

Chloride - Mercuric Nitrate Method

Version 8 / May 2023

Applications and Industries

Drinking water, surface waters, seawater, domestic and industrial wastewater

References

ASTM D 512 – 04, Chloride Ion in Water, Test Method A
APHA Standard Methods, 23rd ed., Method 4500 Cl⁻ C -1997
EPA Methods for Chemical Analysis of Water and Wastes, method 325.3 (1983)

Chemistry

In an acidic solution, mercuric nitrate reacts with chloride to form mercuric chloride. Diphenylcarbazone, the endpoint indicator, forms a purple complex with excess mercuric ions. Results are expressed as ppm (mg/L) Cl⁻.

Available Analysis Systems

Titrimetric: Titrets®

Storage Requirements

Products should be stored in the dark and at room temperature.

Shelf Life

When stored in the dark and at room temperature:

Titrets kit: at least 1 year

Accuracy Statement

Statements of accuracy are based on laboratory tests performed under ideal testing conditions using standards of known concentration prepared in deionized water.

Due to the non-linear nature of the test scale, the accuracy of these tests varies with the location of the test result on the scale. At twice the minimum concentration for a particular kit range, the accuracy is $\pm 10\%$ error.

Safety Information

Safety Data Sheets (SDS) are available upon request and at www.chemetrics.com. Read SDS before using these products. Breaking the tip of an ampoule in air when a valve assembly is not attached may cause the glass ampoule to shatter. Wear safety glasses and protective gloves.

Note: These products contain mercury and must be disposed according to local, state and federal laws.

Interference Information

- Bromide and iodide are titrated along with chloride causing a false positive result.
- Chromate and sulfite may interfere when present in excess of 10 ppm.
- Sulfide is expected to interfere.
- Nitrite interferes significantly. This chemistry is not applicable for the analysis of nitrite-treated cooling waters.
- Copper should not interfere at levels below 50 ppm.
- Ferrous and ferric iron do not affect the accuracy of the test if present at up to 125 ppm, unless hydrogen peroxide is present. Iron may alter the solution and/or end point colors.
- Hydrogen peroxide, in the presence of iron, prevents the formation of the purple color, causing a false high result. Addition of 2% EDTA to the sample prior to analysis will help to minimize the interference. Hydrogen peroxide alone at up to 125 ppm does not interfere.
- Zinc, lead, nickel, and chromous ion may alter the solution and/or endpoint color but should not affect the accuracy of the test if present at up to 100 ppm.
- QACs interfere if present at ppm levels.
- Deep sample color may interfere.
- Samples with high pHs or that are buffered to a pH above approximately 3 may cause a white precipitate to form in the test ampoule and prevent the formation of the purple color, causing a false positive test result. The pH of such samples can be adjusted with 0.1N Nitric Acid (HNO₃) prior to analysis. Sample pHs of less than 3 may limit the ability of the indicator to form the purple color, also causing false high results. Sodium hydroxide (NaOH), but not sodium carbonate (Na₂CO₃), can be used to adjust the sample pH to near neutral prior to analysis.

Interpretation of Results

At the endpoint of this titration, the color of the solution in the test ampoule changes from purple to colorless. If the Titret ampoule is filled with sample but the color of the solution remains purple (does not change to colorless), the chloride concentration is below the test range. If the solution in the ampoule is colorless immediately upon introduction of the first small dose of sample, add additional small doses to ensure the purple color does not appear. If no purple appears, the chloride concentration is above the test range.