

**Intended Use**

For **IN VITRO quantitative** determination of Chloride in serum using manual or automated applications.

**Clinical Significance**

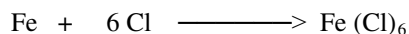
Determinations of Chloride are primarily used for diagnosing chronic pyelonephritis, metabolic acidosis, dehydration, congestive heart failure, and hypercalcemia, as well as for monitoring the causes and treatments. (1)

**Method History**

In 1956 D.M. Zall, et al (2), published a Chloride method for small amounts of Chloride in water. The method of Zall, et al, suffers from two major disadvantages. The method is non-linear and mercury is discharged to waste as a pollutant. A non-mercurometric linear Chloride method was published by B. Fingerhut (3) in 1972. Catachem's 340nm Chloride method is based upon the work reported by Fingerhut.

**Method Principle**

Chloride ions present in the serum sample interact with Ferric ions in dilute acid to form a yellow chloro-complex with maximum absorption at 340nm. The intensity of the color thus produced is directly proportional to the concentration of the Chloride ion in the serum sample. The reaction volume illustrates the reaction that occurs in this method.

**Reagent Content**

The concentrations of the active ingredients in the reagents are approximately as follows.

**Chloride Acid Reagent (R1)**

Each liter contains:

Methane Sulfonic Acid 1.56 mol

Nonreactive ingredients

**Chloride Color Reagent (R2)**

Ferric Nitrate 0.5 mol

**Precautions**

Avoid contact of reagent with skin and eyes. Should contact with skin and eyes occur, wash affected area with plenty of cold water.

**DO NOT PIPETTE REAGENTS BY MOUTH.**

**Preparation Of Working Reagents**

Catachem Chloride 340nm Reagents are packaged in ready-to-use form. No preparation is required.

**Reagent Storage And Stability**

Store Catachem Chloride 340nm Reagents at 2-26°C. When stored as directed, the reagents are stable until the expiration date stated on the label.

**Specimen Collection And Preparation**

Test sera should be fresh, clear, and unhemolyzed. When blood is drawn, it should be processed as soon as possible and the serum should be isolated from the clot without delay.

**Quality Control**

To monitor the performance of the Reagent and the procedure used, we recommend the regular use of a normal and abnormal control serum.

**Interfering Substances**

Several substances have been reported to interfere with the Chloride determination in serum. (4,5) The following substances, if present in the sample, reagents or system, can produce erroneous results. a) the bromide ion interferes in any quantity. Hemolysis normally will decrease the Chloride values; b) anticoagulants should be avoided. A summary of the influence of drugs on clinical laboratory procedures may be found by consulting D.S. Young, et al. (4)

**Expected Values**

The range of expected values determined for this method in humans is 96-106 meq/L. These values are suggested guidelines. It is recommended that each laboratory establish the normal range for the area in which it is located and for the species under test.

**Directions For Use**

Catachem Chloride 340nm method requires two reagents. The reagents are packaged ready for use. No preparation is necessary. The Working Reagents are stable for twelve months at 2-8°C if capped while not in use.

**Procedure:**

Catachem's Chloride method is as follows:

**Assay Name:** CHLORIDE

**Assay Type:** Chemistry

**Assay Mode:** Standard

**Temperature:** 37 °C

**Units:** mEq/L

**# of decimals:** 0

**Assay Description:** Dual Reagent; Calibrated (Fe-nitrate)

**Blank used:**

Valid interval: 15 days 0 hours

**Standards:**

Catacal, Concentration: value as per insert.



**Procedure (continued):**

- Add R 1 Reagent [Chloride Rgt R1], Volume [250.0 µL],
- Add R 2 Reagent [Chloride Rgt R2], Volume [83.0 µL],
- Incubate 00:01:00 [0h 1min 0sec]
- Read with Primary Filter[340]
- Add Sample, Volume [16.0 µL]
- Incubate 00:01:00 [0h 1min 0sec]
- Read with Primary Filter[340]

meq/L	Precision SD	CV%
77	0.83	1.1
96	0.84	0.87
120	1.6	1.3

**Calculations And Results**

$$\frac{\text{Sample Delta Absorbance}}{\text{Calibrator Delta Absorbance}} \times \text{Calibrator (meq/L)} = \text{Chloride (meq/L)}$$

**Example:**

	<u>Assay OD</u>
Sample	0.240
Calibrator	0.250
Calibrator	= 100 meq/L

$$\text{Chloride (meq/L)} = \frac{0.24}{0.25} \times 100 \text{ meq/L} = 96 \text{ meq/L}$$

**Correlation**

A comparison of this method against a Mercuric Thiocyanate Chloride method on an automated analyzer resulted in the following regression statistics.

Range	=	90 - 110 meq/L
N	=	50
Y	=	1.13x + 18.4
r	=	0.987
Sy.x	=	1.6

**References**

1. Fundamentals of Clinical Chemistry. Edited by Norbert Teitz. WV Saunders, Philadelphia (1976).
2. Zall DM, Fisher D, Garner MQ. Photometric determination of chlorides in water. Anal Chem 28:166 5-1668 (1956).
3. Fingerhut, B. A known mercurimetric automated method for serum chloride. Clin Chim Acta 41 :247-253 (1972).
4. Young DS, Pestaner LC, Gibberman V. Effect of drugs on clinical laboratory tests. Clin Chem 21 (5): ID-432D (1975).

**Method Performance Characteristics**

**Sensitivity:** The sensitivity of this method is 0.004-0.0045 absorbance units per meq/L.

**Linear Range:** In this method there is no significant nonlinearity over the range of 0-150 meq/L.

**Precision:** Within-run and day-to-day precision is summarized below.

**Precision Study**

Chloride meq/L	Total Precision SD	Total CV %
77	1.07	1.4
96	1.70	1.8
120	1.61	1.3

Chloride	Within-run	Within-run
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