

Summary: Dissolved nitrogen compounds are converted to nitrate by persulfate oxidation and subsequent UV digestion in a caustic solution of boric acid (pH 14). Nitrate is reduced quantitatively to nitrite by a cadmium-copper reductor in the form of an open tube cadmium reactor. The nitrite formed is diazotized with sulfanilamide and subsequently coupled with *N*-(1-naphthyl)ethylenediamine dihydrochloride. This reaction takes place in an acidic solution (pH 2). The resulting highly colored azo dye is colorimetrically detected at 540 nm.

Interferences: Eliminate interference from iron, copper, and other metals by using ethylenediamine-tetraacetic acid (EDTA) in the buffer solution.

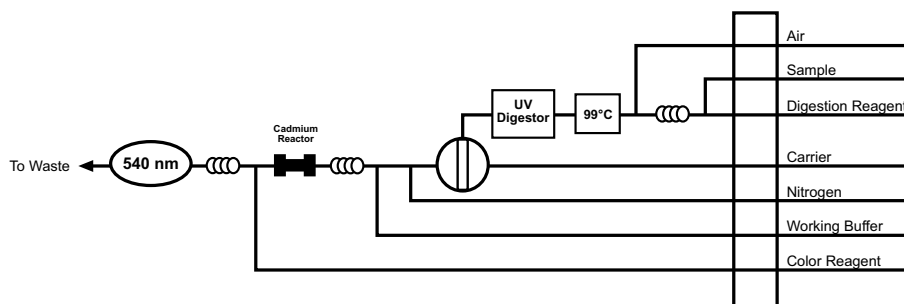
Performance Specifications:

Range:	0.10–10 mg/L
Throughput:	20 samples/hour
Precision:	
0.10 mg/L	<6% RSD
10 mg/L	<2% RSD
Method Detection Limit (MDL):	0.02 mg/L

Chemicals:

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

Basic Flow Diagram:



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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