

Summary:

Cyanide ion (CN^-), hydrogen cyanide in water ($\text{HCN}(\text{aq})$), and the cyano-complexes of zinc, copper, cadmium, mercury, nickel, silver, and iron may be determined by this method. Cyanide ions from Au(I), Co(III), Pd(II), and Ru(II) complexes are only partially determined. Cyanide is released from cyanide complexes by ultraviolet digestion. The addition of acid converts cyanide ion to hydrogen cyanide gas (HCN), which diffuses through the gas diffusion membrane into an alkaline receiving solution where it is converted back to cyanide ion. The cyanide ion is monitored amperometrically with a silver working electrode, silver/silver chloride reference electrode, and platinum/stainless steel counter electrode at an applied potential of zero volt.

Interferences:

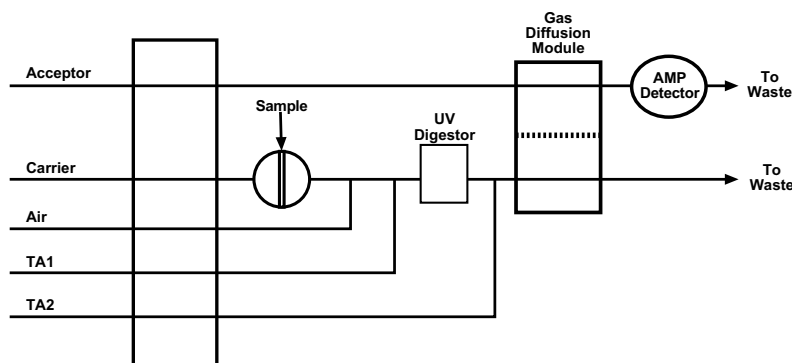
Sulfide is treated by adding lead carbonate. Water soluble aldehydes are treated with ethylenediamine solution. Oxidizing agents are removed by ascorbic acid. High concentrations of carbonate can be treated with hydrated lime. Thiocyanates are decomposed to cyanide by ultraviolet radiation.

Performance Specifications:

Range:	2.0 $\mu\text{g/L}$ –5.0 mg/L
Throughput:	30 samples/hour
Precision:	
2.0 $\mu\text{g/L}$	<2% RSD
5.0 mg/L	<0.5% RSD
Method Detection Limit (MDL):	0.2 $\mu\text{g/L}$

Chemicals:

Acetic Acid, glacial, $\text{C}_2\text{H}_4\text{O}_2$	Potassium Cyanide, KCN
Acetone, $\text{C}_3\text{H}_6\text{O}$	Silver Nitrate, AgNO_3
Ascorbic Acid, $\text{C}_6\text{H}_8\text{O}_6$	Sodium Acetate, anhydrous, $\text{C}_2\text{H}_3\text{O}_2\text{Na}$
Brij®-35, 30% w/v	Sodium Hydroxide, NaOH
(OI Analytical Part #A21-0110-33)	Total Acid 1 (TA 1) Reagent
5-[4-(Dimethylamino)benzylidene]-	(OI Analytical Part #A001505)
rhodanine, $\text{C}_{12}\text{H}_{12}\text{N}_2\text{OS}_2$	Total Acid 2 (TA 2) Reagent

Basic Flow Diagram:**Selected References:**

Methods for Chemical Analysis of Water and Wastes; EPA/600/4-79-020; U.S. Environmental Protection Agency, Office of Research and Development, Environmental Monitoring and Support Laboratory: Cincinnati, OH, 1993; Method 335.3.

Standard Methods for the Examination of Water and Wastewater, 17th ed.; American Public Health Association: Washington, D.C., 1989, 4–137.

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