

Cyanide (free) - Isonicotinic-Barbituric Acid Method

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Applications and Industries

Drinking water, fresh surface waters
NOT recommended for seawater
Pre-distillation is recommended for wastewater samples.

References

S. Nagashima, Spectrophotometric Determination of Cyanide with Isonicotinic Acid and Barbituric Acid, International Journal of Environ. Anal. Chem., 1981, Vol. 10, pp. 99-106.

Chemistry

Free cyanide reacts with chlorine to form cyanogen chloride (CNCl), which then reacts with a stabilized isonicotinic-barbituric acid reagent to form a blue colored complex in direct proportion to the cyanide concentration. Results are expressed as ppm (mg/L) CN⁻.

For total cyanide determination, a preliminary distillation of the sample can be performed.

Shelf Life

When stored in the dark and at room temperature:

Visual colorimetric:

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

Activator Solution: at least 8 months

Instrumental colorimetric:

Vacu-vials kit: at least 8 months

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 a spectrophotometer:

- ≤ 0.010 ppm at 0 ppm
- ± 0.016 ppm at 0.040 ppm
- ± 0.030 ppm at 0.100 ppm
- ± 0.060 ppm at 0.300 ppm

With V-2000 and V-3000:

- ≤ 0.020 ppm at 0 ppm
- ± 0.016 ppm at 0.040 ppm
- ± 0.040 ppm at 0.100 ppm
- ± 0.090 ppm at 0.300 ppm

Available Analysis Systems

Visual colorimetric: CHEMets®

Instrumental colorimetric: Vacu-vials®

Storage Requirements

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

Interference Information

- Thiocyanate is measured quantitatively with this chemistry.
- Sulfides and aldehydes will cause low test results.
- Nitriles may interfere.
- Low test results are obtained with seawater and brackish waters.
- Chloride, nitrate, sulfite, and sulfate up to 100 ppm do not interfere.
- Acetate, ferricyanide, and ferrocyanide at up to 10 ppm do not interfere.
- Nitrite and cyanate at or above 100 ppm may interfere.
- Ferric iron at or above 10 ppm may interfere.
- Sample pHs must be adjusted to between 7.5 and 11 to obtain accurate test results. Extreme caution must be used to ensure that the sample pH is not adjusted to below 7, as toxic cyanide gas may be released at lower pHs.
- Distillation removes most interferences except sulfide. Pretreatment with zinc acetate may be performed to prevent interference from sulfide.
- The ampoule reagent may contain a milky white precipitate. The precipitate does not impact product performance unless the product has expired or has been stored improperly.
- 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 with CHEMetrics photometers 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.