

# Nitrate

## Methods

Nitrate is the most completely oxidized form of nitrogen. It is formed during the final stages of biological decomposition, either in wastewater treatment facilities or in natural water supplies. Low-level nitrate concentrations may be present in natural waters. However, a Maximum Contaminant Level of 10 ppm nitrate-nitrogen has been established for drinking water by the USEPA.

### The Cadmium Reduction Method

References: ASTM D 3867-09, Nitrate-Nitrite in Water, Test Method B. APHA Standard Methods, 23<sup>rd</sup> ed., Method 4500-NO<sub>3</sub><sup>-</sup> E - 2016. USEPA Methods for Chemical Analysis of Water and Wastes, Method 353.3 (1983).

Nitrate is reduced to nitrite using cadmium as the reducing agent. The resulting nitrite concentration is then determined colorimetrically. This method is applicable to drinking and surface waters, as well as domestic and industrial wastes. Nitrite will interfere with this test. Results are expressed as ppm (mg/L) NO<sub>3</sub>-N or NO<sub>3</sub>.

### The Zinc Reduction Method

References: ASTM D 3867-09, Nitrate-Nitrite in Water, Test Method B. APHA Standard Methods, 23<sup>rd</sup> ed., Method 4500-NO<sub>3</sub><sup>-</sup> E - 2016. USEPA Methods for Chemical Analysis of Water and Wastes, Method 353.3 (1983). Nelson, J.L., Kurtz, L.T., and R.H. Bray, "Rapid Determination of Nitrates and Nitrites", *Anal. Chem.*, V26, p. 1081-1082, (1954).

Nitrate is reduced to nitrite using zinc as the reducing agent. The resulting nitrate concentration is then determined colorimetrically. This method is applicable to industrial wastewaters, drinking, and surface waters. **These test kits can also be used for the analysis of seawater.** This method will measure nitrate in the presence of low levels of nitrite (**by difference**). Results are expressed as ppm (mg/L) NO<sub>3</sub>-N.

## Visual Kits

### Range: 0-3.4 ppm as N

MDL: 0.3 ppm / Method: Zinc Reduction

CHEMets Kit	Cat#
CHEMets Refill, 30 ampoules and 30 zinc foil packs, Shelf life 12 months	R-6905
Acidifier Solution Pack, six 20 mL bottles	A-6901 <sup>1</sup>
Comparator, Shelf life 12 months 0, 0.3, 0.6, 0.9, 1.3, 1.7, 2.2, 2.8, 3.4 ppm	C-6906

Kit comes in a plastic case and contains everything needed to perform 30 tests: Refill, Comparator, Acidifier Solution, reaction tube and cap, 25 mL sample cup and instructions.

### Range: 0-4.5 ppm as N

MDL: 0.4 ppm / Method: Cadmium Reduction

CHEMets Kit	Cat#
CHEMets Refill, 30 ampoules and 30 cadmium foil packs, Shelf life 12 months	R-6902
Comparator, Shelf life 12 months 0, 0.4, 0.7, 1.0, 1.4, 1.8, 2.5, 3.5, 4.5 ppm	C-6904

Kit comes in a plastic case and contains everything needed to perform 30 tests: Refill, Comparator, 25 mL sample cup, reaction tube with cap and instructions.

### Range: 0-45 ppm as N

MDL: 4 ppm / Method: Cadmium Reduction

CHEMets Kit	Cat#
CHEMets Refill, 30 ampoules and 30 cadmium foil packs, Shelf life 12 months	R-6904
Comparator, Shelf life 12 months 0, 4, 7, 10, 14, 18, 25, 35, 45 ppm	C-6909D

Kit comes in a plastic case and contains everything needed to perform 30 tests (except distilled water): Refill, Comparator, 25 mL sample cup, 3.0 mL syringe, reaction tube with cap and instructions.

### Range: 0-225 ppm as N

MDL: 20 ppm / Method: Cadmium Reduction

CHEMets Kit	Cat#
CHEMets Refill, 30 ampoules and 30 cadmium foil packs, Shelf life 12 months	R-6904
Comparator, Shelf life 12 months 0, 20, 35, 50, 70, 90, 125, 175, 225 ppm	C-6909A

Kit comes in a plastic case and contains everything needed to perform 30 tests (except distilled water): Refill, Comparator, 25 mL sample cup, 1.0 mL syringe, reaction tube with cap and instructions.

MiniPet® is a registered trademark of Tricontinent Scientific, Inc.

 **WARNING!** The product employing the Zinc Reduction method can expose you to chemicals including ethylene glycol, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

 **WARNING!** The products employing the Cadmium Reduction method can expose you to chemicals including cadmium, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

**Range: 0-675 ppm as N**  
MDL: 60 ppm / Method: Cadmium Reduction

	Cat#
<b>CHEMets Kit</b>	<b>K-6909B</b>
CHEMets Refill, 30 ampoules, 30 cadmium foil packs, and 30 pipette tips, Shelf life 12 months	R-6909
Comparator, Shelf life 12 months 0, 60, 105, 150, 210, 270, 375, 525, 675 ppm	C-6909B

Kit comes in a plastic case and contains everything needed to perform 30 tests (except distilled water): Refill, Comparator, 25 mL sample cup, 100  $\mu$ L MiniPet<sup>®</sup>, reaction tube with cap and instructions.

**Range: 0-2700 ppm as N**  
MDL: 240 ppm / Method: Cadmium Reduction

	Cat#
<b>CHEMets Kit</b>	<b>K-6909C</b>
CHEMets Refill, 30 ampoules, 30 cadmium foil packs, and 30 pipette tips, Shelf life 12 months	R-6909
Comparator, Shelf life 12 months 0, 240, 420, 600, 840, 1080, 1500, 2100, 2700 ppm	C-6909C

Kit comes in a plastic case and contains everything needed to perform 30 tests (except distilled water): Refill, Comparator, 25 mL sample cup, 25  $\mu$ L MiniPet<sup>®</sup>, reaction tube with cap and instructions.

## Instrumental Kits

**Multi-Analyte Photometers**  
V-2000 / V-3000  
(See page 14 for instrumental features)

**Range: 0-1.50 ppm as N**  
Method: Zinc Reduction

	Cat#
<b>Vacu-vials Kit</b> , Shelf life 12 months	<b>K-6913</b>

Kit comes in a cardboard box and contains everything needed to perform 30 tests: thirty ampoules, thirty zinc foil packs, Acidifier Solution, reaction tube and cap, 25 mL sample cup, ampoule blank and instructions.

**Range: 0-1.50 ppm as N**  
Method: Cadmium Reduction

	Cat#
<b>Vacu-vials Kit</b> , Shelf life 12 months	<b>K-6903</b>

Kit comes in a cardboard box and contains everything needed to perform 30 tests: thirty ampoules, thirty cadmium foil packs, 25 mL sample cup, reaction tube with lid, ampoule blank and instructions.

**Range: 0-7.50 ppm as N**  
Method: Cadmium Reduction

	Cat#
<b>Vacu-vials Kit</b> , Shelf life 12 months	<b>K-6923</b>

Kit comes in a cardboard box and contains everything needed to perform 30 tests: thirty ampoules, thirty cadmium foil packs, 3 mL syringe, 25 mL sample cup, reaction tube with lid, 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.*

**Range: 0-50.0 ppm as NO<sub>3</sub>**  
Method: Cadmium Reduction

	Cat#
<b>Vacu-vials Kit</b> , Shelf life 12 months	<b>K-6933</b>

Kit comes in a cardboard box and contains everything needed to perform 30 tests (except distilled water): thirty ampoules, thirty cadmium foil packs, 25 mL sample cup, 3.0 mL syringe, reaction tube with lid, ampoule blank, and instructions.

## Components and Accessories

Description	Cat#
Sample Cup Pack, 25 mL (6 ea)	A-0013
Ampoule Blank Pack (5 ea)	A-0023
*Sample Zeroing Accessory Pack	A-0025
Syringe Pack, 1.0 mL (6 ea)	A-0027
Syringe Pack, 3.0 mL (6 ea)	A-0063
MiniPet <sup>®</sup> , 100 $\mu$ L (1 ea)	A-0170
Pipette Tips Pack (30 ea)	A-0171
Reaction Tube Pack, (6 ea)	A-0187
MiniPet <sup>®</sup> , 25 $\mu$ L (1 ea)	A-0191

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

\*For use when testing colored or turbid samples. See page 13 for details.

Instructions and SDSs are posted on our website.

*If no shelf life is listed for a product, then the shelf life is at least 1 year.*



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