

Silica - Heteropoly Blue Method

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Applications and Industries

Boiler water, cooling water, natural waters, wastewater, high purity water

Not recommended for seawater

References

APHA Standard Methods, 22nd ed., Method 4500-SiO₂ D - 1997

USEPA Methods for Chemical Analysis of Water and Wastes, Method 370.1 (1983)

ASTM D859-05, Silica in Water

Chemistry

Silica reacts with ammonium molybdate under acidic conditions to produce yellow molybdosilicic acid, which is reduced by aminonaphtholsulfonic acid to form heteropoly blue. The resulting blue color is directly proportional to the silica concentration of the sample. Results are expressed as ppm (mg/L) SiO₂. To convert test results to ppm Si, multiply by 0.467.

Available Analysis Systems

Visual colorimetric: CHEMetrics® and ULR CHEMetrics®

Instrumental colorimetric: Vacu-vials®

Accuracy Statement

CHEMetrics and ULR CHEMetrics kits:

± 1 color standard increment

Vacu-vials kit:

With spectrophotometers:

< 0.07 ppm at 0 ppm
± 0.08 ppm at 0.25 ppm
± 0.20 ppm at 1.00 ppm
± 0.30 ppm at 3.00 ppm

With V-2000 and V-3000 photometers:

≤ 0.25 ppm at 0 ppm (V-2000)
< 0.13 ppm at 0 ppm (V-3000)
± 0.15 ppm at 0.50 ppm
± 0.60 ppm at 3.00 ppm
± 0.75 ppm at 7.50 ppm

Storage Requirements

Products should be stored in the dark and at room temperature. The CHEMetrics refill (R-9010) can be refrigerated to extend the shelf life.

Interference Information

This chemistry measures “molybdate reactive silica” which includes dissolved simple silicates, monomeric silica, silicic acid, and an undetermined fraction of polymeric silica.

Citric acid has been added to the reagent to eliminate interference from up to 60 ppm phosphate.

Color development is affected by high salt concentrations. With seawater, the color intensity may be increased by approximately 10-15%.

Sample temperatures should be at or near 20°C. Low sample temperatures may cause false low results.

Strong oxidizing agents may interfere in the reduction step, preventing the blue color formation.

Sulfide and high concentrations of iron may interfere.

Glassware may contribute silica.

Ethylene and propylene glycol do not interfere at concentrations up to at least 1%.

To minimize interferences from sample color or turbidity, instrumental test results can be adjusted for a “chemical zero” which is prepared by omitting the addition of ammonium molybdate (A-9001 Activator Solution) to the sample during the test procedure.

Shelf Life

When stored in the dark and at room temperature:

Visual colorimetric:

CHEMetrics refill (R-9010): 11 months*

*This shelf life can be extended by 18 months if the refill is refrigerated when not in use.

ULR CHEMetrics refill (R-9011): at least 1 year

Color comparators: at least 1 year

Activator and Neutralizer Solutions: at least 1 year

Instrumental colorimetric:

Vacu-vials kit: at least 1 year

Safety Information

Safety Data Sheets (SDS) are available upon request and at www.chemetrics.com. Read SDS before using these products. Breaking the tip of an ampoule in air rather than water may cause the glass ampoule to shatter. Wear safety glasses and protective gloves.