

EN

SULPHATE

● Reagent R1: 984648, 984649 (Aquakem only)

INTENDED USE

For determination of the sulphate ion in drinking, ground, surface and waste water on Thermo Scientific™ Aquakem™ or Gallery™ analyzers.

METHOD

Colorimetric method.

PRINCIPLE OF THE PROCEDURE

Sulphate ion is precipitated in a strongly acid medium with Barium Chloride. The resulting turbidity is measured photometrically at 405 nm and compared with appropriate calibration standard solutions. Aquakem and Gallery application uses 420 nm.

REAGENT INFORMATION

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

Ready-to-use reagents	Barcode id
984648 Sulphate R1 4 x 20 ml	767
984649 Sulphate R1 XL 6 x 60 ml	767

Note: 60 ml vials are intended for Aquakem analyzers only.

Concentrations

R1	Barium chloride	1 %
	Hydrochloric acid	≤ 1 %
	Stabilizers	

Precautions

Exercise the normal precautions required for handling all laboratory chemicals.

Reagent preparation

The reagents are ready-to-use.

Note: Check that there are no bubbles on the surface of the reagent when you insert vials in 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:

984727 Sulphate Std, 1000 mg/l

Calibration

It is recommended to calibrate the test when a new reagent lot is introduced. The reagent may have some variation in measured responses between lots. Calibration is polynomial / 2nd order. Spline can also be used.

For Aquakem Sulphate Application, 500 mg/l calibration standard was used.

For Gallery Application Sulphate Low, a 100 mg/l calibration standard was used.

For Gallery Application Sulphate 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

Turbid/highly coloured samples may interfere.

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	Sulphate * - 100 mg/l	Up to 500 mg/l
Gallery	Sulphate Low * - 20 mg/l	Up to 100 mg/l
Gallery	Sulphate 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)
Sulphate L	Std 0.2 mg/l	7	1.05	0.084	0.26 *

MDL was determined using Gallery analyzer.

*MDL = 3.14 x SD (Std 0.2 mg/l, n = 7)

Precision

Gallery analyzer

	Tap Water (mg/l)		Pond Water (mg/l)	
	N	50	N	50
	Mean	24.0	Mean	72.0
	SD	CV %	SD	CV %
Within run	0.254	1.1 %	0.320	0.4 %
Between run	0.063	0.3 %	0.282	0.4 %
Total	0.262	1.1 %	0.427	0.6 %

OTHER REMARKS

The results obtained in individual laboratories may differ from the given performance data due to e.g. sample matrix, concentrations or analysis 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 0117522406
- 2) EPA Method 375.4
- 3) DIN 38405-D 5-2
- 4) SM 4500-SO42- E
- 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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2017-12-19

Changes from previous version

Application area updated.
Calibration instructions updated.
General updates.