

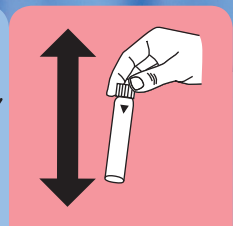
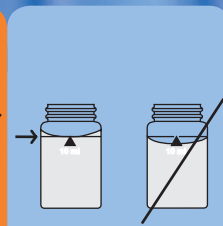
Lovibond® Water Testing


Tintometer® Group



Manual of Methods

MD50 • MD150



KS4.3 T / 20


Method name

Method number

Bar code for the detection of the methods

Measuring range

20

S:4.3

Chemical Method

Acid / Indicator

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

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

Language codes ISO 639-1

Revision status

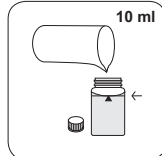
EN Handbook of Methods 01/20

Performing test procedure

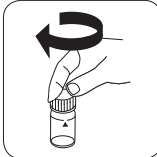
Implementation of the provision Acid capacity $K_{S4.3}$ with Tablet

Select the method on the device

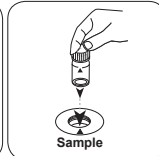
For this method, no ZERO measurements are to be carried out with the following devices: XD 7000, XD 7500



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

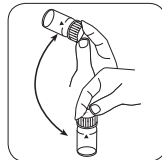


Close vial(s).

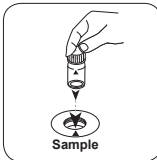


Place **sample vial** in the sample chamber. • Pay attention to the positioning.

• • •



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.

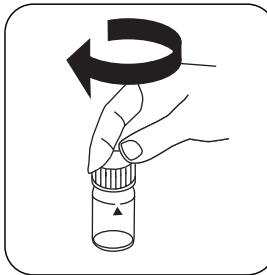
Determination of Molybdate HR with Tablet

Select the method on the device.

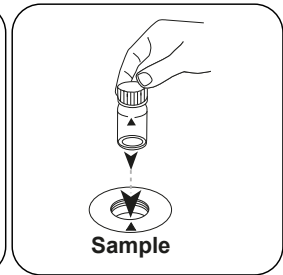
For this method, a ZERO measurement does not have to be carried out every time on the following devices: XD 7000, XD 7500



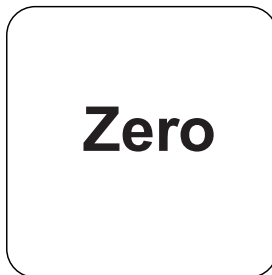
Fill 24 mm vial with **10 mL sample**.



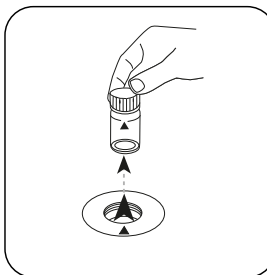
Close vial(s).



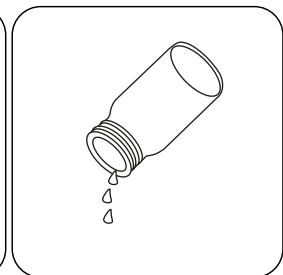
Place **sample vial** in the sample chamber. Pay attention to the positioning.



Press the **ZERO** button.

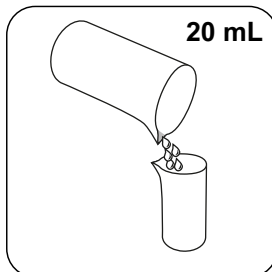


Remove the vial from the sample chamber.

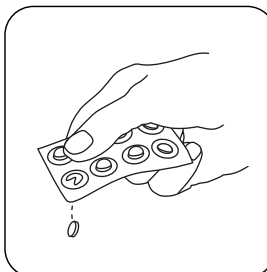


Empty vial.

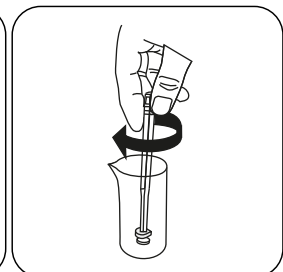
For devices that require **no ZERO measurement**, start here.



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



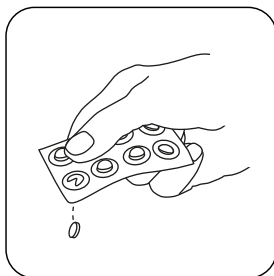
Add **MOLYBDATE HR No. 1 tablet**.



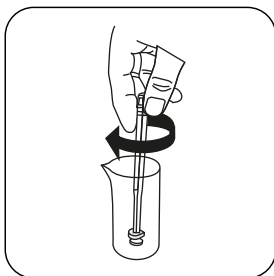
Crush tablet(s) by rotating slightly.



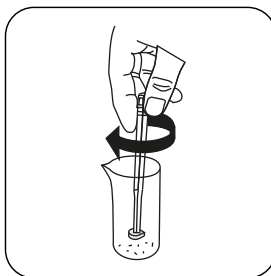
EN



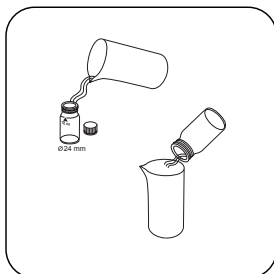
Add **MOLYBDATE HR No. 2 tablet** .



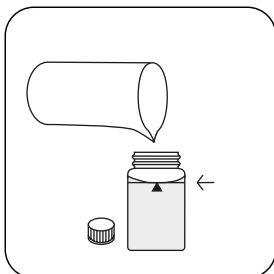
Crush tablet(s) by rotating slightly.



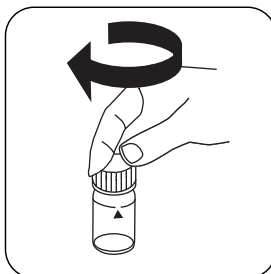
Dissolve the tablets using a clean stirring rod.



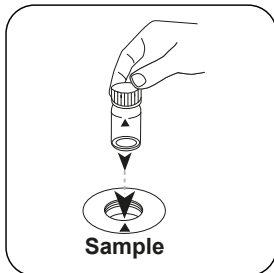
Rinse out vial with prepared sample .



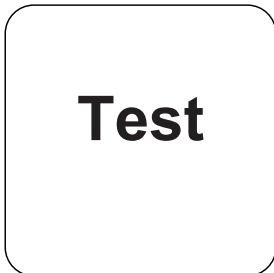
Fill up vial with **sample** to the **10 mL mark**.



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.

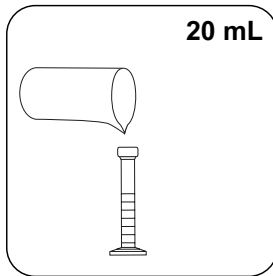
Accessories	Packaging Unit	Part Number
Mixing cylinder, 25 ml	1 pc.	19802650

Preparation

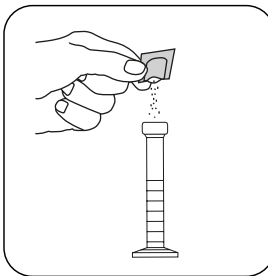
1. Strong alkaline or acidic water samples must be adjusted between pH 3 and pH 5 before the analysis (use 0.5 mol/l Sulphuric acid or 1 mol/l Sodium hydroxide).
2. To avoid errors caused by deposits, rinse the glassware with Hydrochloric acid (approx. 20%) before the analysis and then rinse with deionised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

Determination of Molybdate LR with Vario Powder Packs

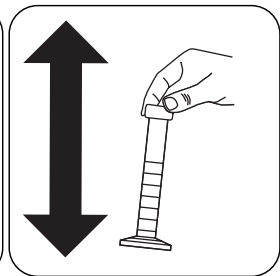
Select the method on the device.



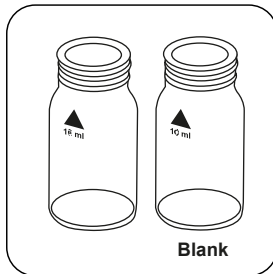
Put **20 mL sample** in 25 mL measuring cylinder.



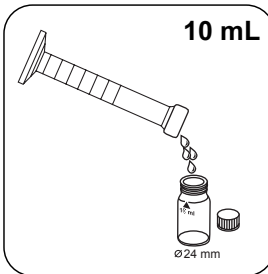
Add **Vario Molybdenum 1 LR F20 powder pack**.



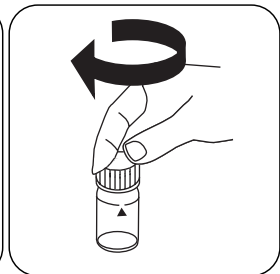
Stopper the mixing cylinder. Shake to dissolve the powder.



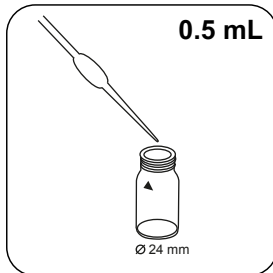
Prepare two clean 24 mm vials. Mark one as a blank.



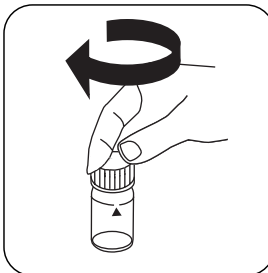
Place **10 mL sample** in each vial.



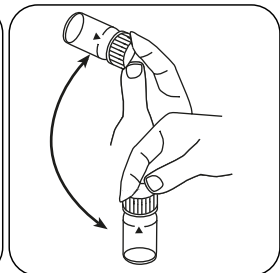
Firmly close the **blank**.



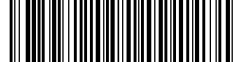
Place **0.5 mL Molybdenum 2 LR solution** in the sample cuvette.



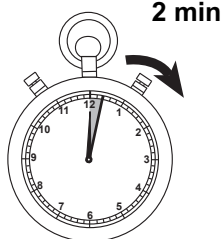
Close vial(s).



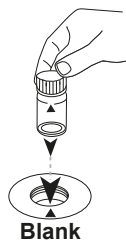
Invert several times to mix the contents.



Press the **ENTER** button.



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



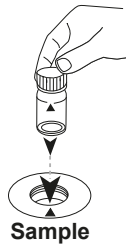
Place **blank** in the sample chamber. Pay attention to the positioning.

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

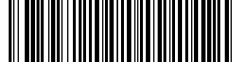
Appendix

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.

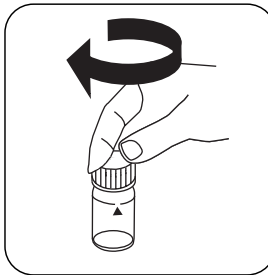
Determination of Molybdate HR with Vario Powder Packs

Select the method on the device.

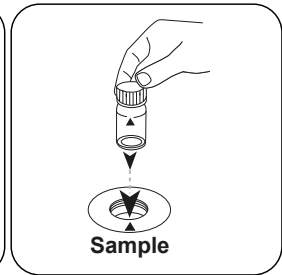
For this method, a ZERO measurement does not have to be carried out every time on the following devices: XD 7000, XD 7500



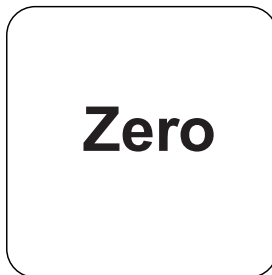
Fill 24 mm vial with **10 mL sample**.



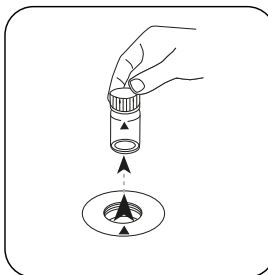
Close vial(s).



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

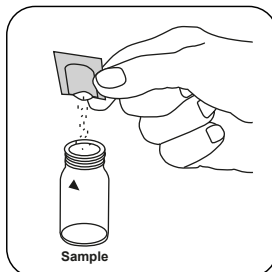


Press the **ZERO** button.

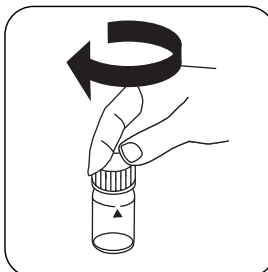


Remove the vial from the sample chamber.

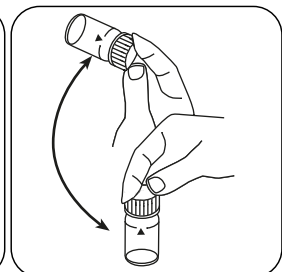
For devices that require **no ZERO measurement**, start here.



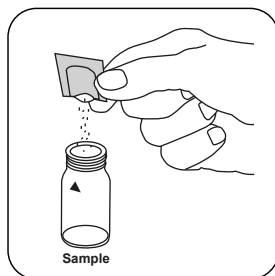
Add **Vario Molybdenum HR 1 F10 powder pack**.



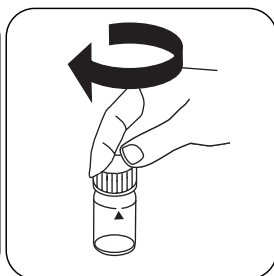
Close vial(s).



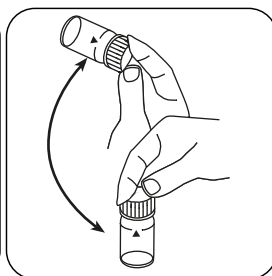
Swirl around to dissolve the powder.



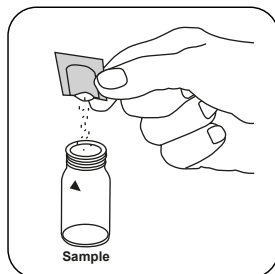
Add **Vario Molybdenum HR 2 F10 powder pack**.



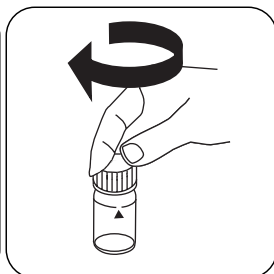
Close vial(s).



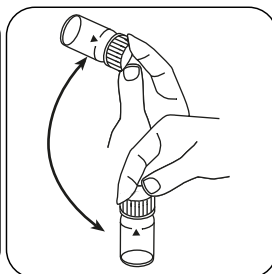
Invert several times to mix the contents.



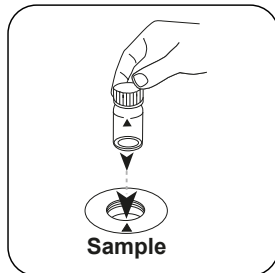
Add **Vario Molybdenum HR 3 F10 powder pack**.



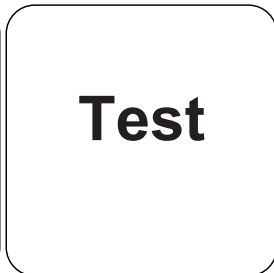
Close vial(s).



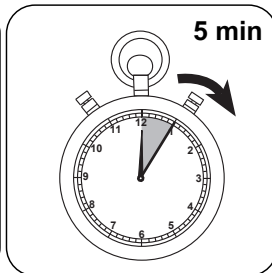
Swirl around to dissolve the powder.



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

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Technical changes without notice
Printed in Germany 08/24

No.: 00386768

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