

1.14897.0001  
1.14897.0002Spectroquant®  
Chloride TestCl<sup>-</sup>

## 1. Method

Chloride ions react with mercury(II) thiocyanate to form slightly dissociated mercury(II) chloride. The thiocyanate released in the process in turn reacts with iron(III) ions to form red iron(III) thiocyanate that is determined photometrically. The method is analogous to EPA 325.1 and APHA 4500-Cl<sup>-</sup> E.

## 2. Measuring range and number of determinations

Cell mm	Measuring range mg/l Cl <sup>-</sup>	Number of determinations
10	2,5 - 25,0 10 - 250	100 (Cat. No. 1.14897.0001) or 175 (Cat. No. 1.14897.0002)

For programming data for selected photometers / spectrophotometers see [www.service-test-kits.com](http://www.service-test-kits.com).

## 3. Applications

## Sample material:

Groundwater, surface water, and seawater (after dilution)  
Drinking water and mineral water  
Industrial water  
Wastewater and percolating water

## 4. Influence of foreign substances

This was checked in solutions containing 12 (125) and 0 mg/l Cl<sup>-</sup>. The determination is not yet interfered with up to the concentrations of foreign substances given in the table. The values in parentheses apply for the measuring range 10 - 250 mg/l Cl<sup>-</sup> (see section 7).

Concentrations of foreign substances in mg/l or %					
Ag <sup>+</sup>	5 (10)	Cu <sup>2+</sup>	500	Ni <sup>2+</sup>	500
Al <sup>3+</sup>	100	F <sup>-</sup>	100	NO <sub>2</sub> <sup>-</sup>	100 (500)
Br <sup>-</sup>	1 (5)	Fe <sup>3+</sup>	250	Pb <sup>2+</sup>	500
Ca <sup>2+</sup>	1000	Hg <sup>2+</sup>	2 (10)	PO <sub>4</sub> <sup>3-</sup>	100
Cd <sup>2+</sup>	500	K <sup>+</sup>	1000	S <sup>2-</sup>	0.5 (2.5) <sup>1)</sup>
CN <sup>-</sup>	0.2 (1)	Mg <sup>2+</sup>	1000	SiO <sub>3</sub> <sup>2-</sup>	1000
Cr <sup>3+</sup>	500	Mn <sup>2+</sup>	1000	Zn <sup>2+</sup>	500
Cr <sub>2</sub> O <sub>7</sub> <sup>2-</sup>	250	NH <sub>4</sub> <sup>+</sup>	1000		
				Free chlorine	10
				Surfactants <sup>2)</sup>	1000
				NaNO <sub>3</sub>	20%
				Na <sub>2</sub> SO <sub>4</sub>	0.25% (1%)

<sup>1)</sup> In case of higher concentrations, eliminate sulfide ions by adding hydrogen peroxide (1 drop of Perhydrol® per 10 ml of sample).

<sup>2)</sup> tested with nonionic, cationic, and anionic surfactants

## 5. Reagents and auxiliaries

## Please note the warnings on the packaging materials!

The test reagents are stable up to the date stated on the pack when stored closed at +15 to +25 °C.

## Package contents:

1 bottle of reagent Cl-1  
1 bottle of reagent Cl-2  
2 AutoSelectors

## Other reagents and accessories:

Hydrogen peroxide 30 % H<sub>2</sub>O<sub>2</sub> (Perhydrol®) for analysis EMSURE®, Cat. No. 107209

MColorpHast™ Universal indicator strips pH 0 - 14, Cat. No. 109535

Ammonia solution 25 % for analysis EMSURE®, Cat. No. 105432

Nitric acid Titrisol® for 1 mol/l, Cat. No. 109966

Spectroquant® CombiCheck 60, Cat. No. 114696

Pipettes for pipetting volumes of 0.50, 1.0, 2.5, and 5.0 ml

Rectangular cells 10 mm (2 pcs), Cat. No. 114946

## 6. Preparation

- Analyze immediately after sampling.
- The pH must be within the range 1 - 12. Adjust, if necessary, with dilute ammonia solution or nitric acid.
- Filter turbid samples.

## 7. Procedure

Measuring range 2.5 - 25.0 mg/l Cl<sup>-</sup>:

Pretreated sample (10 - 30 °C)	5.0 ml	Pipette into a test tube.
Reagent Cl-1	2.5 ml	Add with pipette and mix.
Reagent Cl-2	0.50 ml	Add with pipette and mix.

Leave to stand for 1 min (reaction time), then fill the sample into a 10-mm cell, and measure in the photometer.

Measuring range 10 - 250 mg/l Cl<sup>-</sup>:

Pretreated sample (10 - 30 °C)	1.0 ml	Pipette into a test tube.
Reagent Cl-1	2.5 ml	Add with pipette and mix.
Reagent Cl-2	0.50 ml	Add with pipette and mix.

Leave to stand for 1 min (reaction time), then fill the sample into a 10-mm cell, and measure in the photometer.

## Notes on the measurement:

- Certain photometers may require a blank (preparation as per measurement sample, but with distilled water instead of sample).
- For photometric measurement the cells must be clean. Wipe, if necessary, with a clean dry cloth.
- Measurement of turbid solutions yields false-high readings.
- The pH of the measurement solution must be approx. 1.
- The color of the measurement solution remains stable for 30 min after the end of the reaction time stated above. (After 60 min the measurement value would have increased by 5 %.)

## 8. Analytical quality assurance

recommended before each measurement series

To check the photometric measurement system (test reagents, measurement device, handling) and the mode of working, Spectroquant® CombiCheck 60 can be used. Besides a **standard solution** with 125 mg/l Cl<sup>-</sup>, this article also contains an **addition solution** for determining sample-dependent interferences (matrix effects).

Additional notes see under [www.qa-test-kits.com](http://www.qa-test-kits.com).

## Characteristic quality data:

In the production control, the following data were determined in accordance with ISO 8466-1 and DIN 38402 A51:

	Measuring range mg/l Cl <sup>-</sup>	
	2.5 - 25.0	10 - 250
Standard deviation of the method (mg/l Cl <sup>-</sup> )	± 0.19	± 2.8
Coefficient of variation of the method (%)	± 1.4	± 2.1
Confidence interval (mg/l Cl <sup>-</sup> )	± 0.5	± 7
Number of lots	31	31

## Characteristic data of the procedure:

	Measuring range mg/l Cl <sup>-</sup>	
	2.5 - 25.0	10 - 250
Sensitivity: Absorbance 0.010 A corresponds to (mg/l Cl <sup>-</sup> )	0.3	1
Accuracy of a measurement value (mg/l Cl <sup>-</sup> )	max. ± 1.0	max. ± 10

For quality and batch certificates for Spectroquant® test kits see the website.

## 9. Notes

- Reclose the reagent bottles immediately after use.
- The contents of the test tubes and of the cells as well as the test reagents must not be run off with the wastewater! Information on disposal can be obtained at [www.disposal-test-kits.com](http://www.disposal-test-kits.com).

