

Summary:

Samples are mixed with a methyl orange indicator solution that is weakly buffered at pH 3.1. Alkalinity from carbonates, bicarbonates, and hydroxides causes the color of the indicator solution to change from red to yellow. The absorbance is measured at 550 nm, which is the wavelength of the maximum absorbance of the indicator. Since this method uses an inverse chemistry, a decrease in absorbance at this wavelength is used to measure alkalinity. This decrease is directly proportional to the alkalinity of the sample.

Interferences:

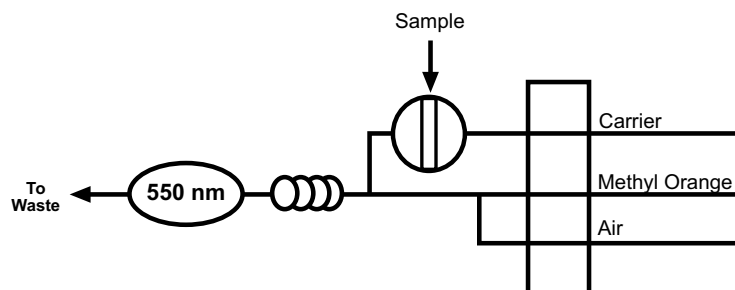
Alkalinity of samples with pH values less than 3.1 cannot be determined by this method. Residual chlorine bleaches the indicator solution and interferes with the assay. Treat samples containing chlorine with sodium thiosulfate. Color or background absorbance at 550 nm may interfere with the assay. Filter samples prior to analysis to remove turbidity. If samples are filtered, this method is not approved for NPDES (National Pollutant Discharge Elimination System) monitoring. Temperature variances in the laboratory will cause baseline noise and drift.

Performance Specifications:

Range:	10–500 mg/L as calcium carbonate (CaCO ₃)	
Throughput:	80 samples/hour	
Precision:	<u>10–200 mg/L</u>	<u>25–500 mg/L</u>
10 mg/L	<6% RSD	—
25 mg/L	—	<6% RSD
100 mg/L	<3% RSD	<3% RSD
200 mg/L	<2% RSD	<2% RSD
500 mg/L	—	<2% RSD
Method Detection Limit (MDL):	2.1 mg/L as CaCO ₃	3 mg/L as CaCO ₃

Chemicals:

DOWFAX® 2A1 (OI Analytical Part #A000080)	Potassium Acid Phthalate, C ₈ H ₅ O ₄ K
Hydrochloric Acid, concentrated, HCl	Sodium Carbonate, anhydrous, Na ₂ CO ₃
Methyl Orange, C ₁₄ H ₁₄ N ₃ O ₃ Na	Sodium Thiosulfate, Na ₂ S ₂ O ₃

Basic Flow Diagram:**Note:**

This method complies with USEPA Method 310.2.

Selected References:

Methods for Chemical Analysis of Water and Wastewater; EPA-600/4-79-020; U.S. Environmental Protection Agency, Office of Research and Development, Environmental Monitoring and Support Laboratory: Cincinnati, OH, 1984; Method 310.2.

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

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