

EN

AMMONIA (DIC)

1 Reagent R1: 984362
2 Reagent R2: 984363

INTENDED USE

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

METHOD

Colorimetric method.

PRINCIPLE OF THE PROCEDURE

Ammonia reacts with hypochlorite ions generated by the alkaline hydrolysis of sodium dichloroisocyanurate to form monochloramine. This reacts with salicylate ions in the presence of sodium nitroprusside at around pH 12.6 to form a blue compound. The absorbance of this compound is measured spectrophotometrically at the wavelength 660 nm and is related to the ammonia concentration by means of a calibration curve.

REAGENT INFORMATION

All reagents need to be ordered separately.
For this method, both R1 and R2 are needed.

Ready-to-use reagents		Barcode id
984362 Ammonia R1	1 x 125 ml	A01
984363 Ammonia R2	4 x 20 ml	A02

Note: Use a fresh Ammonia R1 aliquot daily.

Pour the daily need to the 20 ml vial included in the reagent delivery and keep the 125 ml vial refrigerated when opened.

Daily need can be calculated approximately: Sum the vial dead volume (1 ml) with the R1 consumption (0.060 ml per test) for one day's load for calibrators, QC samples and samples.

Concentrations

R1		≤ 15 %
	Sodium salicylate	≤ 15 %
	Trisodium citrate	≤ 15 %
	Sodium nitroprusside	≤ 0.1 %
R2		3.2 %
	Sodium hydroxide	3.2 %
	Sodium Dichloroisocyanurate	≤ 1 %

Precautions

Reagents are hazardous.
See separate sheet inside the kit for Hazardous- and Precautions-phrases:
Ammonia R1: H319, P280, P305 + P351 + P338, P337 + P313.
Ammonia R2: H290, H314, H412, P280, P303 + P361 + P353, P305 + P351 + P338, 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.

Note: Ammonia as nature is very volatile. It is recommended to use 10 ml sample tubes that are filled with half of the volume to avoid high concentration ammonia evaporation. Additionally, extra caution is needed when ammonia containing reagents are used.

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:

984720 Ammonium (as N) Std, 1000 mg/l

984728 Ammonium (as NH₄) Std, 1000 mg/l

Calibration

Calibration is linear or polynomial/2nd order depending on the range selected. Both can be used.

For Aquakem Ammonia Application, a 20 mg/l as N calibration standard was used.

For Gallery Application Ammonia Low a 1000 µg/l as N calibration standard was used.

For Gallery Application Ammonia High, a 10 mg/l as N 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

Magnesium forms a magnesium hydroxide precipitate at high pH values (>12). The trisodium citrate is used to prevent this interference and the method should tolerate magnesium at concentrations normally found in most non-saline waters.

PERFORMANCE CHARACTERISTICS

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

MEASURING RANGE

Analyzer	Name of the application and range as Nitrogen (N)	Extended measuring range
Aquakem	Ammonia * - 2 mg/l N	Up to 10 mg/l N
Aquakem	Ammonia High * - 75 mg/l N	Up to 375 mg/l as N
Gallery	Ammonia Low * - 200 µg/l N	Up to 1000 µg/l N
Gallery	Ammonia High * - 2 mg/l N	Up to 10 mg/l N

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 (µg/l N)	SD	MDL (µg/l N)
Ammonia L	blank	7	0.52	0.164	0.5 *
	blank	50	0.55	0.358	1.6 **

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 (µg/l N)		Tap Water (µg/l N)	
	N	50	N	50
	Mean	17	Mean	189
	SD	CV %	SD	CV %
Within run	0.340	1.9 %	0.849	0.4 %
Between run	0.786	4.5 %	0.871	0.5 %
Total	0.856	4.9 %	1.216	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 0117516139
- 2) ISO 7150
- 3) DIN 38 406
- 4) 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.