



Lead

M232

0.01 - 5 mg/L Pb

4-(2-Pyridylazo)-resorcine

## Instrument specific information

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

Instrument Type	Cuvette	$\lambda$	Measuring Range
SpectroDirect, XD 7000, XD 7500	□ 50 mm	520 nm	0.01 - 5 mg/L Pb

## Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Lead Spectroquant 1.09717.0001 reagent test <sup>d)</sup>	50 pc.	420753

## Application List

- Waste Water Treatment
- Galvanization

## Preparation

1. Before performing the test, you must read through the original instructions and safety advice that is delivered with the test kit (MSDS are available on the home-page of [www.merckmillipore.com](http://www.merckmillipore.com)).
2. With the test process described, only Pb<sup>2+</sup> ions are determined. To determine colloidal, undissolved and complex-bound lead, digestion is first required.



## Notes

1. This method is adapted from MERCK.
2. Spectroquant® is a registered trademark of the company MERCK KGaA.
3. Appropriate safety precautions and good laboratory technique should be used during the whole procedure.
4. Reagents and samples must be metered using a suitable volumetric pipette (class A).
5. To increase the accuracy, it is recommended to perform a reagent blank with deionised water.
6. The data given in the method validation apply when using a 50 mm cuvette.

Variations in the length of the vial can extend the measuring range:

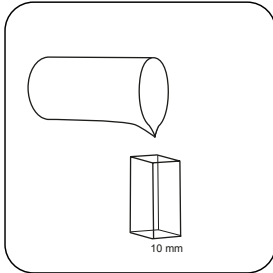
- 50 mm vial: 0.01 mg/L - 1 mg/L, solution: 0.001
- 20 mm vial: 0.05 mg/L - 2.5 mg/L, solution: 0.001
- 10 mm vial: 0.1 mg/L - 5 mg/L, solution: 0.01



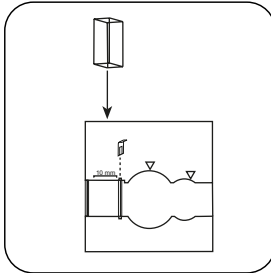
## Determination of Lead

Select the method on the device.

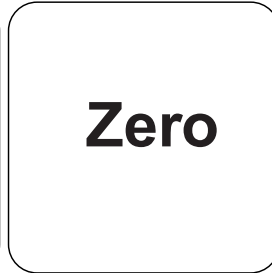
For this method, a ZERO measurement does not have to be carried out every time on the following devices: XD 7000, XD 7500



Fill 10, 20 or 50 mm vial with sample.

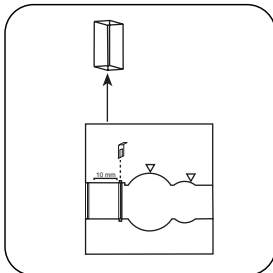


Place sample vial in the sample chamber. • Pay attention to the positioning.

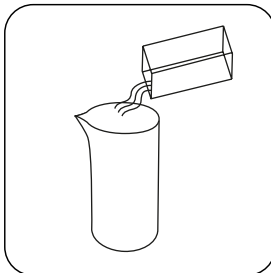


**Zero**

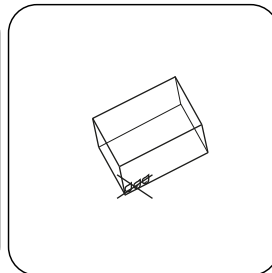
Press the **ZERO** button.



Remove vial from the sample chamber.



Empty vial.

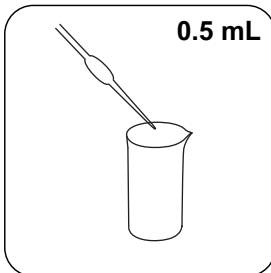


Dry the vial thoroughly.

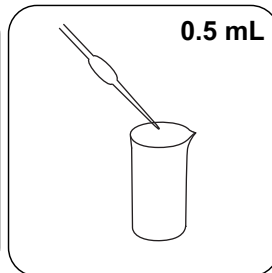
For devices that require **no ZERO measurement**, start here.



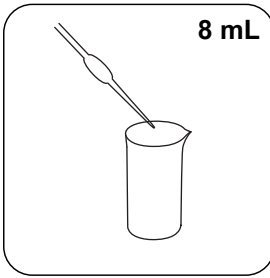
**Note! Reagent Pb-1 contains Potassium cyanide! Adhere strictly to the specified dosage sequence!**



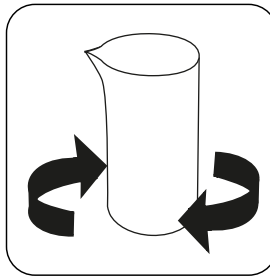
Place **0.5 mL Reagent Pb-1** in a suitable sample vessel.



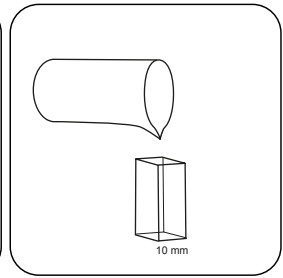
Add **0.5 mL Reagent Pb-2**.



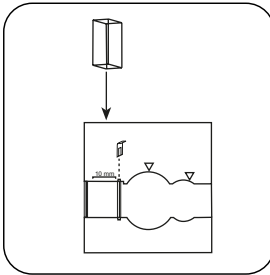
Add **8 mL sample**.



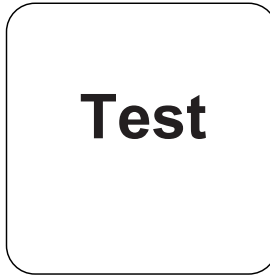
Invert several times to mix the contents.



Fill **10, 20 or 50 mm vial** with **sample**.



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



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

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



## Chemical Method

4-(2-Pyridylazo-)-resorcin

## Appendix

### Calibration function for 3rd-party photometers

Conc. =  $a + b \cdot \text{Abs} + c \cdot \text{Abs}^2 + d \cdot \text{Abs}^3 + e \cdot \text{Abs}^4 + f \cdot \text{Abs}^5$

Wavelength: 520 nm

□ 50 mm

a	$0.0000 \cdot 10^0$
b	$1.3518 \cdot 10^0$
c	
d	
e	
f	

### Interferences

Interference	from / [mg/L]
Ag	50
Al	500
Ca	250
Cd <sup>2+</sup>	25
Cr <sup>3+</sup>	25
Cr <sub>2</sub> O <sub>7</sub> <sup>2-</sup>	10
Cu <sup>2+</sup>	100
Fe <sup>3+</sup>	2
Hg <sup>2+</sup>	50
Mg	250
Mn <sup>2+</sup>	0,1
NH <sub>4</sub> <sup>+</sup>	1000
Ni <sup>2+</sup>	100
NO <sub>2</sub> <sup>-</sup>	1000
PO <sub>4</sub> <sup>3-</sup>	50
Zn	25

<b>Interference</b>	<b>from / [mg/L]</b>
EDTA	0,25
Surfactants	500
Na-Ac	0,5
NaCl	0,5
NaNO <sub>3</sub>	0.125
Na <sub>2</sub> SO <sub>4</sub>	0.375
Total Hardness	30° dH

## Method Validation

<b>Limit of Detection</b>	0.006 mg/L
<b>Limit of Quantification</b>	0.017 mg/L
<b>End of Measuring Range</b>	1.0 mg/L
<b>Sensitivity</b>	1.3742 mg/L / Abs
<b>Confidence Intervall</b>	0.044mg/L
<b>Standard Deviation</b>	0.018 mg/L
<b>Variation Coefficient</b>	3.62 %

## Bibliography

Shvoeva, O.P., Dedkova, V.P. & Savvin, S.B. Journal of Analytical Chemistry (2001) 56: 1080

° Spectroquant® is a Merck KGaA Trademark