

Summary:

Cyanide ion (CN^-), hydrogen cyanide in water ($\text{HCN}(\text{aq})$), and the cyano-complexes of zinc, copper, cadmium, mercury, nickel, and silver may be determined by this method. Cyanide is released from metallo-cyanide complexes by off-line addition of two ligand-exchange reagents at a $\text{pH} > 12$. The free cyanide is injected into the analyzer, and hydrochloric acid is added to convert cyanide into hydrogen cyanide gas (HCN), which passes under a gas diffusion membrane. The hydrogen cyanide gas diffuses through the 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. The current generated is proportional to the cyanide concentration present in the original sample.

Interferences:

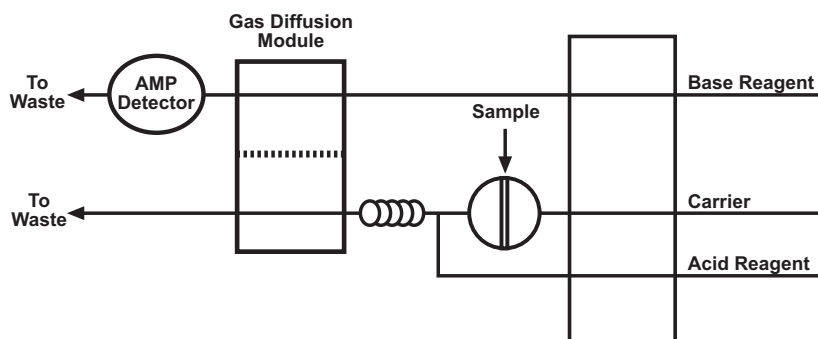
Eliminate sulfide interference by adding lead carbonate. Treat water soluble aldehydes with ethylenediamine solution. Remove oxidizing agents by adding ascorbic acid. High concentrations of carbonate can be treated with hydrated lime.

Performance Specifications:

Range:	2.0 $\mu\text{g/L}$ –5.0 mg/L CN^-
Throughput:	30 samples/hour
Precision:	
2.0 $\mu\text{g/L}$	<2% RSD
50 $\mu\text{g/L}$	<2% RSD
500 $\mu\text{g/L}$	<2% RSD
5.0 mg/L	<1% RSD
Method Detection Limit (MDL):	0.5 $\mu\text{g/L CN}^-$

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, $\text{C}_2\text{H}_3\text{O}_2\text{Na}$
5-[4-(Dimethylamino)benzylidene]- rhodanine, $\text{C}_{12}\text{H}_{12}\text{N}_2\text{OS}_2$	Sodium Hydroxide, NaOH
Ethylenediamine, $\text{C}_2\text{H}_8\text{N}_2$	WAD Reagent A (OI Analytical Part #A001416)
Hydrochloric Acid, concentrated, HCl	WAD Reagent B (OI Analytical Part #A001417)
Mercury(II) Cyanide, $\text{Hg}(\text{CN})_2$	

Basic Flow Diagram:**Note:**

This method complies with USEPA Method OIA-1677.

Selected Reference:

Milosavljev, E.B.; Solujic, L.; Hendrix, J.L. *Environmental Science and Technology* **1995**, 29 (No. 2), 426–430.