

Manganese - Periodate Method

Version 7 / May 2023

Applications and Industries

Drinking water, natural waters, treated wastewater effluent

References

APHA Standard Methods, 14th ed., Method 314 C (1975)

Chemistry

Soluble manganese is oxidized by periodate in a slightly acidic solution to form permanganate ion. The resulting pink color is proportional to the manganese concentration in the sample. Results are expressed as ppm (mg/L) Mn.

Available Analysis Systems

Visual colorimetric: CHEMets®

Instrumental colorimetric: Vacu-vials®

Storage Requirements

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

Shelf Life

When stored in the dark and at room temperature:

Visual colorimetric:

CHEMets refill, Activator Solution, color comparators:
at least 1 year

Instrumental colorimetric:

Vacu-vials 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.

CHEMets kit: ± 1 color standard increment

Vacu-vials kit:

With spectrophotometer and V-2000:

- ≤ 0.5 ppm at 0 ppm
- ± 0.6 ppm at 2.0 ppm
- ± 1.5 ppm at 7.5 ppm
- ± 2.3 ppm at 22.5 ppm

With V-3000:

- ≤ 1.0 ppm at 0 ppm
- ± 0.6 ppm at 2.0 ppm
- ± 1.5 ppm at 7.5 ppm
- ± 2.3 ppm at 22.5 ppm

Interference Information

- This chemistry measures soluble manganese but does not differentiate the various valence states.
- Permanganate (MnO_4^-) develops approximately 25% more color with this reagent than other forms of manganese, causing a high bias. If the sample is known to contain manganese in the form of permanganate only, multiplying test results by 0.8 will improve the accuracy of the results.
- Oxidizable substances, including organic materials, may interfere negatively.
- Reducing agents such as sulfide, thiosulfate, sulfite, and ferrous iron may prevent the oxidation step, causing low test results.
- Calcium at greater than 700 mg/L, chloride at greater than 70,000 mg/L, and magnesium greater than 100,000 mg/L may interfere.
- Highly buffered samples or extreme sample pH may exceed the buffering capacity of the reagent. For such samples, pH should be adjusted to 4-5 prior to analysis.
- Manganese may precipitate above pH 6.
- Sample color or turbidity may make a color match difficult during visual colorimetric testing and may cause a false positive result with instrumental colorimetric tests. CHEMetrics' Sample Zeroing Accessory Pack can be used to correct for potential errors during instrumental analysis.

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 rather than water may cause the glass ampoule to shatter. Wear safety glasses and protective gloves.