EN

CHLORIDE

❶ Reagent R1: 984364, 984365 (large)

INTENDED USE
For determination of soluble chloride in drinking, ground, surface and waste water on Thermo Scientific™ Aquakem™ or Gallery™ analyzers.

METHOD
Colorimetric method with mercury (II) thiocyanate.

PRINCIPLE OF THE PROCEDURE
Chloride reacts with mercury (II) thiocyanate to form a soluble non-ionic compound. The thiocyanate ions released reacts in acid solution with iron (III) nitrate to form a red/brown iron (III) thiocyanate complex. The resulting intensity of the stable color produced is measured spectrophotometrically at a wavelength of 480 nm and is related to the chloride concentration by means of a calibration curve.

REAGENT INFORMATION
All reagents need to be ordered separately.
For this method only one reagent, R1, is needed.

Ready-to-use reagents		**Barcode id**
984364 Chloride R1	4 x 20 ml	A03
984365 Chloride R1 L	20 x 20 ml	A03

Concentrations

R1	Methanol	14.9 %
	Iron (III) nitrate	2.8 %
	Mercury dithiocyanate	0.08 %
	Nitric acid	≤ 1 %

Precautions
Chloride R1 is hazardous.
See separate sheet inside the kit for Hazardous- and Precautions-phrases: H226, H290, H302, H312, H332, H314, H370, H412, P280, P303 + P361 + P353, P305 + P351 + P338, P307 + P311, P273

Exercise the normal precautions required for handling all laboratory reagents.
The products has to be disposed of as laboratory chemical in accordance with local regulations.

Reagent preparation
The reagents are ready-to-use.
Note: Check that there are no bubbles on the surface of reagent when you insert vials into the analyzer.

Storage and Stability
Reagents in unopened vials are stable at 2…8 °C until the expiry date printed on the label.
Refer to reagent definitions in the factory delivered analyzer for the on-board stability.

SAMPLES

Sample type
Drinking, ground, surface and waste water.

Sample preparation
Sample material should be homogenous and representative.

TEST PROCEDURE
See a separate Application note for Aquakem or Gallery analyzer. Application note is suggestive and should be tailored to sample matrix and concentration in use.

Materials required but not provided
Deionized water (aseptic and free of heavy metals) and general laboratory equipment.

Standard solutions available:
984721 Cloride Std, 1000 mg/l

Calibration
Calibration is polynomial/2nd order. Spline can also be used.

For Aquakem Application Chloride, 500 mg/l calibration standard was used.
For Gallery Application Chloride Low, a 100 mg/l calibration standard was used.
For Gallery Application Chloride High, a 500 mg/l calibration standard was used.

Quality Control
Use quality control samples at least once a day. Run the quality control sample always after each calibration, and before the daily sample load to verify the reagent on board stability and every time a new reagent vial is used. It is also recommended to use two levels of controls. The control intervals and limits must be adapted to the individual laboratory requirements. The results of the quality control sample(s) should fall within the limits pre-set by the laboratory.

CALCULATION OF RESULTS
The results are calculated automatically by the analyzer using a calibration curve.

Lot dependent calibration curve can be found from Certificate of Analysis. Please see section Additional Material for instructions.

LIMITATIONS OF THE PROCEDURE

Interference
Interference can arise from substances which reduce iron (III) to iron (II) and mercury (III) to mercury (II) such as bromide, sulfide, thiocyanate, cyanides including complex cyanides, nitrite, ammonia and non-ionic detergents.

PERFORMANCE CHARACTERISTICS
The results obtained in individual laboratories may differ from the performance data given.

MEASURING RANGE

Analyzer	Name of the application and range	Extended measuring range
Aquakem	Chloride * – 100 mg/l	Up to 1000 mg/l
Gallery	Chloride Low *- 20 mg/l	Up to 100 mg/l
Gallery	Chloride High * -100 mg/l	Up to 500 mg/l

Quantitation Limit
The quantitation limit is the lowest amount of analyte in a sample which can be quantitatively determined with suitable precision and accuracy. The quantitation limit can be estimated for example by multiplying 5 to 10 times the SD of a blank sample.

Method Detection Limit (MDL)
The minimum concentration of an analyte that can be identified, measured and reported with 99% confidence that the analyte concentration is greater than zero.

Application	Sample	n	Average (mg/l)	SD	MDL (mg/l)
Chloride L	**blank**	**7**	**0.23**	**0.011**	**0.035 ***
	blank	**50**	**0.22**	**0.042**	**0.349 ****

MDL was determined using Gallery analyzer.

*MDL = 3.14 x SD (blank sample, n = 7)
**MDL = 3 x SD + average (blank sample, 5 batches, n = 50)

Precision
Gallery analyzer

	Pond Water (mg/l)		**Tap Water (mg/l)**		**Pond Water (mg/l)**	
	N	50	**N**	50	**N**	50
	Mean	2.53	**Mean**	4.91	**Mean**	16.50
	SD	**CV %**	**SD**	**CV %**	**SD**	**CV %**
Within run	0.031	1.2 %	0.030	0.6 %	0.075	0.5 %
Between run	0.011	0.4 %	0.020	0.4 %	0.224	1.4 %
Total	0.033	1.3 %	0.036	0.7 %	0.236	1.4 %

OTHER REMARKS
The results obtained in individual laboratories may differ from the given performance data due to e.g. sample matrix, concentrations or analysis

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environment. Each laboratory is responsible to verify the method to prove the analysis performance.

WASTE MANAGEMENT
Please refer to local legal requirements. It is recommended to empty the analyzer cuvette waste bin and waste water daily. Emptying should be done immediately after the analysis when using hazardous reagents/solutions.

Note: If using reagents/solutions that react with each other, cuvette waste bin and waste water should be emptied and washed between use of these reagents.

BIBLIOGRAPHY
1) ISBN 0117516260
2) EPA Method 325.2
3) SM 4500 Cl E
4) EN ISO 15682
5) ISO 15923-1

ADDITIONAL MATERIAL
Certificate of analysis and SDS are available at
www.e-labeling.eu/TSF

Applications for Gallery and Aquakem automated analyzers are available upon request from the local sales representative. Information in the Application note can change without prior notice.

MANUFACTURER
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CONTACT INFORMATION
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Changes from previous version
Precautions updated.
General updates.

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