# Chloride Fluid Monoreagent

IVD CE

IN VITRO TEST FOR THE QUANTITATIVE DETERMINATION OF CHLORIDE IN HUMAN SERUM, PLASMA AND URINE BY THIOCYANATE METHOD

| REF | 88 72 72 | 2x100ml |
|---|---|---|

## CALIBRATION

| | | |
|---|---|---|
| Chloride standard (100mmol/l) | 5ml | 88 19 21 |

## QUALITY CONTROL

| | | |
|---|---|---|
| Control Serum N | 6x5ml | 88 41 48B |
| Control Serum P | 6x5ml | 88 46 85B |

The control intervals and limits must be adapted to the individual laboratory and country-specific requirements. Values obtained should fall within established limits. Each laboratory should establish corrective measures to be taken if values fall outside the limits.

## SUMMARY

Chloride is the most abundant extracellular anion. Together with natrium chloride is responsible for the maintenance of osmotic pressure, the anion-cation balance and therefore of the water distribution in the extracellular fluid compartment. Decreased plasma $Cl^-$-concentrations (hypochloremia) can result from salt-losing nephritis, persistent gastric secretion, prolonged vomiting and metabolic acidosis that are caused by increased production or reduced secretion of organic acids. Increased plasma $Cl^-$-concentrations (hyperchloremia) occur with dehydration, renal tubular acidosis, acute renal failure, in adrenocortical hyperfunction , salicylate intoxication and metabolic acidosis associated with prolonged diarrhoea and loss of sodium bicarbonate. Chloride is often analyzed in combination with sodium and potassium to determine the anion gap in serum and/or urine. The urinary anion gap is useful in the initial evaluation of hyperchloremic metabolic acidosis. Due to the different reactivity equivalents of chloride and bromide the thiocyanate method is less disturbed by the presence of bromide than measurement with an ion-selective electrode.

## TEST PRINCIPLE

Chloride ions and Hg II – thiocyanate form thiocyanate ions in acidic medium.
These ions react with $HNO_3$ and FE III – ions and effect a red colour. The increasing extinction is directly proportional to the concentration of chloride ions.

$$2\,Cl^- + Hg(SCN)_2 \longrightarrow HgCl_2 + 2SCN^-$$

$$2SCN^- + Fe^{3+} \longrightarrow Fe(SCN)^{2+}$$

## NOTES

For in vitro diagnostic use.
Exercise the normal precautions required for all laboratory reagents. Contains mercuric thiocyanate.Toxic, harmful if inhaled or absorbed through skin. Consider local disposal regulations.

## LIMITATIONS - INTERFERENCE

Criterion: Recovery within ±10% of initial value.
Icterus: No significant interference up to a bilirubin concentration of 30 mg/dl.
Hemolysis: No significant interference up to a haemoglobin concentration of 1000 mg/dl.
Lipemia (Intralipid): No significant interference up to a triglyceride concentration of 400 mg/dl.

## MEASURING/REPORTABLE RANGE

As mentioned before urine has to be diluted threefold with aqua dist.
If measured values exceed the linear range from 1 – 130 mmol/l dilute the sample 1+1 with the identical volume aqua dest. and multiply the result by a factor of 2.

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## EXPECTED VALUES

| | | |
|---|---|---|
| *Serum*: | | 97 – 108 mmol/l |
| *Urine :* | 24 h urine | 95 – 240 mmol/24h |
| | morning urine | 54 – 158 mmol/l |

Conversion between conventional and SI units: 1 mEq/l = 1 mmol/l
Conversion between mmol/ and mg/dl: mmol/l = 0.282 x mg/dl
Each laboratory should investigate the transferability of the expected values to its own patient population and if necessary determine its own reference range.
For diagnostic purposes the chloride results should always be assayed in conjunction with the patient's medical history, clinical examinations and other findings.

## IMPRECISION

Reproducibility was determined using samples in an internal protocol. The following results were obtained.

| | **Within run** | | |
|---|---|---|---|
| Sample | *Mean mg/gl* | *SD mg/dl* | *CV %* |
| Sample 1 | 102.04 | 0.80 | 0.78 |
| Sample 2 | 104.15 | 0.75 | 0.66 |
| Sample 3 | 113.15 | 0.75 | 0.72 |

| | **Between run** | | |
|---|---|---|---|
| Sample | *Mean mg/gl* | *SD mg/dl* | *CV %* |
| Sample 1 | 101.32 | 1.28 | 1.26 |
| Sample 2 | 103.03 | 1.13 | 1.10 |
| Sample 3 | 105.83 | 1.43 | 1.35 |

## REAGENT CONCENTRATION

**R1:**

| | |
|---|---|
| Hg – II - thiocyanate | 2 mmol/l |
| Fe – III - nitrate | 30 mmol/l |
| HNO3 | 40 mmol/l |

## PREPARATION AND STABILITY

All reagents are ready to use.
Protect from direct sunlight.
Stable up to the expiry date when stored at +2°C to +8°C.

## SPECIMEN

*Serum*
Separate serum from the clot and cells within 45 min.
*Urine*
Urine has to be diluted 1+2 with distilled water. Multiply result by 3. Centrifuge samples containing precipitate before performing the assay.

## TESTING PROCEDURE

• Working solutions as described above
*Additional materials required*
• Calibrators and controls as indicated below
• 0.9% NaCl

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**Manual procedure:**

| | |
|---|---|
| Wavelength | Hg 492 nm (460 – 500 nm) |
| Temperature | +25°C / +30°C / +37°C |
| Cuvette | 1cm light path |
| Zero adjustment | against reagent blank |

| | *blank* | *Standard / Calibrator* | *Sample* |
|---|---|---|---|
| *Working reagent* | 1000 µl | 1000 µl | 1000 µl |
| *Standard* | --- | 10 µl | --- |
| *Sample* | --- | --- | 10 µl |

Mix and after 5 minutes read absorbance of sample and standard against reagent blank. Determine the absorbance change as
ΔA sample = (A sample – A blank)
ΔA standard = (A standard – A blank)
and use this for the calculation.

**Calculation:**

$$\frac{\Delta A\,\text{sample}}{\Delta A\,\text{standard}} \times \text{standard conc.} = \text{Chloride conc. (mmol/l)}$$

Chloride concentration is calculated using the Chloride concentration is calculated using the supplied standard (100 mmol/l = 354.6 mg/dl). Linearity is up to 130 mmol/l (462 mg/dl)

Temperature permanency throughout the measurement is extremely important!

## DISPOSAL

Please note the legal regulations.

## LITERATURE


1. Bablok W. et al. A General Regression Procedure for Method Transformation. J Clin Chem Clin Biochem 1988;26:783-790.
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## **AXIOM** Product range Clinical Chemistry

| **Enzymes** | **Ions** | **Other Metabolites** |
|---|---|---|
| Acid Phosphatase | Ammonium fluid | Bilirubin T/D |
| Alkaline Phosphatase | Copper fluid | Creatinine fluid |
| α-Amylase direct | Calcium fluid | Glucose GOD-PAP fluid |
| CK-NAC actived | Chloride fluid | Glucose Hexokinase fluid |
| CK-MB (NAC- actived) | Inorganic Phosphorus UV fluid | Urea Enzymatic fluid |
| γ-GT fluid | Iron fluid | Urea UV fluid |
| LDH fluid | TIBC | Uric Acid PAP fluid |
| Cholinesterase | Magnesium fluid | |
| GOT/ASAT fluid | Potassium fluid | **Controls** |
| GPT/ALAT fluid | Sodium fluid | |
| Lipase UV fluid | | Control Serum N |
| Lactate PAP | **Proteins** | Control Serum P |
| α-HBDH | | |
| **Lipids** | Albumin | |
| | CSF-Protein fluid | |
| Cholesterol fluid | Microprotein fluid | |
| HDL Cholesterol | Hemoglobin | |
| LDL Cholesterol | Protein Total fluid | |
| Triglycerides fluid | | |

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