

Summary: Nitrate is reduced quantitatively to nitrite by cadmium metal. The nitrite formed, in addition to any nitrite originally present in the sample, is diazotized with sulfanilamide and subsequently coupled with *N*-(1-naphthyl)ethylenediamine dihydrochloride. The resulting highly colored azo dye is colorimetrically detected at 540 nm. Nitrite singly may be measured by performing the same analysis but without the cadmium reduction. Without the cadmium, nitrate is not reduced to nitrite and is not detected since only nitrite forms the azo dye.

Interferences: Filter turbid samples prior to analysis. EDTA is added to eliminate interferences from iron, copper, or other metals. Adjust samples to between pH 5–9 with either concentrated HCl or NH₄OH. Extract samples containing large concentrations of oil and grease with an organic solvent. Remove sulfide by precipitation with cadmium salts. Chlorine may reduce the reduction efficiency of the cadmium reactor. When necessary, dechlorinate samples with sodium thiosulfate (Na₂S₂O₃).

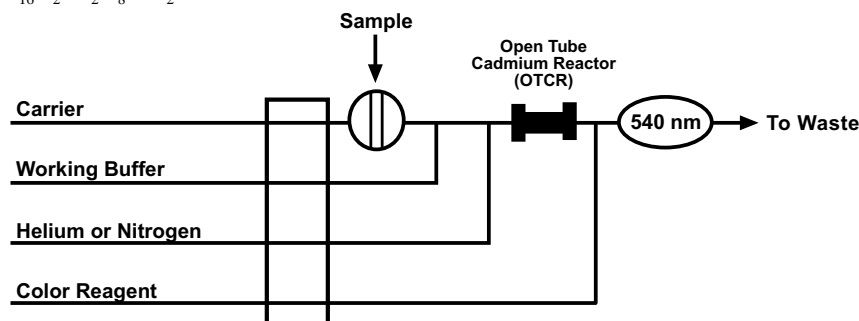
Performance Specifications:

Range:	0.10–10 mg/L
Throughput:	65 samples/hour
Precision:	
0.5 mg/L	<1% RSD
Method Detection Limit (MDL):	0.001 mg/L

Chemicals:

Ammonium Chloride, NH ₄ Cl	<i>N</i> -(1-naphthyl)ethylenediamine
Ammonium Hydroxide, NH ₄ OH	Dihydrochloride, C ₁₂ H ₁₄ N ₂ •2HCl
Brij®-35, 30% w/v	Hydrochloric Acid, concentrated, HCl
(OI Analytical Part #A21-0110-33)	Phosphoric Acid, concentrated, H ₃ PO ₄
Chloroform, CHCl ₃	Potassium Nitrate, KNO ₃
Cupric Sulfate Pentahydrate,	Potassium Nitrite, KNO ₂
CuSO ₄ •5H ₂ O	Sulfanilamide, C ₆ H ₈ N ₂ O ₂ S
Ethylenediaminetetraacetic Acid,	
Disodium Salt Dihydrate (EDTA),	
C ₁₀ H ₁₆ N ₂ Na ₂ O ₈ •2H ₂ O	

Basic Flow Diagram:



Note: This method complies with USEPA Method 353.2.

Selected References: *Methods for the Chemical Analysis of Water and Wastes*; EPA/600/R-79-020; U.S. Environmental Protection Agency, Office of Research and Development, Environmental Monitoring and Support Laboratory: Cincinnati, OH, 1984; Method 353.2.

Standard Methods for the Examination of Water and Wastewater, 20th ed.; American Public Health Association: Washington, D.C., 1998.

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