DOC313.53.94463

EZ3016 Sodium Analyser

Method and reagent sheets

01/2023, Edition 1.01

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1. Legal information

Manufacturer: AppliTek NV/SA

Distributor: Hach Lange GmbH

The translation of the manual is approved by the manufacturer.

The information in this document is subject to change without prior notice

2. Analytical specifications

Please refer also to the respective technical datasheet at Hach Support Online.

Sodium - All specifications				
Analysis method	Discontinuous, direct measurement by combined ion-selective electrode			
Parameter	Sodium			
Cycle time	Standard measurement cycle time: 10 minutes			
Limit of detection (LOD)	≤ 10 mg/L			
Precision/Repeatability	Better than 4% full scale range for standard test solutions			
Cleaning	Automatic; frequency freely programmable			
Calibration	Automatic, 2-point; frequency freely programmable			
Validation	Automatic; frequency freely programmable			
Interferences	Silver ions (Ag^+) must be absent. The sodium electrode is sensitive to the following ions. The ratio of this ion to sodium (X^+/Na^+) should thus not be larger than the value in brackets: H^+ (< 0.001), Li^+ (<1), K^+ (< 5), NH_4^+ (< 50), Mg^{2+} (< 2000). Fats, oil, proteins, surfactants and tar.			
Measuring ranges	**% of range - Dilution**		**Low range (mg/L)**	**High range (mg/L)**
	B	25% of standard range	10	250
	C	50% of standard range	10	500
	0	**standard range**	**10**	**1000**

3. Analysis method

Summary

The Sodium (Na^+) concentration is determined by a discontinues, direct measurement using an ionselective electrode.

Analysis steps

The analysis vessel is flushed with fresh sample. The TISA [T(otal) I(onic) S(trength) A(djustment)] buffer solution will be added to the sample in order to adjust the pH and to assure the total strength of the sample. The potential of the sample solution is measured. With the obtained value, the analyzer calculates the sodium concentration in the sample.

Calibration

The calibration procedure measures a REF1 Na^+ solution (channel 9, REF1 valve) and a REF2 Na^+ solution (channel 10, REF2 valve) to adapt the slope and offset factors by means of a two-point calibration.

The calibration is performed in the MAIN method.

Remark

The methods cannot be started at the same time.

4. Reagents

⚠ CAUTION	
⚠	Chemical exposure hazard. Obey laboratory safety procedures and wear all of the personal protective equipment appropriate to the chemicals that are handled. Read the safety data sheet from the supplier before bottles are filled or reagents are prepared. For laboratory use only. Make the hazard information known in accordance with the local regulations of the user.

⚠ CAUTION	
⚠	Chemical exposure hazard. Dispose of chemicals and wastes in accordance with local, regional and national regulations.

4.1 Reagent overview and consumption

In the tables below, the products that are needed to prepare the reagents are listed. The product name, the formula, the molecular weight, the CAS No. and the amount needed to prepare 1 litre of the reagents is given. Check the consumption of the reagents (28 days) to adapt the volumes needed.

Product	Consumption	Consumption/28 days A rata 1 analysis/10 min	Recommended containers
Buffer solution	~ 0.25 mL / analysis	~ 1 L	Plastic – 2.5 L
REF1 solution	~ 0.5 L / calibration	/	Plastic – 1 L
REF2 solution	~ 0.5 L / calibration	/	Plastic – 1 L

4.2 DI-water overview and consumption

	Rinse water (mL/analysis) Type I	Dilution water (mL/analysis) Type I	Total (mL/analysis)	Consumption/28 days A rata 1 analysis / 5 min
B	N.A.	N.A.	N.A.	N.A.
C	N.A.	N.A.	N.A.	N.A.
0	N.A.	N.A.	N.A.	N.A.

4.3 Storage and quality of chemicals

Quality of chemicals

All chemicals should be of Reagent grade, ACS grade or better (*). The use of pro analysis chemicals is recommended. Poor quality of the reagents can affect the analyser performance.

(*) Analytical Reagent (AR), Guaranteed Reagent (GR), UNIVAR, AnalaR, Premium Reagent (PR), ReagentCertified ACS reagent, ACS Plus reagent, puriss p.a. ACS reagent, ReagentPlus®, TraceCERT®, Suprapur®, Ultrapur®, or better are also possible.

Quality of DI-water

All EZ analysers are tested with standard solutions, reagents and dilution water prepared using type I water or better as defined by ASTM D1193-91.

To achieve the specifications as stated on the data sheet, method and reagents sheet and acceptance test reports, the same water quality (or better) must be used for the preparation of the standard solutions, reagents and dilution water.

Additionally the water used for the preparation of the standard solutions for an EZ analyser must be free of the parameter or any of the interferences for the method of that EZ analyser.

Reagent grade, sodium-free (< 2 ppb Na^+ & < 0.2 µS/cm) de-ionized water must be used to prepare the chemical solutions and for rinse purposes.

Storage of Reagents

While operating the instrument, keep in mind the reagent requirements as stated in the reagent overview, the chapters below and/or in the data sheet of the instrument.

⚠ CAUTION	
⚠	For longer-term storage: Store the reagents cold; Store the reagents in the dark; If applicable: Store the reagents in a fridge during operation

⚠ CAUTION	
⚠	Refresh the reagents after one month (unless stated differently in the chapters below). Do not mix old reagents with freshly prepared reagents. Remove old reagents from the container before adding freshly prepared reagents.

4.4 Buffer solution

Products	Formula	MW (g/mol)	CAS No.	1 litre solution
Tris(hydroxymethyl)aminomethane (THAM or Trometamol)	$NH_2C(CH_2OH)_3$	121.14	77-86-1	100 g
Nitric acid (65%)	HNO_3	63.01	7697-37-2	~ 40 mL

Preparation

Dissolve 100 g of Tris(hydroxymethyl)aminomethane ($NH_2C(CH_2OH)_3$) completely in 900 mL of de-ionized water. Adjust the pH of this solution by use of nitric acid (HNO_3, 65%) to 7.5. Fill up to 1 litre with de-ionized water. Store this solution in a plastic container.

Note: The amount of nitric acid (HNO_3, 65%) to be dosed is ~ 40 mL on 1 litre of buffer solution.

4.5 Calibration solution

Products	Formula	MW (g/mol)	CAS No.	1 litre solution
Sodium chloride	NaCl	58.44	7647-14-5	25.43 g

Preparation

10000 mg/L Sodium stock solution

Prepare a stock solution of 10000 mg/L Sodium: Dissolve accurately 25.43 g sodium chloride (NaCl) in 500 mL de-ionized water using a volumetric flask of 1000 mL. Fill up to 1 litre with de-ionized water. Store this solution in a plastic container.

Sodium standard solution – REF2

Prepare a standard solution for calibration according to the following table: take accurately x mL of the 10000 mg/L Sodium stock solution and transfer into a volumetric flask of 1000 mL. Add de-ionized water up to the mark grade.

	Measuring range	Concentration REF2	Amount of stock solution to add to 1 litre
B	250 mg/L Na^+	250 mg/L Na^+	25 mL
C	500 mg/L Na^+	500 mg/L Na^+	50 mL
0	**1000 mg/L Na^+**	**1000 mg/L Na^+**	**100 mL**

Sodium standard solution – REF1

Prepare a standard solution for calibration according to the following table: take accurately x mL of the 10000 mg/L Sodium stock solution and transfer into a volumetric flask of 1000 mL. Add de-ionized water up to the mark grade.

	Measuring range	Concentration REF1	Amount of stock solution to add to 1 litre
B	250 mg/L Na^+	25 mg/L Na^+	2.5 mL
C	500 mg/L Na^+	50 mg/L Na^+	5 mL
0	**1000 mg/L Na^+**	**100 mg/L Na^+**	**10 mL**

4.6 Conditioning

The sodium electrode needs to be conditioned in saturated NaCl solution for 48 hours before use.

4.7 Cleaning solution (facultative)

The cleaning procedure should prevent any build-up of chemicals in the analyser. To obtain an effective cleaning procedure one has to test the cleaning solution and the cleaning interval for each application. Perform the selected cleaning solution and interval for a trial period, check then the effectiveness of the procedure and change if necessary.

Change Information	
Date: 17/01/2023	Previous version: Edition 2 to Edition 1.01

Reason for Change

- Addition of water consumption
- Addition of information reagents
- Correction of CAS number of Nitric Acid
- Addition of conditioning

Description of Change

- Addition of estimated consumption of water for rinse and dilution (chapter 4.2)
- Addition of extra information regarding storage and quality of reagents (chapter 4.3)
- Correction of CAS number of Nitric acid from 7697-32-2 to 7697-37-2 (chapter 4.4)
- Addition of conditioning electrode (chapter 4.6)