

## Methods

Cyanide is used in many chemical and refining processes. It is found in effluent from electroplating and metal cleaning operations, coke ovens, steel manufacturing facilities, and gas scrubbers. Although cyanide can be safely removed by alkaline chlorination, its acute toxicity to aquatic life necessitates routine monitoring of effluents. The Maximum Contaminant Level for free cyanide in drinking water is 0.2 mg/L.

CHEMetrics' cyanide test kits are applicable to the monitoring of effluents and surface water supplies. It is recommended, however, that the sample be distilled and hydrogen sulfide be removed prior to analysis.

### The Isonicotinic-Barbituric Acid Method

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

In the Cyanide CHEMets® and Vacu-vials Kit, chlorine is added to a sample that has been buffered to pH 6. The resulting cyanogen chloride reacts with isonicotinic and barbituric acids to form a blue color. Results are expressed as ppm (mg/L) CN.

This chemistry provides two advantages over the more commonly used pyridine methods: (1) The shelf-life of the reagent is extended, and (2) the analyst is not exposed to noxious and hazardous fumes from the pyridine reagent.

### The Silver Nitrate Method

Reference: APHA Standard Methods, 22<sup>nd</sup> ed., Method 4500-CN<sup>-</sup> D - 1999.

The Cyanide Titrets® Kit employs silver nitrate as the titrant and 5-(p-dimethylaminobenzylidene) rhodanine as the indicator. A color change from orange to yellow signals the end of the titration. Results are expressed as ppm (mg/L) CN.

## Visual Kits

Range: 0-0.1 & 0.1-1 ppm

MDL: 0.005 ppm / Method: Isonicotinic-Barbituric Acid

	Cat#
<b>CHEMets Kit,</b>	<b>K-3810</b>
CHEMets Refill, 30 ampoules	R-3810
Neutralizer Solution Pack, six 20 mL bottles	A-3800 <sup>1</sup>
Activator Solution Pack, six 10 mL bottles, Shelf-life 8 months	A-3801 <sup>1</sup>
Low Range Comparator 0, 0.01, 0.02, 0.03, 0.04, 0.06, 0.08, 0.1 ppm	C-3801
High Range Comparator 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 1.0 ppm	C-3810
Kit comes in a plastic case and contains everything needed to perform 30 tests: Refill, Low and High Range Comparators, Neutralizer Solution, Activator Solution, 5 mL sample cup & top, and instructions.	

Range: 5-50 ppm

MDL: 5.0 ppm / Method: Silver Nitrate

	Cat#
<b>Titrets Kit, Shelf-life 18 months</b>	<b>K-3815</b>
Increments: 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.0, 9.0, 10.0, 12.5, 15.0, 17.5, 20.0, 25.0, 35.0, 50.0 ppm	
Kit comes in a cardboard box and contains everything needed to perform 30 tests: thirty ampoules with valve assemblies, Indicator Solution, titrettor, 25 mL sample cup and instructions.	

## Instrumental Kit

### Multi-Analyte Photometers

V-2000 / V-3000 Series

(See page 14 for instrumental features)

Range: 0-0.400 ppm

Method: Isonicotinic-Barbituric Acid

	Cat#
<b>Vacu-vials Kit, Shelf-life 8 months</b>	<b>K-3803</b>
Kit comes in a cardboard box and contains everything needed to perform up to 29 tests (except distilled water): thirty ampoules, Neutralizer Solution, Activator Solution, 25 mL sample cup, 3.0 mL syringe, ampoule blank and instructions.	

*Vacu-vials Kits require the use of a CHEMetrics Direct-Readout Photometer (photometers sold separately) or a spectrophotometer capable of accepting a 13 mm diameter round cell. See page 14 for details.*

### Kit Components common to Cyanide

Description	Cat#
Sample Cup Pack, 25 mL (6 ea)	A-0013
Ampoule Blank Pack (5 ea)	A-0023
Titrettor Pack (1 ea)	A-0053
Syringe Pack, 3.0 mL (6 ea)	A-0063
Sample Cup & Top Pack, 5 mL (6 ea)	A-0105

<sup>1</sup>The accessory pack supplies enough solution to perform at least 200 tests.

Instructions and MSDS(s) are posted on our website.  
If no shelf-life is listed for a product, then the shelf-life is at least 2 years.