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Water quality — Determination of chromium(VI) — Spectrometric method using 1,5-diphenylcarbazide

*Qualité de l'eau — Dosage du chrome(VI) — Méthode par spectrométrie
d'absorption moléculaire avec la 1,5-diphénylcarbazide*



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Foreword

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International Organization for Standardization
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Water quality — Determination of chromium(VI) — Spectrometric method using 1,5-diphenylcarbazide

1 Scope

This International Standard specifies a spectrometric method for determination of chromium(VI) in water. The method is applicable to the determination of dissolved chromium(VI) in waters in the concentration range of 0,05 mg/l to 3 mg/l. The application range may be extended by dilution of the sample.

2 Principle

After sample pretreatment (which aims at stabilizing the valency states of chromium(VI) and chromium(III), if present) chromium(VI) reacts with 1,5-diphenylcarbazide to form a red-violet chromium-1,5-diphenylcarbazone complex. The absorbance of this complex is then measured at a wavelength between 540 nm and 550 nm, the exact wavelength being given in the test report.

3 Reagents

Use only reagents of recognized analytical grade and only distilled water or water of equivalent purity.

Commercially available reagents with guaranteed concentrations may also be used.

3.1 Phosphate buffer solution, pH = 9,0 ± 0,2.

Dissolve 456 g of dipotassium hydrogen phosphate ($K_2HPO_4 \cdot 3H_2O$) in 1 000 ml of water. Check the pH and adjust if necessary.

3.2 Sodium hydroxide solution.

Dissolve 20 g of sodium hydroxide (NaOH) in 100 ml of water.

3.3 Phosphoric acid solution A.

Dilute 10 ml of phosphoric acid (H_3PO_4 , $\rho = 1,71$ g/ml) to 100 ml with water.

3.4 Phosphoric acid solution B.

Dilute 700 ml of phosphoric acid (H_3PO_4 , $\rho = 1,71$ g/ml) to 1 000 ml with water.

3.5 Aluminium sulfate solution.

Dissolve 247 g of aluminium sulfate [$Al_2(SO_4)_3 \cdot 18H_2O$] in 1 000 ml of water.

3.6 Sulfite solution.

Dissolve 11,8 g of sodium sulfite (Na_2SO_3) in water and dilute to 100 ml.

This solution is stable for about a week.

3.7 Sulfite test paper.

3.8 1,5-diphenylcarbazide solution.

Dissolve 1 g of 1,5-diphenylcarbazide ($C_{13}H_{14}N_4O$) in 100 ml of propanone (acetone), C_3H_6O , and acidify with one drop of glacial acetic acid.

Stored in a brown glass bottle in a refrigerator at 4 °C, this solution is stable for two weeks. Discard the solution if it becomes discoloured.