

Cadmium

Principle

Cadion forms a complex with cadmium. The reduction in the colour intensity of cadion is used for the determination of cadmium.

Range of Application

Waste water, process control

Storage Information

The test reagents are stable at +2 to +8°C up to the expiry date given on the package.

Interferences

The ions listed in the table have been individually checked up to the given concentrations. Cumulative effects and the influence of other ions have not been determined by us. There is no interference from:

1000 mg/l: SO₄²⁻

50 mg/l: Ca²⁺, Mg²⁺

25 mg/l: Fe²⁺, Cu²⁺, Ni²⁺, Zn²⁺, Pb²⁺, Co²⁺, Ag⁺, Au⁺, Cr⁶⁺

2 mg/l: Mn²⁺

The measurement results must be subjected to plausibility checks (dilute and/or spike the water sample).

Removal of Interferences

Higher concentrations of calcium and magnesium can be separated off by a special method (Dr. Lange Calcium Separation Set LCW 903). Undissolved cadmium or cadmium bound in complexes can only be determined after digestion with Crack-Set LCW 902 has been carried out.

pH/Temperature

The pH of the water sample must be between pH 3 and pH 10. The temperature of the water sample and reagents must be between 15 and 25°C.

Analytical Quality Assurance

addista is an analytical quality assurance system with which you can check the accuracy and precision of your analysis results at any time. Regular checks ensure that your measurement system is functioning properly and is being correctly operated, and reveal sample-specific interferences.

Safety Advice

On grounds of quality and reliability, the analysis should be carried out only with original Dr. Lange accessories.

Sample cuvette contains:

Ethanol,
Potassium hydroxide
R: 10-36/38 S: 26



Complexing solution A (LCK 308 A) contains:

Potassium cyanide,
Potassium hydroxide
R: 23/24/25-32-36/38 S: 1-13-26-37/39-45



Stabilizer B (LCK 308 B) contains:

13% formaldehyde
R: 20/21/22-36/37/38-40-43 S: 26-37/39



R: (10) Flammable. (20/21/22) Harmful by inhalation, in contact with skin and if swallowed. (23/24/25) Toxic by inhalation, in contact with skin and if swallowed. (32) Contact with acids liberates very toxic gas. (36/37/38) Irritating to eyes, respiratory system and skin. (40) Possible risks of irreversible effects. (43) May cause sensitization by skin contact.

S: (1) Keep locked up. (13) Keep away from food, drink and animal feedingstuffs. (26) In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. (37/39) Wear suitable gloves and eye/face protection. (45) In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

CADAS 100 (LPG 185 / ≥ LPG 210)

If this test is not already stored in your instrument please ask your Dr. Lange Agency for programming instructions.

Data table

LCK 308

LP2W	98/04
Cd • F ₁ = 0.489 • F ₂ = -1.314 • K = 0	
CADAS 30/30S/50/50S	98/04
Cd • λ: 552 nm • Pro.: 1 • F ₁ = 0.453 • F ₂ = -1.246 • K = 0	
Cd 902 • λ: 552 nm • Pro.: 9 • F ₁ = 0.453 • F ₂ = -1.246 • F ₃ = 1.2 • K = 0	
ISIS 6000/9000	98/04
Cd • λ: 565 nm • Pro.: 1 • F ₁ = 0.446 • F ₂ = -1.258 • K = 0.003	
Cd 902 • λ: 565 nm • Pro.: 9 • F ₁ = 0.446 • F ₂ = -1.258 • F ₃ = 1.2 • K = 0.003	
CADAS 100 / LPG 185	98/04
Cd • λ: 552 nm • F ₁ = 0.464 • F ₂ = -1.252	
CADAS 100 / ≥ LPG 210	98/04
Cd • λ: 552 nm • F ₁ = 0.464 • F ₂ = -1.252 • K = 0	

Applies to LASA

Cadmium

Edition 98/04

Each day that analyses are carried out, one blank-value cuvette must be prepared for all measured values.

1. Pretreatment

Pipette into the enclosed reaction tube

Water sample	10.0 ml
Complexing solution A (LCK 308 A)	1.0 ml

Close reaction tube and invert repeatedly.

2. Calcium/Magnesium Separation

If the calcium and magnesium concentrations are greater than 50 mg/l the Dr. Lange Calcium Separation Set LCW 903 must be used.

If the calcium and magnesium concentrations are less than 50 mg/l the "analysis" can be carried out **immediately**.

3. Analysis

Pipette into the cuvette test

	analysis	blank-value
Stabilizer B (LCK 308 B)	0.4 ml	0.4 ml

Close cuvettes and invert a few times.

Pipette into the same cuvettes

Pretreated water sample	4.0 ml	--
Distilled water	--	4.0 ml

Close cuvettes and invert a few times. After **30 sec** thoroughly clean the outside of the cuvettes and evaluate.

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Evaluation

1. Insert program filter with relevant symbol (see below).
2. Select test with relevant key.
3. Check program control number: **__ : 40**
4. Insert blank-value cuvette (see procedure).
5. Insert sample cuvette.

Parameter	Symbol	Meas. range
Cadmium (Cd)	308	0.02 – 0.30 mg/l

**Applies to
LASA 1/plus, LASA 20, LASA 30, LP1W, LKT,
LP2W, Photometer with Barcode-System,
ISIS 6000, CADAS 200Basis,
CADAS 100 (LPG 185) / (≥ LPG 210)**

Cadmium

Edition 98/04

1. Pretreatment

Pipette into the enclosed reaction tube

Water sample	10.0 ml
Complexing solution A (LCK 308 A)	1.0 ml

Close reaction tube and invert repeatedly.

2. Calcium/Magnesium Separation

If the calcium and magnesium concentrations are greater than 50 mg/l the Dr. Lange Calcium Separation Set LCW 903 must be used.

If the calcium and magnesium concentrations are less than 50 mg/l the "analysis" can be carried out **immediately**.

3. Analysis

Pipette into the cuvette test

Stabilizer B (LCK 308 B)	0.4 ml
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Close cuvette and invert a few times.

Insert sample cuvette as blank-value cuvette in the photometer, before adding water sample (see evaluation).

Pipette into the same cuvette

Pretreated water sample	4.0 ml
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Close cuvette and invert a few times. After **30 sec** thoroughly clean the outside of the cuvette and evaluate.

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Evaluation

1. Press "Mode" key and check program control number: **__ : 40**
2. Insert program filter **560 nm**.
3. Select test with "Mode" key.
4. Insert sample cuvette (**without** water sample).
5. Insert sample cuvette (**with** water sample).

Parameter	Display	Meas. range
Cadmium (Cd)	Cd LCK 308	0.02 – 0.30 mg/l
Cadmium (Cd, Crack-Set)	Cd 902 LCK 308	0.024 – 0.36 mg/l

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Evaluation

1. Press any key.
2. Check program control number: **__ : 40**
3. Select test with ↑ or ↓ key.
4. Insert sample cuvette (**without** water sample).
5. Insert sample cuvette (**with** water sample).

Parameter	Display	Meas. range
Cadmium (Cd)	Cd LCK 308	0.02 – 0.30 mg/l
Cadmium (Cd, Crack-Set)	Cd 902 LCK 308	0.024 – 0.36 mg/l

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Edition 98/04

Evaluation

1. Insert filter **535 nm**.
2. Select »Dr. Lange« mode.
3. Select test number (see below).
4. Control number must be **1**.
5. Insert sample cuvette (**without** water sample) and press green key.
6. Insert sample cuvette (**with** water sample) and press green key.

Parameter	Test-No.	Meas. range
Cadmium (Cd)	308	0.02 – 0.30 mg/l
Cadmium (Cd, Crack-Set)	308	0.024 – 0.36 mg/l

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Evaluation

1. Insert filter **550 nm**.
2. Press "Null" (zero) key.
3. Insert sample cuvette (**without** water sample) and press "Extinktion" (extinction) key.
Make a note of the display – **Ext. 1**
4. Insert sample cuvette (**with** water sample) and press "Extinktion" (extinction) key.
Make a note of the display – **Ext. 2**

Calculation of the cadmium concentration

$$(\text{Ext.1} \times 0.489) - (\text{Ext.2} \times 1.314) = \text{mg/l cadmium}$$

Parameter	Meas. range
Cadmium (Cd)	0.02 – 0.30 mg/l

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Evaluation

1. Insert program filter **550 nm**.
2. Press "Tests" key until display (see below) appears.
3. Control number must be **3**.
4. Press "Null" (zero) key.
5. Insert sample cuvette (**without** water sample) and press "Ergebnis" (result) key.
6. Insert sample cuvette (**with** water sample) and press "Ergebnis" (result) key.

If more than one sample is to be measured start the next evaluation at point 5.

Parameter	Display	Meas. range
Cadmium (Cd)	Cadmium LCK 308	0.02 – 0.30 mg/l

**Cadmium**

Edition 98/04

Evaluation

1. Insert sample cuvette (**without** water sample).
2. Insert sample cuvette (**with** water sample).

Parameter	Meas. range
Cadmium (Cd)	0.02 – 0.30 mg/l
Cadmium (Cd, Crack-Set)	0.024 – 0.36 mg/l

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Evaluation

1. Check program control number:
 __ : **40 (CADAS 200)**
 __ : **40 (ISIS 6000)** ⇒ Select »CUVETTE TEST« mode.
2. Select test number (see below).
3. Control number must be **1**.
4. Insert sample cuvette (**without** water sample) and press green key.
5. Insert sample cuvette (**with** water sample) and press green key.

Parameter	Test-No.	Meas. range
Cadmium (Cd)	308	0.02 – 0.30 mg/l
Cadmium (Cd, Crack-Set)	308	0.024 – 0.36 mg/l

Cadmium

Edition 98/04

Evaluation

1. Select »TEST« mode.
2. Select symbol (see below).
3. Select symbol » > «.
4. Check factors and measuring wavelength in memory »Mem«.
5. Close cuvette compartment – without cuvette – and press "NULL" (zero) key.
6. Insert sample cuvette (**without** water sample) and press "MESS" (measure) key.
7. Remove cuvette, close cuvette compartment – without cuvette – and again press "NULL" (zero) key.
8. Insert sample cuvette (**with** water sample) and press "MESS" (measure) key.

If more than one sample is to be measured start the next evaluation at point 5.

Parameter	Symbol	Meas. range
Cadmium (Cd)	\$ 308	0.02 – 0.30 mg/l

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Evaluation

1. Select »TEST« mode.
2. Select symbol (see below).
3. Control number must be **9**.
4. Close cuvette compartment – without cuvette – and press "NULL" (zero) key.
5. Insert sample cuvette (**without** water sample) and press "MESS" (measure) key.
6. Insert sample cuvette (**with** water sample) and press "MESS" (measure) key.

If more than one sample is to be measured start the next evaluation at point 5.

Parameter	Symbol	Meas. range
Cadmium (Cd)	308	0.02 – 0.30 mg/l