

1.11132.0001
1.11132.0007MQuant®
Chloride TestCl⁻

1. Method

Titrimetric determination with dropping bottle

In nitric solution chloride ions are titrated with mercury(II) nitrate solution against 1,5-diphenylcarbazone as the indicator, forming slightly dissociated mercury(II) chloride in the process. At the titration end-point, excess mercury(II) ions react with the indicator to form a blue-violet complex. The chloride concentration is determined from the consumption of titration solution (mercurimetric determination).

2. Graduation and number of determinations

Graduation	Number of determinations ¹⁾
1 drop $\hat{=}$ 25 mg/l Cl ⁻	100 at 150 mg/l Cl ⁻

¹⁾ In the case of chloride contents of more than 150 mg/l, the maximum number of determinations possible is fewer than 100 (see section 9).

3. Applications

Sample material:

Groundwater, surface water, and seawater (after dilution)
Waters from aquaculture
Drinking water and mineral water
Water for concrete in the construction industry
Industrial water and wastewater
Boiler and boiler feed water, cooling water
Swimming-pool water
Food after appropriate sample pretreatment
Soils and fertilizers after appropriate sample pretreatment

4. Influence of foreign substances

This was checked individually in solutions containing 150 mg/l Cl⁻. The concentrations of foreign substances usually present in the sample materials stated above as well as those given in the table lie below the limit at which the determination is interfered with. Cumulative effects were not checked; such effects can, however, not be excluded.

Concentrations of foreign substances in mg/l					
Br ⁻	is measured at the same time	Fe ³⁺	100	NO ₂ ⁻	50
CO ₃ ²⁻	1000	I ⁻	is measured at the same time	S ²⁻	1
				SO ₃ ²⁻	50

To avoid the stated interferences see section 6, "Preparation"

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 (indicator solution)
1 bottle of reagent Cl-2
1 bottle of reagent Cl-3 (titration solution)
1 graduated 5-ml plastic syringe
1 test vessel
1 card with brief instruction

Other reagents:

MQuant® Universal indicator strips pH 0 - 14, Cat. No. 1.09535
Ammonia solution 25 % for analysis EMSURE®, Cat. No. 1.05432
Nitric acid Titrisol® for 1 mol/l, Cat. No. 1.09966
tetra-Sodium diphosphate decahydrate for analysis EMSURE®, Cat. No. 1.06591
Hydrogen peroxide 30 % H₂O₂ (Perhydrol®) for analysis EMSURE®, Cat. No. 1.07209
Chloride standard solution Certipur®, 1000 mg/l Cl⁻, Cat. No. 1.19897

6. Preparation

- The pH must be within the range 1 - 12. Adjust, if necessary, with ammonia solution or nitric acid.
- Preparation of the sample to avoid interferences due to **iron(III)**:
Add aqueous, 5 % tetra-sodium diphosphate solution and mix (2 drops per 5 ml of sample).
- sulfide and sulfite ions**:
Add hydrogen peroxide 30 % H₂O₂ (Perhydrol®) and mix (1 drop of Perhydrol® per 10 ml of sample).

7. Procedure

Rinse the test vessel several times with the pretreated sample.		
Pretreated sample (15 - 30 °C)	5 ml	Inject into the test vessel with the syringe.
Reagent Cl-1	2 drops ¹⁾	Add and swirl. The sample generally turns blue in color.
Reagent Cl-2	dropwise ¹⁾	Add while swirling until the color changes to yellow .
Holding the reagent bottle vertically, slowly add reagent Cl-3 dropwise to the sample while swirling until its color changes from yellow to blue-violet . Shortly before the color changes, wait a few seconds after adding each drop. Result in mg/l Cl⁻ = number of drops x 25		

¹⁾ **Hold the bottle vertically while adding the reagent!**

8. Method control

To check test reagents and handling:
Dilute the chloride standard solution to 150 mg/l Cl⁻ with distilled water and analyze as described in section 7.
Additional notes see under www.qa-test-kits.com.

9. Notes

- Reclose the reagent bottles immediately after use.
- Rinse the test vessel and the syringe **with distilled water only**.
- In titrimetric determinations the consumption of titration solution is dependent on the concentration of the substance to be determined. The quantities of indicator and titration solution contained in the reagent bottles have been calculated to suffice for 100 determinations each of 150 mg/l Cl⁻. The following applies for other chloride contents:

Chloride content mg/l	Number of determinations	Indicator solution	Titration solution
25 - 150	100	is used up completely	A remainder is left over.
>150	<100	A remainder is left over.	is not sufficient for 100 determinations

- The contents of the test vessel 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.**

