NB: NEW!
The actual edition date is given with the procedure or evaluation.

Crack-Set

Task
Hach Lange cuvette tests are designed to measure by means of a photometer the dissolved and non complexed ions. In waste water, however, heavy metals are often undissolved and complexely bound. The Crack-Set LCW 902 was developed to analyse this metal load photometrically, too.

Principle
Undissolved and complexely bound heavy metals are dissolved by boiling in an acidic medium in the presence of an oxydising agent.

Storage Information
The test reagents are stable at +15 to +25°C up to the expiry date given on the package.

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

Removal of Interferences
If the sample exhibits turbidity after the Crack-Set LCW 902 has been used, this must be eliminated by filtration with the Membrane Filtration Set LCW 904 or LCW 916.

pH-value
To guarantee the complete destruction of organic complexes, the pH-value must be less than pH 1 after addition of the sulphuric acid A (LCW 902 A). The pH value of samples with an elevated buffer capacity must be verified before the addition of potassium peroxodisulphate B (LCW 902 B) and adjusted to a pH lower than 1 by adding sulphuric acid if necessary.

After the buffer solution C (LCW 902 C) has been added the pH of the sample is between 2.5 and 5. No further pH adjustment is necessary.

Note
The reaction tubes should not be used more than ***25 times***.

Special note
This method is not intended for the analysis of waste water with a high cyanide content. When using this method in connection with waste water with a high cyanide content:
a) toxic vapour may result: work in a hood
b) the complexed metals will not necessarily be dissolved, as some cyanide complexes are very stable.

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

Applies to all types of photometer

Crack-Set

Edition 08/2001

Add into the enclosed reaction tube	
Homogenized sample	10 ml
Sulphuric acid A (LCW 902 A)	1 ml
control of pH-value if necessary	
Potassium peroxodisulphate B (LCW 902 B)	2 dosing spoon
Close reaction tube and invert a few times. Heat in the thermostat at ***100°C*** for ***60 min***. ● In the thermostat **HT 200 S**: Heat reaction tube ***15 min*** in **standard program HT**. Allow to cool down and pipette	
Buffer solution C (LCW 902 C)	1 ml
into the reaction tube. Close reaction tube and invert a few times.	

Crack-Set

Edition 07/1993

Evaluation

The metal content of the sample prepared by cracking can now be analysed. The results can, for example, be called total iron or total nickel etc..
The specifications of the appropriate Hach Lange cuvette test are applied to the analysis.

Parameter	Test-No.	Name	Meas. range
Lead	306	Lead 902	0.12 – 2.4 mg/l
Cadmium	308	Cadmium 902	0.024 – 0.36 mg/l
Iron	321	Iron 902	0.24 – 7.2 mg/l
Copper	329	Copper 902	0.12 – 9.6 mg/l
Nickel	337	Nickel 902	0.12 – 7.2 mg/l
Zinc	360	Zinc 902	0.24 – 7.2 mg/l

Iron	521	Iron Trace 902	0.012 – 1.2 mg/l
Copper	529	Copper Trace 902	0.012 – 1.2 mg/l
Nickel	537	Nickel Trace 902	0.06 – 1.2 mg/l

Crack-Set

Edition 07/1993

Evaluation

The metal content of the sample prepared by cracking can now be analysed. The results can, for example, be called total iron or total nickel etc..
The specifications of the appropriate Hach Lange cuvette test are applied to the analysis.

The indicated result must be multiplied by 1.2 .

Parameter	Test-No.	Meas. range
Lead	306	0.12 – 2.4 mg/l
Cadmium	308	0.024 – 0.36 mg/l
Iron	321	0.24 – 7.2 mg/l
Copper	329	0.12 – 7.2 mg/l
Nickel	337	0.12 – 7.2 mg/l
Zinc	360	0.24 – 7.2 mg/l

Crack-Set

Edition 07/1993

Evaluation

The metal content of the sample prepared by cracking can now be analysed. The results can, for example, be called total iron or total nickel etc..
The specifications of the appropriate Hach Lange cuvette test are applied to the analysis.

LASA 1 / plus:

Parameter	Display	Meas. range
Lead	Pb 902 LCK 306	0.12 – 2.4 mg/l
Cadmium	Cd 902 LCK 308	0.024 – 0.36 mg/l
Iron	Fe 902 LCK 321	0.24 – 7.2 mg/l
Copper	Cu 902 LCK 329	0.12 – 7.2 mg/l
Nickel	Ni 902 LCK 337	0.12 – 7.2 mg/l
Zinc	Zn 902 LCK 360	0.24 – 7.2 mg/l

LASA 20:

Parameter	Display	Meas. range
Lead	Pb 902 LCK 306	0.12 – 2.4 mg/l
Cadmium	Cd 902 LCK 308	0.024 – 0.36 mg/l
Iron	Fe 902 LCK 321	0.24 – 7.2 mg/l
Copper	Cu 902 LCK 329	0.12 – 9.6 mg/l
Nickel	Ni 902 LCK 337	0.12 – 7.2 mg/l
Zinc	Zn 902 LCK 360	0.24 – 7.2 mg/l

LP1W, LKT, LP2W **LCW 902**

Crack-Set

Edition 07/1993

Evaluation

The metal content of the sample prepared by cracking can now be analysed. The results can, for example, be called total iron or total nickel etc..
The specifications of the appropriate Hach Lange cuvette test are applied to the analysis.

The indicated result must be multiplied by 1.2 . The multiplication of the indicated result is not necessary, when you multiply the factors of the working procedure of the cuvette test package with 1.2 and enter it into the unit.

Parameter	Test-No.	Meas. range
Lead	306	0.12 – 2.4 mg/l
Cadmium	308	0.024 – 0.36 mg/l
Iron	321	0.24 – 7.2 mg/l
Copper	329	0.12 – 9.6 mg/l
Nickel	337	0.12 – 7.2 mg/l
Zinc	360	0.24 – 7.2 mg/l

Iron	521	0.012 – 1.2 mg/l
Copper	529	0.012 – 1.2 mg/l
Nickel	537	0.06 – 1.2 mg/l

CADAS 100 (LPG 185) / (≥ LPG 210) **LCW 902**

Crack-Set

Edition 04/1998

Evaluation

The metal content of the sample prepared by cracking can now be analysed. The results can, for example, be called total iron or total nickel etc..
The specifications of the appropriate Hach Lange cuvette test are applied to the analysis.

The indicated result must be multiplied by 1.2 . The multiplication of the indicated result is not necessary, when you multiply the factors of the working procedure of the cuvette test package with 1.2 and enter it into the unit.

Parameter	Test-No.	Meas. range
Lead	306	0.12 – 2.4 mg/l
Cadmium	308	0.024 – 0.36 mg/l
Iron	321	0.24 – 7.2 mg/l
Copper	329	0.12 – 9.6 mg/l
Nickel	337	0.12 – 7.2 mg/l
Zinc	360	0.24 – 7.2 mg/l

Iron	521	0.012 – 1.2 mg/l
Copper	529	0.012 – 1.2 mg/l
Nickel	537	0.06 – 1.2 mg/l

CADAS 30/30S/50/50S, ISIS 6000/9000, LASA 30/50/100 **LCW 902**

Crack-Set

Edition 07/1993

Evaluation

The metal content of the sample prepared by cracking can now be analysed. The results can, for example, be called total iron or total nickel etc..
The specifications of the appropriate Hach Lange cuvette test are applied to the analysis.

CADAS 30/30S/50/50S, ISIS 6000/9000, LASA 30/50/100:

Parameter	Test-No.	Name	Meas. range
Lead	306	Pb 902	0.12 – 2.4 mg/l
Cadmium	308	Cd 902	0.024 – 0.36 mg/l
Iron	321	Fe 902	0.24 – 7.2 mg/l
Copper	329	Cu 902	0.12 – 9.6 mg/l
Nickel	337	Ni 902	0.12 – 7.2 mg/l
Zinc	360	Zn 902	0.24 – 7.2 mg/l

CADAS 30/30S/50/50S, ISIS 6000/9000:

Iron	521	Fe 902	0.012 – 1.2 mg/l
Copper	529	Cu 902	0.012 – 1.2 mg/l
Nickel	537	Ni 902	0.06 – 1.2 mg/l

LASA 30/100:

Iron	521	Fe 902-T	0.012 – 1.2 mg/l
Copper	529	Cu 902-T	0.012 – 1.2 mg/l
Nickel	537	Ni 902-T	0.06 – 1.2 mg/l

CADAS 200 Barcode / Basis, DR 2800/3800/3900/5000/6000 **LCW 902**

Crack-Set

Edition 07/1993

Evaluation

The metal content of the sample prepared by cracking can now be analysed. The results can, for example, be called total iron or total nickel etc..
The specifications of the appropriate Hach Lange cuvette test are applied to the analysis.

Parameter	Test-No.	Meas. range	Control-No. (CADAS 200 Basis)
Lead	306	0.12 – 2.4 mg/l	9
Cadmium	308	0.024 – 0.36 mg/l	1
Iron	321	0.24 – 7.2 mg/l	2
Copper	329	0.12 – 9.6 mg/l	3
Nickel	337	0.12 – 7.2 mg/l	5
Zinc	360	0.24 – 7.2 mg/l	9

only CADAS 200 Basis, DR 2800/3800/3900/5000/6000:

Parameter	Test-No.	Meas. range	Control-No.
Iron	521	0.012 – 1.2 mg/l	9
Copper	529	0.012 – 1.2 mg/l	2
Nickel	537	0.06 – 1.2 mg/l	7