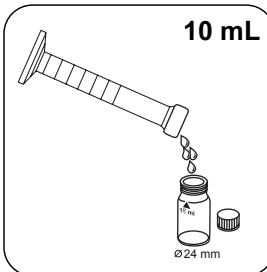
Een **Vario Molybdenum 1 LR F20 poederpakje** toevoegen.



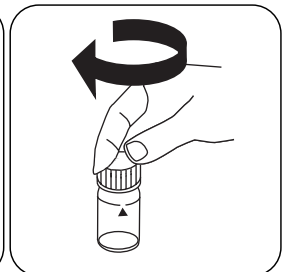
De mengcilinder met een stop afsluiten. Het poeder oplossen door te schudden.



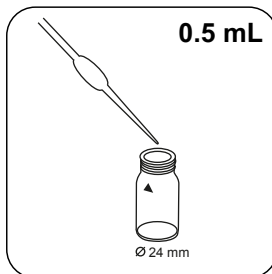
Twee propre spoelbakjes van 24 mm klaarzetten. Een als nulspoelbakje kenmerken.



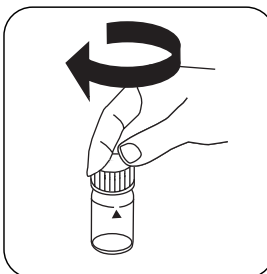
In elk spoelbakje **10 mL staal** doen.



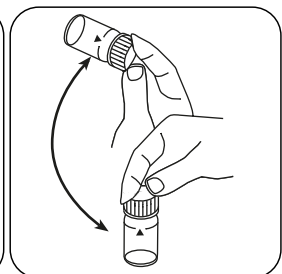
Het **nulspoelbakje** vast afsluiten.



0.5 mL Molybdenum 2 LR oplossing in het staalspoelbakje doen.



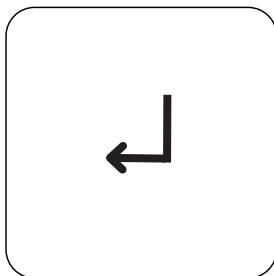
De spoelbakjes afsluiten.



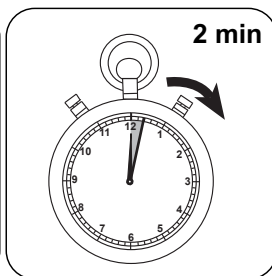
De inhoud mengen door om te draaien.



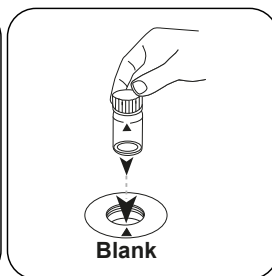
NL



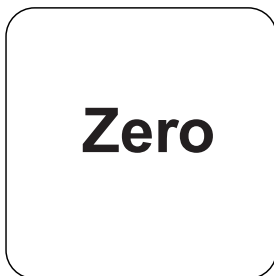
De toets **ENTER** indrukken.



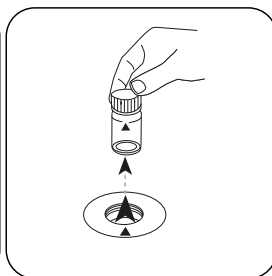
De reactietijd van **2 minuten** afwachten.



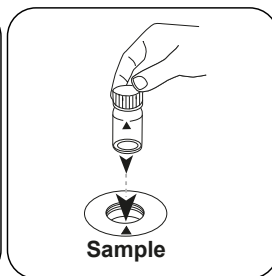
Het **nulspoelbakje** in de meetschacht plaatsen. Op de positionering letteren.



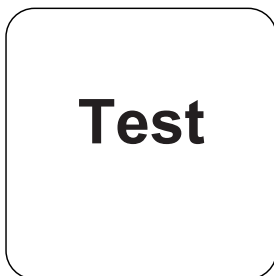
De toets **NUL** indrukken.



Het spoelbakje uit de meetschacht nemen.



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



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

De display toont het resultaat in mg/L Molybdaat/Molybdeen.

Evaluatie

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

Eenheid	Dagvaardingsformulier	Omrekeningsfactor
mg/l	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

NL

Chemische methode

Ternair Complex

Aanhangsel

Verstoringen

Verstoringen	verstoort vanaf	Invloed
Al	50	
Cr	1000	
Fe	50	
Ni	50	
NO ₂ ⁻	in alle hoeveelheden	
Cu	10	Resulteert in hogere meetwaarden met een reactietijd van meer dan 5 minuten

Literatuurverwijzing

Analytische scheikunde, 25(9) 1363 (1953)



Molybdaat HR PP

M252

0.3 - 40 mg/L Mo

MO2

Mercaptoazijnzuur

Reagentia

NL

Benodigd materiaal (deels optioneel):

Reagentia	Verpakkingseenheid	Bestelnr.
VARIO Molybdeen HR, set F10	1 Zin	535300

Vorbereiding

1. Filtreer troebele watermonsters vóór de analyse door een vouwfilter.
2. Sterk gebufferde monsters of monsters met een extreme pH-waarde moeten vóór de analyse worden ingesteld op een pH van ongeveer 7 met salpeterzuur 1 mol/l of 1 mol/l natriumhydroxideoplossing.

Uitvoering van de bepaling Molybdaat HR met Vario-poederpakje

De methode in het apparaat selecteren.



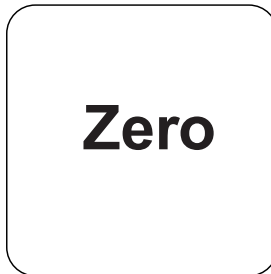
Spoelbakje van 24 mm met
10 mL staal vullen.



De spoelbakjes afsluiten.



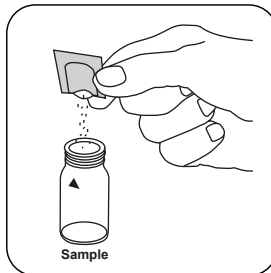
Het **staalspoelbakje** in de
meetschacht plaatsen. Op
de positionering letten.



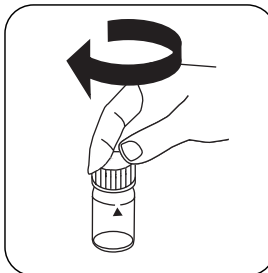
De toets **NUL** indrukken.



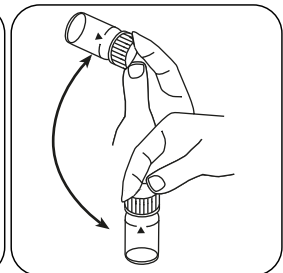
Het spoelbakje uit de
meetschacht nemen.



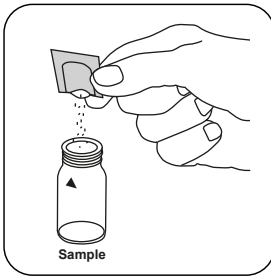
Een **Vario Molybdenum
HR 1 F10 poederpakje**
toevoegen.



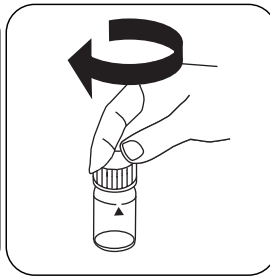
De spoelbakjes afsluiten.



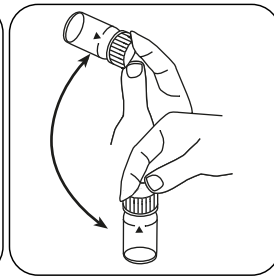
Het poeder oplossen door
om te draaien.



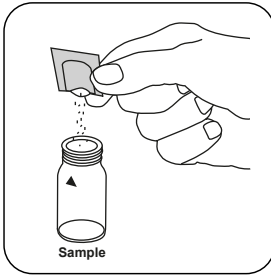
Een **Vario Molybdenum HR 2 F10 poederpakje** toevoegen.



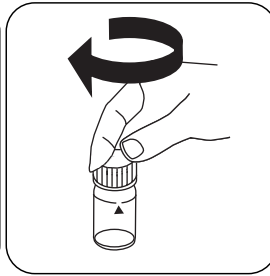
De spoelbakjes afsluiten.



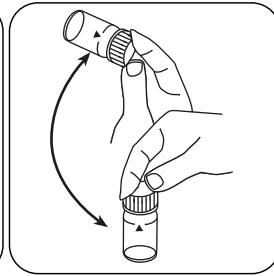
De inhoud mengen door om te draaien.



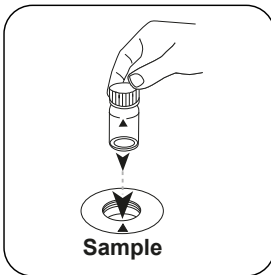
Een **Vario Molybdenum HR 3 F10 poederpakje** toevoegen.



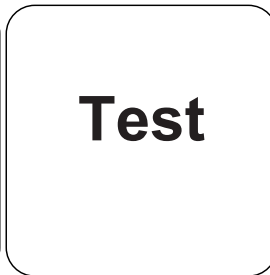
De spoelbakjes afsluiten.



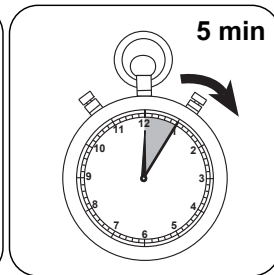
Het poeder oplossen door om te draaien.



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 Molybdaat/Molybdeen.

Evaluatie

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

Eenheid	Dagvaardingsformulier	Omrekeningsfactor
mg/l	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

NL

Chemische methode

Mercaptoazijnzuur

Aanhangsel

Verstoringen

Permanente verstoringen

1. Bij concentraties van 10 mg/L Cu meer dan de aangegeven reactietijd van 5 minuten leiden tot hogere gemeten waarden. Een snelle uitvoering van de test is daarom bijzonder belangrijk.

Verstoringen	verstoort vanaf
Al	50
Cr	1000
Fe	50
Ni	50
NO ₂ ⁻	in alle hoeveelheden

Validatie van de methodes


Aantoonbaarheidsgrens	0.16 mg/L
Bepaalbaarheidsgrens	0.47 mg/L
Einde meetbereik	40 mg/L
Gevoeligheid	25.04 mg/L / Abs
Betrouwbaarheidsgrenzen	0.712 mg/L
Standaardafwijking procedure	0.294 mg/L
Variatiecoëfficiënt procedure	1.46 %



Literatuurverwijzing

Analytische scheikunde, 25(9) 1363 (1953)

NL

KS4.3 T / 20


方法名称

方法号

用于方法检测的条形码

测量范围

酸性 / 指示剂

屏幕显示: MD 100 / MD 110 / MD 200

化学方法

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。

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

材料

所需材料 (部分可選) :

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

應用列表

- 污水處理
- 飲用水處理
- 原水處理

備註

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

語言代碼ISO 639-1

修訂狀態

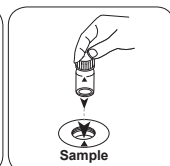
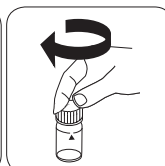
CN 方法手冊 01/20

开始测量

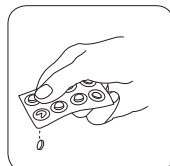
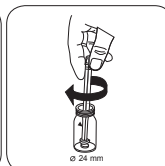
进行测定 $K_{s4.3}$ 片剂酸容量

选择设备中的方法。

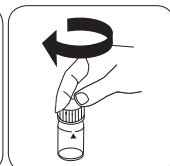
对于这种方法，在以下设备上不能进行 ZERO 测量：XD 7000, XD 7500

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

• • •

加入 ALKA-M-PHOTOME-
TER 片剂。

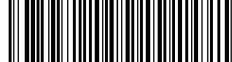
用轻微的扭转压碎片剂。



密封比色杯。

CN 方法手册 01/20

ZH



T 钼酸盐

M250

1 - 50 mg/L MoO₄

Mo3

巯基乙酸

材料

所需材料 (部分可选) :

ZH

试剂	包装单位	货号
钼酸盐 HR No.1	片剂 / 100	513060BT
钼酸盐 HR No.1	片剂 / 250	513061BT
钼酸盐 HR No.2	片剂 / 100	513070BT
钼酸盐 HR No.2	片剂 / 250	513071BT
套件钼酸盐 No.1/No.2 [#]	各100次	517631BT
套件钼酸盐 No.1/No.2 [#]	各250次	517632BT

备注

1. 必须严格遵守添加片剂的顺序。

进行测定 HR 钼酸盐片剂

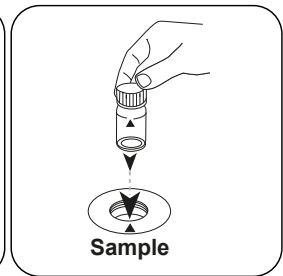
选择设备中的方法。



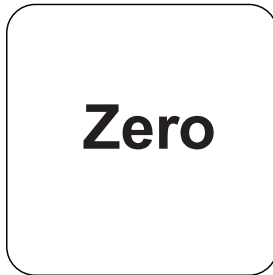
用 10 mL 样本填充 24 mm 比色杯。



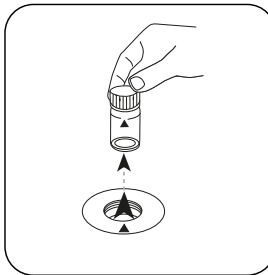
密封比色杯。



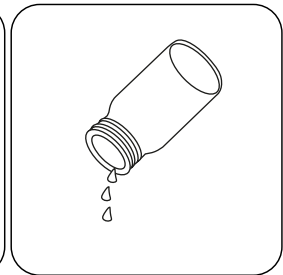
将样本比色杯放入测量轴中。注意定位。



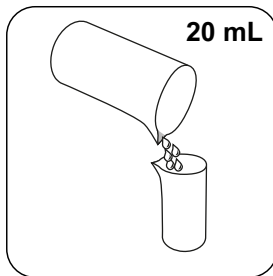
按下 ZERO 按钮。



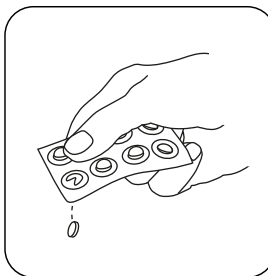
从测量轴上取下比色杯。



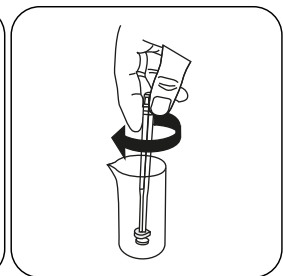
倒空比色杯。



加入 20 mL 样本到 100 mL 量杯中。

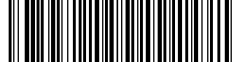


加入 MOLYBDATE HR No. 1 片剂。

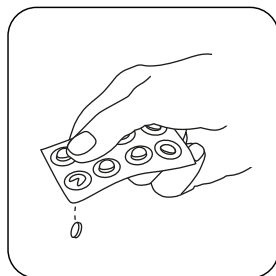


用轻微的扭转压碎片剂。

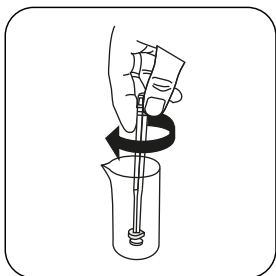
ZH



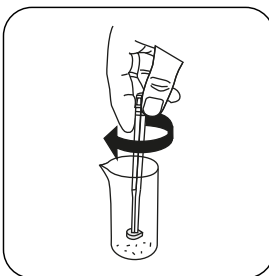
ZH



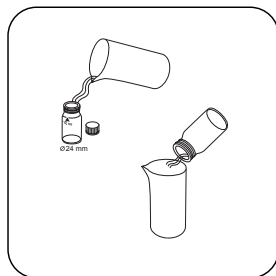
加入 **MOLYBDATE HR No. 2** 片剂。



用轻微的扭转压碎片剂。



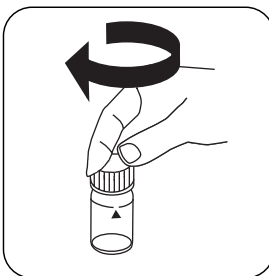
用清洁的搅拌棒搅拌溶解片剂。



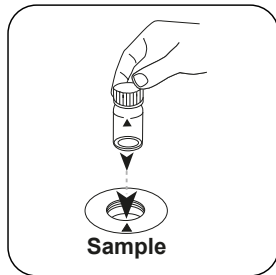
用准备好的样本冲洗比色杯。



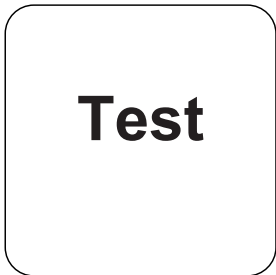
用样本将比色杯填充至 **10 mL** 刻度处。



密封比色杯。



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 钼酸盐。

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	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

ZH

化学方法

巯基乙酸

附录

干扰说明

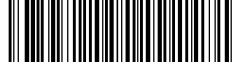
可消除干扰

1. 铈、钼、钽和锆的干扰用柠檬酸掩盖。
2. 钒 (V) 的干扰用氟化钾掩盖。
3. 在反应条件 (pH 3.8 - 3.9) 下铁不反应。锅炉用水常见浓度的其他金属不会造成显著干扰。

参考文献

Photometrische Analyse, Lange/ Vjedelek, Verlag Chemie 1980

* i含搅拌棒, 10cm



LR PP 钼酸

M251

0.03 - 3 mg/L Mo

Mo1

Ternary Complex

材料

所需材料 (部分可选) :

ZH

试剂	包装单位	货号
VARIO 钼 LR, 套件	1 片	535450

它还需要以下配件。

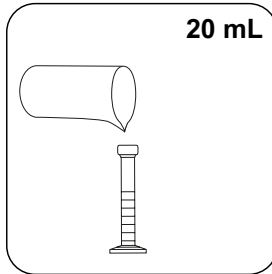
附件	包装单位	货号
带塞混合缸, 必要附件, 用于利用 MD 100 测定钼 LR (276140)	1 片	19802650

准备

1. 在分析前 (用 0.5 mol/l 硫酸或 1 mol/l 氢氧化钠溶液) 必须将强碱性或酸性水的 pH 范围调节到 3 和 5 之间。
2. 为避免沉积造成的错误, 请在分析前用盐酸溶液 (约 20%) 冲洗玻璃器皿, 然后用去离子水冲洗。

进行测定 LR 钼酸 Vario 粉包

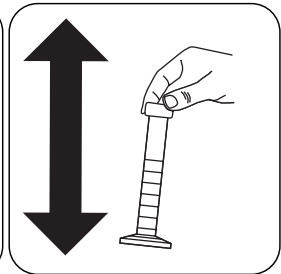
选择设备中的方法。



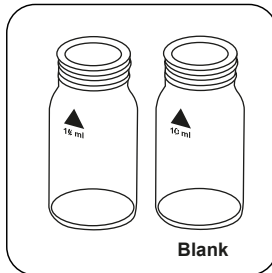
加入 **20 mL** 样本到 25 mL 搅拌缸中。



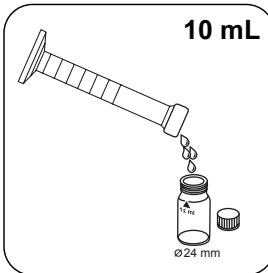
加入 **Vario Molybdenum 1 LR F20** 粉包。



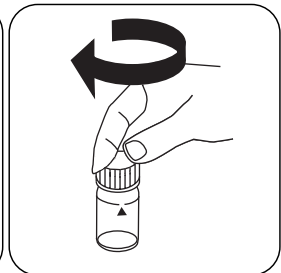
用塞子密封搅拌缸。通过摇晃溶解粉末。



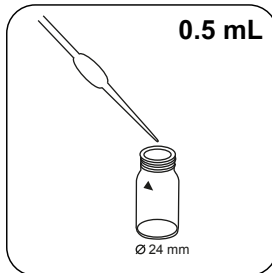
准备两个干净的 24 mm 比色杯。将一个比色杯标记为空白比色杯。



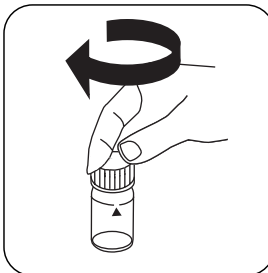
在每个比色杯中加入 **10 mL** 样本。



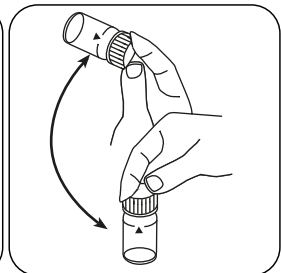
密封空白比色杯。



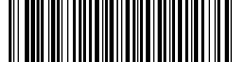
将 **0.5 mL Molybdenum 2 LR** 溶液加入到样本比色杯中。



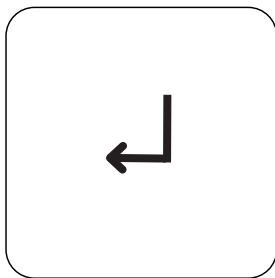
密封比色杯。



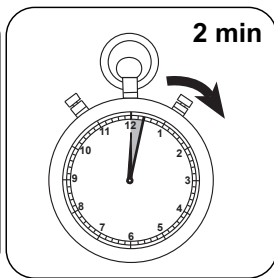
通过旋转混合内容物。



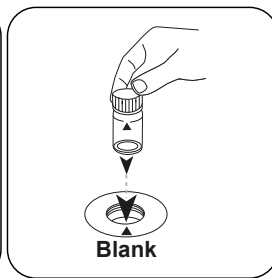
ZH



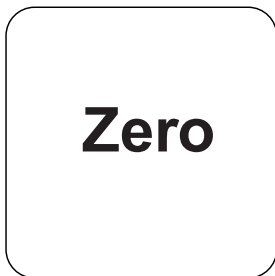
按下 **ENTER** 按钮。



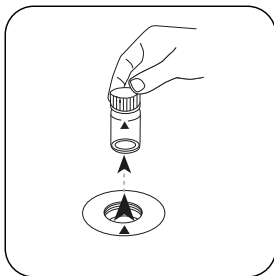
等待 **2 分钟** 反应时间。



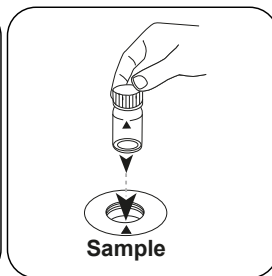
将空白比色杯放入测量轴中。注意定位。



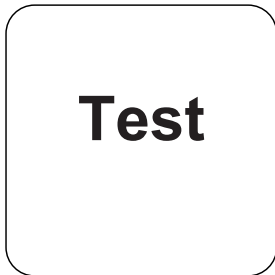
按下 **ZERO** 按钮。



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 钼酸。

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	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

ZH

化学方法

Ternary Complex

附录

干扰说明

干扰	從/ [mg/l]	影響
Al	50	
Cr	1000	
Fe	50	
Ni	50	
NO ₂ ⁻	所有的量	
Cu	10	反应时间超过5分钟会导致读数偏高

参考文献

Analytical Chemistry, 25(9) 1363 (1953)



HR PP 钼酸

M252

0.3 - 40 mg/L Mo

MO2

巯基乙酸

材料

所需材料 (部分可选) :

ZH

试剂	包装单位	货号
VARIO 钼 HR, 套件 F10	1 组	535300

准备

1. 在分析前通过波纹过滤器过滤浑浊的水样。
2. 在分析前用 1 mol/L 硝酸或 1 mol/L 氢氧化钠溶液将高度缓冲的样本或具有极端 pH 值的样本调节至 pH 值约为 7。

进行测定 HR 钼酸 Vario 粉包

选择设备中的方法。



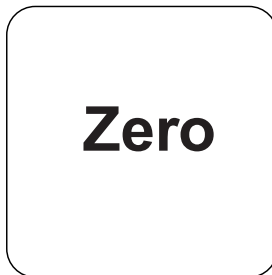
用 **10 mL** 样本填充 24 mm 比色杯。



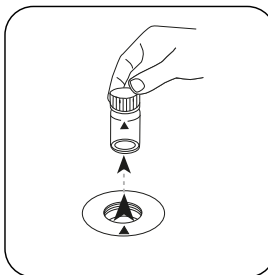
密封比色杯。



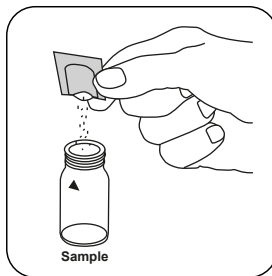
将样本比色杯放入测量轴中。注意定位。



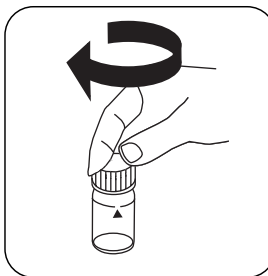
按下 **ZERO** 按钮。



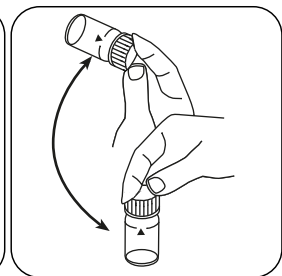
从测量轴上取下比色杯。



加入 **Vario Molybdenum HR 1 F10** 粉包。



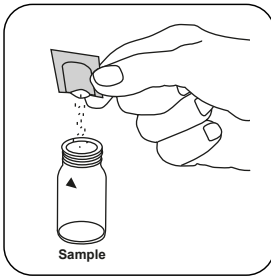
密封比色杯。



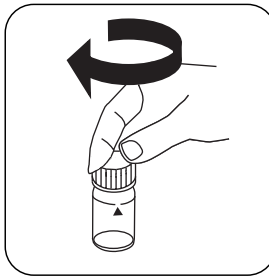
通过旋转溶解粉末。



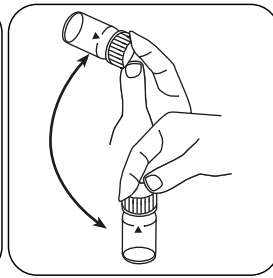
ZH



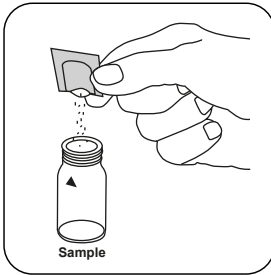
加入 **Vario Molybdenum HR 2 F10** 粉包。



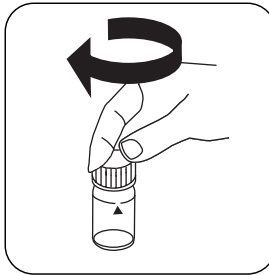
密封比色杯。



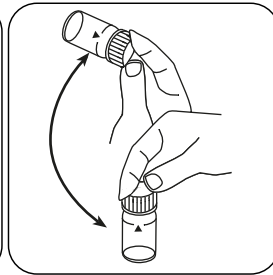
通过旋转混合内容物。



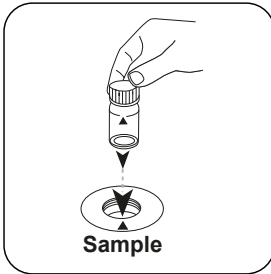
加入 **Vario Molybdenum HR 3 F10** 粉包。



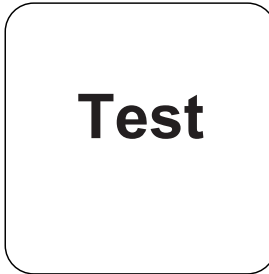
密封比色杯。



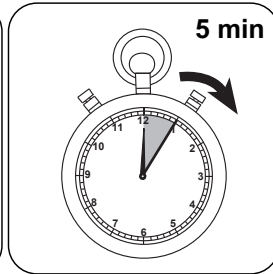
通过旋转溶解粉末。



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 钼酸。

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	MoO ₄	1
mg/l	Mo	0.6
mg/l	Na ₂ MoO ₄	1.29

ZH

化学方法

巯基乙酸

附录

干扰说明

持续干扰

- 在浓度超过 10 mg/L Cu 时，反应时间超过规定的 5 分钟导致测量值较高。因此，快速进行测试尤为重要。

干扰	從/ [mg/l]
Al	50
Cr	1000
Fe	50
Ni	50
NO ₂ ⁻	所有的量

方法验证

检出限	0.16 mg/L
测定下限	0.47 mg/L
测量上限	40 mg/L
灵敏度	25.04 mg/L / Abs
置信范围	0.712 mg/L
标准偏差	0.294 mg/L
变异系数	1.46 %

参考文献

Analytical Chemistry, 25(9) 1363 (1953)

Tintometer GmbH

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

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 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

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 Brazil

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

Tintometer Spain

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

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 Inc.

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



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