

ISE indirect Na-K-Cl for Gen.2

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Order information

REF	CONTENT	Analyzer(s) on which cobas c pack(s) can be used
10820652216	ISE Reference Electrolyte (1 x 500 mL)	cobas 8000 ISE
04880455190	ISE Internal Standard Gen.2 (2 x 2000 mL)	
04880480190	ISE Diluent Gen.2 (2 x 2000 mL)	
11298500316	ISE Cleaning Solution (5 x 100 mL)	
10825468001	Sodium electrode (1 electrode)*	
10825441001	Potassium electrode (1 electrode)*	
03246353001	Chloride electrode (1 electrode)*	
03149501001	Reference electrode (1 electrode)*	
04663632190	Activator (9 x 12 mL)	
11183974216	ISE Standard Low (10 x 3 mL)	Code 502
11183982216	ISE Standard High (10 x 3 mL)	Codes 503, 763
12149435122	Precinorm U Plus (10 x 3 mL)	Code 300
12149443122	Precipath U Plus (10 x 3 mL)	Code 301
05117003190	PreciControl ClinChem Multi 1 (20 x 5 mL)	Code 391
05947626190	PreciControl ClinChem Multi 1 (4 x 5 mL)	Code 391
05117216190	PreciControl ClinChem Multi 2 (20 x 5 mL)	Code 392
05947774190	PreciControl ClinChem Multi 2 (4 x 5 mL)	Code 392

*Roche Diagnostics GmbH is not the legal manufacturer of this device under REGULATION (EU) 2017/746 (IVDR)

English

Intended use

The ISE module of the Roche/Hitachi **cobas c** systems is intended for the quantitative determination of sodium, potassium and chloride in serum, plasma or urine using ion-selective electrodes.

Summary

Physiological significance:¹

Electrolytes are involved in most major metabolic functions in the body. Sodium, potassium and chloride are amongst the most important physiological ions and the most often assayed electrolytes. They are supplied primarily through the diet, absorbed in the gastrointestinal tract, and excreted via the kidneys.

Sodium is the major extracellular cation and functions to maintain fluid distribution and osmotic pressure. Some causes of decreased levels of sodium include prolonged vomiting or diarrhea, diminished reabsorption in the kidney and excessive fluid retention. Common causes of increased sodium include excessive fluid loss, high salt intake and increased kidney reabsorption.

Potassium is the major intracellular cation and is critical to neural and muscle cell activity. Some causes of decreased potassium levels include reduced intake of dietary potassium or excessive loss of potassium from the body due to diarrhea, prolonged vomiting or increased renal excretion. Increased potassium levels may be caused by dehydration or shock, severe burns, diabetic ketoacidosis, and retention of potassium by the kidney.

Chloride is the major extracellular anion and serves to regulate the balance of extracellular fluid distribution. Similarly to the other ions, common causes of decreased chloride include reduced dietary intake, prolonged vomiting and reduced renal reabsorption as well as some forms of acidosis and alkalosis. Increased chloride values are found in dehydration, kidney failure, some forms of acidosis, high dietary or parenteral chloride intake, and salicylate poisoning.

Test principle

An Ion-Selective Electrode (ISE) makes use of the unique properties of certain membrane materials to develop an electrical potential (electromotive force, EMF) for the measurements of ions in solution. The electrode has a selective membrane in contact with both the test solution and an internal filling solution. The internal filling solution contains the test ion at a fixed concentration. Because of the particular nature of the membrane, the test ions will closely associate with the membrane on each side. The membrane EMF is determined by the difference in concentration of the test ion in the test solution and the internal filling solution. The EMF develops according to the Nernst equation for a specific ion in solution:

$$(1) \quad E = E_0 + RT / nF \cdot \ln (f \cdot C_t) / (f \cdot C_i)$$

Where:

E	=	electrode EMF
E ₀	=	standard EMF
R	=	constant
T	=	temperature
n	=	charge of the ion
F	=	Faraday's constant
ln	=	natural logarithm (base e)
f	=	activity coefficient
C _t	=	ion concentration in test solution
C _i	=	ion concentration in internal filling solution

For sodium, potassium and chloride, which all carry a single charge, R, T, n, and F are combined into a single value representing the slope (S). For determination on a **cobas 8000** ISE module where the sample is diluted 1:31 for serum/plasma and 1:46 for urine, the ionic strength and therefore the activity coefficients are essentially constant.

The concentration of the test ion in the internal filling solution is also constant. These constants may be combined into the E₀ term. The value of E₀ is also specific for the type of reference electrode used. Equation (1) can hence be rewritten to reflect these conditions:

$$(2) \quad E = E'_0 + S \cdot \ln (C_t)$$

The complete measurement system for a particular ion includes the ISE, a reference electrode and electronic circuits to measure and process the EMF to give the test ion concentration.

The sodium^{2,3} and potassium⁴ electrodes are based on neutral carriers and the chloride⁵ electrode is based on an ion exchanger.

Precautions and warnings

For in vitro diagnostic use for health care professionals. Exercise the normal precautions required for handling all laboratory reagents.

Infectious or microbial waste:

Warning: handle waste as potentially biohazardous material. Dispose of waste according to accepted laboratory instructions and procedures.

Environmental hazards:

Apply all relevant local disposal regulations to determine the safe disposal.

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Safety data sheet available for professional user on request.

[REF] 04880455190/04880480190:

This kit contains components classified as follows in accordance with the Regulation (EC) No. 1272/2008:

Contains mixture of 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-2H-isothiazol-3-one (3:1).

EUH 208 May produce an allergic reaction.

Contact phone: all countries: +49-621-7590

Product safety labeling follows EU GHS guidance.

Handle patient samples and human-based controls as potentially infectious specimens.

As with any diagnostic test procedure, results should be interpreted taking all other test results and the clinical status of the patient into consideration.

In addition, pay attention to all precautions and warnings listed in the Operator's Manual of the analyzer.

ISE calibrators, auxiliary reagents and electrodes

Calibrators S1, S2 and S3

S1: ISE Standard Low

120 mmol/L Na⁺, 3 mmol/L K⁺, 80 mmol/L Cl⁻

S2: ISE Standard High

160 mmol/L Na⁺, 7 mmol/L K⁺, 120 mmol/L Cl⁻

S3: ISE Standard High

160 mmol/L Na⁺, 7 mmol/L K⁺, 120 mmol/L Cl⁻

Storage and stability

Store S1, S2 and S3 at 15-25 °C.

See label for expiration date.

On-board stability

Calibrators S1, S2 and S3: **to be used only once.**

Auxiliary reagents

ISE Reference Electrolyte

1 mol/L potassium chloride

ISE Diluent (ready for use)

HEPES buffer: 10 mmol/L

Triethanolamine: 7 mmol/L

Preservative

ISE Internal Standard (ready for use)

HEPES buffer: 10 mmol/L

Triethanolamine: 7 mmol/L

Sodium chloride: 3.06 mmol/L

Sodium acetate: 1.45 mmol/L

Potassium chloride: 0.16 mmol/L

Preservative

ISE Cleaning Solution

Sodium hydroxide solution:

12 % with sodium hypochlorite solution < 2 % active Cl

Storage and Stability

Store Reference Electrolyte, Internal Standard, Diluent at 15-25 °C.

Store ISE Cleaning Solution at 2-8 °C.

See label for expiration date.

On-board stability

ISE Reference Electrolyte up to expiration date

ISE Diluent 6 weeks

ISE Internal Standard 6 weeks

If always closed immediately after usage and stored at 2-8 °C the ISE Cleaning Solution can be used up to the expiration date.

For daily maintenance use only fresh cleaning solution.

NOTE: If one of the reagent bottles is nearly empty do not just refill the bottle with new reagent. Discard the old reagent bottle, including any remaining reagent.

NOTE: Dissolved gases can cause performance problems if present in high amounts in the Diluent, Internal Standard or Reference Electrolyte. In this case mix the contents of the bottle gently before use.

Electrodes

Sodium, Potassium, Chloride, Reference

Storage and Stability

Store electrodes at 7-40 °C.

See label for expiration date.

On-board stability

Sodium 2 months or 9000 tests

Potassium 2 months or 9000 tests

Chloride 2 months or 9000 tests

Reference 6 months

The electrodes should be replaced after this time period has expired.

For replacement refer to instructions in the Operator's Manual.

Slope ranges

Sodium 50 to 68 mV/dec

Potassium 50 to 68 mV/dec

Chloride -40 to -68 mV/dec

The slope ranges for newly installed electrodes should be in the upper half of the recommended electrode slope range (excluding chloride).

ISE solution summary

Solution	Usage
S1	Full calibration
S2	Full calibration
S3	Full calibration (Compensation)
Reference Electrolyte	Provides a reference potential.
Diluent	For dilution.
Internal Standard	Monitoring of Electrode potential.
Cleaning Solution	Cleans the ion-selective electrodes, dilution vessel and tubing.

CAUTION: The above-mentioned ISE calibrators, auxiliary reagents and electrodes are required to calibrate and calculate results for the ISE module. Use of any other products may result in inaccurate measurements of routine samples and/or damage to the electrodes.

Specimen collection and preparation⁶

Specimen

Only the specimens listed below were tested and found acceptable.

Serum: Use serum free of hemolysis and gross lipemia, collected by standard venipuncture technique.

Plasma: Use only lithium heparin.

Urine:⁷ Collect 24-hour urine without additives. Store refrigerated during collection.

Stability in serum, plasma and urine samples kept in tightly closed tubes are given in the table below.⁸

	15-25 °C	2-8 °C	-20 °C
Sodium	14 days	14 days	stable
Potassium	14 days	14 days	stable
Chloride	7 days	7 days	stable

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Preparation

Do not allow serum to remain on the cells after centrifugation. As described in the literature, potassium values in serum are increased compared to plasma. Serum potassium is released from platelets during clotting. The higher the platelet count, the greater the error.⁹ While serum is susceptible to preanalytic handling (hemolysis) and leakage from erythrocytes, plasma is preferable to serum as sample material for potassium determination.

The chloride content of serum or plasma is stable for several days when the sample is separated from erythrocytes and stored in a tightly closed container.⁷

Gross lipemia causes pseudohyponatremia.¹⁰ Grossly lipemic specimens should be cleared by ultracentrifugation. Turbid urine samples should be cleared by centrifugation.

Potassium: For certain types of hematological neoplasias, (severe) pseudohyperkalemia using lithium heparin samples has been reported.^{11,12,13}

CAUTION:

Serum separator tubes containing acrylic, ester, styrene, urethane or olefin based gels may be used for sample collection as long as they are used in accordance with the manufacturer's recommended procedures. It is especially important that storage temperature, adequate mixing, clotting times and centrifugation at sufficient g-forces for sufficient time periods are respected. Ensure also correct filling levels and ensure a minimum of 1 cm sample above gel layer. If these precautions are not taken, it is possible to accidentally coat the sample probe with gel (interfering with proper sample level detection), or even to aspirate gel into the ISE system (resulting in a clogged system). Inadequate mixing of plasma tubes can cause interference with micro fibrin clots. It is strongly recommended to avoid silicone-type gels, due to risk of silicon oil contaminations. In addition, tubes that exhibit a layer of clear liquid, which rises to the top of the serum after centrifugation, should not be used for direct sample aspiration, in order to prevent coating the sample probes and interfering with ISE system.

Pipetting parameters:

The sample volume pipetted by **cobas** 8000 ISE modules is 15.0 µL for serum and plasma (as well as for automatic rerun) and 10.0 µL for urine samples.

NOTE: Each laboratory should establish guidelines for determining acceptability of specimens and the corrective action to be taken if a specimen is considered unacceptable. Compile a laboratory-specific guideline.

Procedure of ISE measurements

Assay

Refer to the Operator's Manual of the analyzer.

Calibration

Full calibration for Na⁺, K⁺ and Cl⁻ requires the following 3 calibrator solutions: ISE Standard Low, ISE Standard High, and ISE Standard High (compensated). The slope of the calibration curve is calculated from Standards 1 and 2. ISE Compensation affects the intercept, not the slope. An internal standard is also measured during calibration and between samples to compensate for any system deviations. Refer to the Operator's Manual of the analyzer for detailed calibration instructions. Traceability: This method has been standardized against primary calibrators prepared gravimetrically from purified salts.

Calibration frequency

Perform a full calibration

- every 24 hours
- after ISE cleaning and maintenance
- after changing the reagent bottles
- after replacing any electrode

Quality control

For serum/plasma quality control, use control materials as listed in the "Order information" section.

In addition, other suitable control material can be used.

For urine quality control, use commercially available urine controls.

Quality controls should be performed daily and after every additional calibration.

The control intervals and limits should be adapted to each laboratory's individual requirements. Values obtained should fall within the defined limits. Each laboratory should establish corrective measures to be taken if values fall outside the defined limits.

Follow the applicable government regulations and local guidelines for quality control.

Refer to appropriate value sheets/package inserts for additional information.

Expected values¹

Serum (Adults)	Sodium	136-145 mmol/L
	Potassium	3.5-5.1 mmol/L
	Chloride	98-107 mmol/L
Plasma (Adults)	Sodium	136-145 mmol/L
	Potassium	3.4-4.5 mmol/L
	Chloride	98-107 mmol/L

Plasma potassium levels are reported to be lower than serum levels.

Urine (24 h) (Adults)	Sodium	40-220 mmol/24 h
	Potassium	25-125 mmol/24 h
	Chloride	110-250 mmol/24 h

The urinary excretion of sodium, potassium and chloride varies significantly with dietary intake. The values given here are typical of people on an average diet.

NOTE: It is recommended that each laboratory establishes and maintains its own reference ranges. The values given here are only to be used as a guideline.

Maintenance

The system maintenance procedures and frequencies stated in the Operator's Manual must be performed each day at the end of the daily sample run or after an elevated sample throughput.

cobas 8000 ISE module maintenance:

The specially labeled wash rack (green) is used.

Position 1: Cell Cleaning Solution (not necessary when only the ISE is cleaned)

Position 2: ISE Cleaning Solution

Position 3: Activator.

The ISE system requires conditioning after cleaning and prior to calibration.

The system recognizes the wash rack and switches automatically to cleaning mode.

NOTE: Always use fresh solutions for cleaning.

Limitations - interference

Criterion: No significant interference if recovery is within $\pm 10\%$ of initial value.

Hemolysis - serum

Sodium and chloride

Hemoglobin does not interfere in the tested concentration range up to 1000 mg/dL (621 µmol/L) hemoglobin (approximate H index 1000).

Potassium

Do not use hemolyzed samples.

Potassium concentration in erythrocytes is 25 times higher than in normal plasma. The level of interference may be variable depending on the exact content of erythrocytes. An H-index of ≤ 20 equals an increase of the potassium concentration of ≤ 0.1 mmol/L.¹⁴

Icterus - serum

Bilirubin (conjugated/unconjugated) does not interfere in the tested concentration range up to 60 mg/dL (1026 µmol/L) bilirubin (approximate I index 60).

Icterus - urine

Bilirubin (conjugated) does not interfere in the tested concentration range up to 60 mg/dL (1026 µmol/L) bilirubin (approximate I index 60).

Lipemia - serum

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Intralipid does not interfere in the tested concentration range up to 2000 mg/dL Intralipid (corresponding to an approximate L index of 2000). There is poor correlation between the L index (corresponds to turbidity) and the triglycerides concentration. Pseudohyponatremia may be seen with lipemic-specimens as a result of fluid displacement.¹⁰

Sodium: Altered protein-/lipid levels may falsely shift sodium results into the opposite direction; i.e. elevated protein level = pseudohyponatremia, decreased protein level = pseudohypernatremia.^{15,16}

Drugs

The following drugs have been tested and caused no significant interference when added to aliquots of pooled normal human serum up to the indicated concentration. Falsely high chloride values have been reported from patients receiving perchlorate medication. This is due to an interference of perchlorate ions with chloride ISE determinations.

Serum panel:

Acetaminophen (paracetamol)	200 mg/L
Acetylcysteine	150 mg/L
Acetylsalicylic acid	1000 mg/L
Ampicillin-Na	1000 mg/L
Ascorbic acid	300 mg/L
Cefoxitin	2500 mg/L
Cyclosporin	5 mg/L
Doxycycline	50 mg/L
Heparin	5000 U
Ibuprofen	500 mg/L
Intralipid	10000 mg/L
L-Dopa	20 mg/L
Methyldopa	20 mg/L
Metronidazol	200 mg/L
Phenylbutazone	400 mg/L
Rifampicin	60 mg/L
Theophylline	100 mg/L

Urine panel:

Acetaminophen (paracetamol)	3000 mg/L
Acetylcysteine	10 mg/L
Ascorbic acid	4000 mg/L
Doxycyclin	300 mg/L
Gentamycin sulfate	400 mg/L
Ibuprofen	4000 mg/L
L-Dopa	1000 mg/L
Methyldopa	2000 mg/L
Na-Cefoxitin	12000 mg/L
Ofloxacin	900 mg/L
Phenazopyridine	300 mg/L
Salicylic acid	6000 mg/L

For diagnostic purposes, the results should always be assessed in conjunction with the patient's medical history, clinical examination and other findings.

ACTION REQUIRED

Special Wash Programming: The use of special wash steps is mandatory when certain test combinations are run together on **cobas c** systems. All special wash programming necessary for avoiding carry-over is available via the **cobas** link, manual input is required in certain cases. The latest version of the carry-over evasion list can be found with the NaOHD/SMS/SmpCln1+2/SCCS Method Sheet and for further instructions refer to the operator's manual.

Where required, special wash/carry-over evasion programming must be implemented prior to reporting results with this test.

Limits and ranges

Measuring range

Measuring mode ISE indirect:

Application for serum and plasma:

Na ⁺	80-180 mmol/L
K ⁺	1.5-10.0 mmol/L
Cl ⁻	60-140 mmol/L

Analysis of sodium on a **cobas c** system with serum and plasma specimens should yield a linear relationship from 80-180 mmol/L with a deviation from the linear line of less than 5 %.

Analysis of potassium on a **cobas c** system with serum and plasma specimens should yield a linear relationship from 1.5-10.0 mmol/L with a deviation from the linear line of less than 5 %.

Analysis of chloride on a **cobas c** system with serum and plasma specimens should yield a linear relationship from 60-140 mmol/L with a deviation from the linear line of less than 5 %.

Application for urine:

Na ⁺	60-350 mmol/L
K ⁺	3-100 mmol/L
Cl ⁻	60-350 mmol/L

Determine samples having lower concentrations (only applicable for sodium and chloride) via the rerun function. Dilution of samples via rerun function is a 1:31 dilution. Results from samples diluted using the rerun function are automatically multiplied by the dilution factor.

Rerun for urine samples with increased sample volume:

Na ⁺	20-59.9 mmol/L
Cl ⁻	20-59.9 mmol/L

For Urine Application:

Analysis of sodium on a **cobas c** system with urine specimens should yield a linear relationship from 60-350 mmol/L with a deviation from the linear line of less than 10 %.

Analysis of potassium on a **cobas c** system with urine specimens should yield a linear relationship from 3-100 mmol/L with a deviation from the linear line of less than 10 %.

Analysis of chloride on a **cobas c** system with urine specimens should yield a linear relationship from 60-350 mmol/L with a deviation from the linear line of less than 10 %.

For Urine Rerun Application:

Analysis of sodium on a **cobas c** system with urine specimens should yield a linear relationship from 20-59.9 mmol/L with a deviation from the linear line of less than 10 %.

Analysis of chloride on a **cobas c** system with urine specimens should yield a linear relationship from 20-59.9 mmol/L with a deviation from the linear line of less than 10 %.

Specific performance data

Representative performance data on the analyzers are given below. Results obtained in individual laboratories may differ.

Precision

Repeatability and intermediate precision were determined using human samples and controls in accordance with the CLSI (Clinical and Laboratory Standards Institute) EP5 requirements (2 aliquots per run, 2 runs per day, 21 days). The following results were obtained:

Sodium

Sample (on a cobas 8000)	Repeatability			Intermediate precision		
	Mean mmol/L	SD mmol/L	CV %	Mean mmol/L	SD mmol/L	CV %
Plasma low	88.7	0.3	0.4	88.7	0.9	1.1
Plasma medium	120.6	0.4	0.3	120.6	0.9	0.7

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Plasma high	175.8	0.6	0.3	175.8	1.0	0.6
Precinorm U	112.0	0.4	0.4	112.0	0.9	0.8
Precipath U	144.0	0.4	0.3	144.0	0.8	0.5
Urine low ¹	24.7	0.2	0.9	24.7	0.9	3.7
Urine medium ²	174.5	0.5	0.3	174.5	1.1	0.7
Urine high ²	347.2	0.9	0.3	347.2	2.8	0.8
Liquichek 1 ²	83.4	0.3	0.3	83.4	1.3	1.6
Liquichek 2 ²	175.6	1.3	0.8	175.6	1.7	1.0

1) Data obtained with urine rerun function.

2) Data obtained with default urine mode.

Potassium

Sample (on a cobas 8000)	Repeatability			Intermediate precision		
	Mean mmol/L	SD mmol/L	CV %	Mean mmol/L	SD mmol/L	CV %
Plasma low	2.03	0.01	0.5	2.03	0.03	1.6
Plasma medium	5.01	0.02	0.3	5.01	0.03	0.7
Plasma high	9.56	0.03	0.3	9.56	0.06	0.6
Precinorm U	3.60	0.02	0.4	3.60	0.03	0.9
Precipath U	6.61	0.02	0.3	6.61	0.04	0.5
Urine low	3.47	0.01	0.3	3.47	0.04	1.1
Urine medium	50.70	0.26	0.5	50.70	0.63	1.2
Urine high	93.48	0.58	0.6	93.48	1.82	1.9
Liquichek 1	30.64	0.20	0.6	30.64	0.32	1.0
Liquichek 2	66.22	0.61	0.9	66.22	1.14	1.7

Chloride

Sample (on a cobas 8000)	Repeatability			Intermediate precision		
	Mean mmol/L	SD mmol/L	CV %	Mean mmol/L	SD mmol/L	CV %
Plasma low	67.1	0.3	0.4	67.1	0.6	1.0
Plasma medium	128.4	0.4	0.3	128.4	0.7	0.6
Plasma high	138.0	0.6	0.4	138.0	0.9	0.7
Precinorm U	77.1	0.3	0.4	77.1	0.6	0.8
Precipath U	111.8	0.3	0.3	111.8	0.6	0.6
Urine low ¹	21.6	0.2	1.0	21.6	0.8	3.7
Urine medium ²	167.6	0.5	0.3	167.6	1.1	0.7
Urine high ²	333.5	1.6	0.5	333.5	3.5	1.0
Liquichek 1 ²	97.5	0.5	0.5	97.5	0.9	0.9
Liquichek 2 ²	193.2	1.5	0.8	193.2	2.0	1.0

1) Data obtained with urine rerun function.

2) Data obtained with default urine mode.

Method comparison

ISE values for human plasma and urine samples obtained on a **cobas** 8000 analyzer (y) using ISE Standard High as S3 Calibrator, were compared with those determined using the corresponding reference method (x) and with **cobas c** 501 (x) using ISE Standard High as S3 Calibrator.

Sodium

Instruments	Sample Type/ N	Min x	Max x	P/B Regression ¹⁷	Coeff. (r)
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x: flame photom. y: cobas 8000 (S3 = ISE Standard High)	Plasma/100	85.6	180.6	y = 1.015x - 3.553	0.9943
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Bias at 135 mmol/L = -1.528 (-1.1 %)

Bias at 150 mmol/L = -1.303 (-0.9 %)

x: cobas c 501 (S3 = ISE Standard High) y: cobas 8000 (S3 = ISE Standard High)	Plasma/100	81.5	181.9	y = 0.969x + 3.381	0.9984
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Bias at 135 mmol/L = -0.804 (-0.6 %)

Bias at 150 mmol/L = -1.269 (-0.8 %)

x: flame photom. y: cobas 8000 (S3 = ISE Standard High)	Urine ² /105	69.2	337.4	y = 0.996x + 1.248	0.9995
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Bias at 60 mmol/L = 1.008 (1.7 %)

Bias at 220 mmol/L = 0.368 (0.2 %)

x: cobas c 501 (S3 = ISE Standard High) y: cobas 8000 (S3 = ISE Standard High)	Urine ² /105	68.3	349.5	y = 0.969x + 8.259	0.9998
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Bias at 60 mmol/L = 6.339 (10.7 %)

Bias at 220 mmol/L = 1.439 (0.7 %)

x: flame photom. y: cobas 8000 (S3 = ISE Standard High)	Urine ¹ /92	22.2	58.7	y = 0.943x + 3.149	0.9991
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Bias at 30 mmol/L = 1.439 (4.8 %)

x: cobas c 501 (S3 = ISE Standard High) y: cobas 8000 (S3 = ISE Standard High)	Urine ¹ /92	24.2	59.8	y = 0.962x + 1.110	0.9995
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Bias at 30 mmol/L = -0.03 (-0.1 %)

1) Data obtained with urine rerun function.

2) Data obtained with default urine mode.

Potassium

Instruments	Sample Type/ N	Min x	Max x	P/B Regression ¹⁷	Coeff. (r)
x: flame photom. y: cobas 8000 (S3 = ISE Standard High)	Plasma/100	1.54	10.57	$y = 1x + 0.05$	0.9994
Bias at 3.0 mmol/L = 0.050 (1.7 %) Bias at 5.8 mmol/L = 0.050 (0.9 %)					
x: cobas c 501 (S3 = ISE Standard High) y: cobas 8000 (S3 = ISE Standard High)	Plasma/100	1.59	10.59	$y = 0.99x + 0.032$	0.9999
Bias at 3.0 mmol/L = 0.002 (0.1 %) Bias at 5.8 mmol/L = -0.026 (-0.4 %)					
x: flame photom. y: cobas 8000 (S3 = ISE Standard High)	Urine/101	3.1	99.5	$y = 1.014x + 0.506$	0.9997
Bias at 20 mmol/L = 0.786 (3.9 %) Bias at 80 mmol/L = 1.626 (2.0 %)					
x: cobas c 501 (S3 = ISE Standard High) y: cobas 8000 (S3 = ISE Standard High)	Urine/101	2.97	102.04	$y = 1.001x + 0.266$	0.9998
Bias at 20 mmol/L = 0.286 (1.4 %) Bias at 80 mmol/L = 0.346 (0.4 %)					

Chloride

Instruments	Sample Type/ N	Min x	Max x	P/B Regression ¹⁷	Coeff. (r)
x: coulometry y: cobas 8000 (S3 = ISE Standard High)	Plasma/100	65.0	123.0	$y = 1.075x - 6.025$	0.9902

Bias at 90 mmol/L = 0.725 (0.8 %)

Bias at 112 mmol/L = 2.375 (2.1 %)

x: cobas c 501 (S3 = ISE Standard High) y: cobas 8000 (S3 = ISE Standard High)	Plasma/100	61.9	127.9	$y = 0.987x + 1.858$	0.9984
Bias at 90 mmol/L = 0.688 (0.8 %) Bias at 112 mmol/L = 0.402 (0.4 %)					
x: coulometry y: cobas 8000 (S3 = ISE Standard High)	Urine ² /108	66.0	313.0	$y = 1.036x - 4.891$	0.9995
Bias at 60 mmol/L = -2.731 (-4.6 %) Bias at 170 mmol/L = 1.229 (0.7 %)					
x: cobas c 501 (S3 = ISE Standard High) y: cobas 8000 (S3 = ISE Standard High)	Urine ² /108	62.0	349.8	$y = 0.908x + 9.018$	0.9999
Bias at 60 mmol/L = 3.497 (5.8 %) Bias at 170 mmol/L = -6.623 (-3.9 %)					
x: coulometry y: cobas 8000 (S3 = ISE Standard High)	Urine ¹ /92	22.0	59.0	$y = 0.973x - 0.927$	0.9987
Bias at 30 mmol/L = -1.737 (-5.8 %)					
x: cobas c 501 (S3 = ISE Standard High) y: cobas 8000 (S3 = ISE Standard High)	Urine ¹ /92	20.2	57.3	$y = 0.981x + 0.728$	0.9992
Bias at 30 mmol/L = 0.158 (0.5 %)					

1) Data obtained with urine rerun function.

2) Data obtained with default urine mode.

Bias at the medical decision level (MDL) was calculated as follows:

Bias [mmol/L] = intercept + (slope x MDL) - MDL

Bias [%] = (Bias [mmol/L] x 100) / MDL

ISE indirect Na-K-Cl for Gen.2

ISE indirect Na-K-Cl for Gen.2

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A point (period/stop) is always used in this Method Sheet as the decimal separator to mark the border between the integral and the fractional parts of a decimal numeral. Separators for thousands are not used.

Any serious incident that has occurred in relation to the device shall be reported to the manufacturer and the competent authority of the Member State in which the user and/or the patient is established.

Symbols

Roche Diagnostics uses the following symbols and signs in addition to those listed in the ISO 15223-1 standard (for USA: see dialog.roche.com for definition of symbols used):

	Contents of kit
	Volume after reconstitution or mixing
	Global Trade Item Number

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