

# 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<sup>-</sup>. A preliminary distillation can be performed to determine total cyanide.

## Available Analysis Systems

Visual colorimetric: CHEMetrics®

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:

CHEMetrics refill, color comparators and 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.

CHEMetrics kit:  $\pm 1$  color standard increment

Vacu-vials kit:

- $\leq 0.020$  ppm at 0 ppm
- $\pm 0.016$  ppm at 0.040 ppm
- $\pm 0.040$  ppm at 0.100 ppm
- $\pm 0.090$  ppm at 0.300 ppm

## 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 and 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.

## Safety Information

Safety Data Sheets (SDS) are available upon request and at [www.chemetrics.com](http://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.

