

Chloride in Concrete (LCK311, LCW908) Application APP-PHM-0001

General

The problem with the quantitative determination of chloride in concrete lies in detecting the proportion that causes the erosion of steel inserts. As it is very costly and difficult to determine the chloride concentration of free chlorine ions in a very thin boundary layer close to the steel surface, examinations usually tend to determine the mean chloride proportion in relation to a defined volume of concrete. This chloride content is integral to the boundary layer and is determined by means of a photometric chloride test after decomposition of the concrete sample with nitric acid.

Method

Photometric determination of chloride content with mercury(II) thiocyanate/iron(III) after cold decomposition with nitric acid.

Material

5935000V.07	Pocket Colorimeter Chlorid (Pocket-Colorimeter (5870045, 450nm), cap, adapter and Manual) or
LPV422.99.00001	Spectrophotometer DR 2800 or
LPV424.99.00001	Spectrophotometer DR 3800 or
LPV408.99.00001	Spectrophotometer DR 5000 or
LPV440.99.00011	Spectrophotometer DR 3900 or
LPV441.99.00011	Spectrophotometer DR 6000
LCW 908	Sample preparation, cold digestion solution
LCW 904	Membrane filtration set
LCK311	Chlorid cuvette test
SM3240303	Balance
HBG010	Glass beaker, 50 ml
2197000	Weighing dish
1862400	Extraktion bottle
LYW785	Pipette 0,1 ml
LYW786	Pipette tips for für LYW785
BBP078	Pipette 0,2 – 1 ml
BBP079	Pipette tips for BBP078
EZZ031	Protective goggles
SM743 M/L	Disposable protective gloves pursuant to EN374

When using the pocket colorimeters for the first time:

The pocket colorimeter must be programmed for use with LCK311. This only needs to be done once. The programming instructions (DOC022.98.90029) are enclosed with the colorimeter. If you prefer to see the result in M% instead of mg/l on the pocket colorimeter, please change the factors for your LCK311 as follows (to change calibrations see the operating instructions for the colorimeters):

Measuring Range I		Measuring Range II	
RES	0.000	RES	0.000
S0	0.001	S0	0.087
A0	0.015	A0	0.123
S1	0.087	S1	1.250
A1	0.614	A1	1.172

When using the DR 2800 / DR 3800 / DR 5000 / DR 3900 / DR 6000 for the first time:

Download the additional evaluation Chloride in Concrete APP-PHM-0001 as an application from the Internet.

- Go to www.hach-lange.com and select under **LCK311** and **Documents and Software** the application **Chloride in Concrete** and save it on your PC.
- Open the zipped file with a double-click and save the folder used for your photometer to an USB stick:
- DR 2800 / DR 3800 dbhlc
- DR 5000 dbhl
- DR 3900 dbhlm
- DR 6000 dbhlh
- Take the USB stick and upload the application to your photometer.
- In the PDF file you will find the application note with detailed description.

Determining the Chloride Content

Caution: Wear gloves and protective goggles and observe the safety advices relating to LCW908.

Sample preparation (LCW908)

- Switch on the weighing scales.
- Place the weighing dish on the scales and press the tare-button to zero.
- Weigh in 2 g of drill dust and add it to the extraction bottle.
- Screw the dispenser onto the bottle containing the cold digestion solution.
- Add 25 ml of cold digestion solution to the extraction bottle.
- Leave to stand for 10 minutes, shaking the bottle occasionally.
- Then draw the decomposition solution into the syringe.
- Fix the filter attachment to the syringe.
- Point the tip of the syringe upwards and slowly expel the air through the filter.
- Then press the liquid through the filter into the glass beaker.
- The filtered solution is used to determine the chloride content.

Analysis (LCK311)

- Measuring ranges:
- Measuring range (I) for chloride concentrations of 0.001 M% to 0.087 M%.
- Measuring range (II) for chloride concentrations of 0.087 M% to 1.250 M%.
- Pipette a 1.0 ml sample for measuring range I or a 0.1 ml sample for measuring range II.
- Close the cuvette and gently swirl the content.
- Thoroughly clean the outside of the cuvette, then after 3 minutes, evaluate.

Evaluate in accordance with the description in the programming instructions for the pocket chloride colorimeter (DOC022.98.90029) and the work instructions for the cuvette test LCK311.

LCK311 method characteristics determined using standard solutions with the DR 5000:

Sensitivity	0.0092	Abs./(mg/l)
Ordinate intercept	-0.001	Abs.
Residual standard deviation	0.0026	Abs.
Variation coefficient of method	0.73	%
Standard deviation of method	0.00035	M% Chloride in Concrete
Confidence level (95%)	0.00085	M% Chloride in Concrete
Detection limit	0.0004	M% Chloride in Concrete
Limit of determination	0.0012	M% Chloride in Concrete

Disposal information

Make sure decomposition products are disposed in compliance with regional and national regulations.

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