

# **ChemScan<sup>®</sup>**

## **PROCESS ANALYZERS**

©2002, Applied Spectrometry Associates, Inc.

www.chemscan.com

Rev. 9/02

### **ChemScan<sup>®</sup> Method Summary #85 Hardness in Water**

#### Standard Analysis

The standard method for hardness analysis requires the addition of EDTA and dye (Calmagite or Eriochrome Black T) at a fixed pH ( $10.0 \pm 0.1$ ) to an aqueous solution. The dye forms a complex with calcium and magnesium, yielding a red color. The EDTA is added as a titrant, causing the solution to change from red to blue and marking the end point of the titration, which is proportionate to the calcium and magnesium content of the sample.

The standard procedure requires careful control of solution pH and some form of automatic titration with colorimetric detection. This method is difficult to automate and not reliable for very low hardness determinations.

#### ChemScan Analytical Method

The ChemScan method is an improvement of the standard method. The EDTA titration is eliminated and precise pH control is not required as long as sample pH is 12 or more.

The ChemScan Process Analyzer detects the intensity of the reaction between Calmagite indicator and hardness anions (calcium plus magnesium) at multiple wavelengths following addition of a pH buffer. It is reliable at low concentration (0.1 - 4.0 ppm hardness). Results are shown in ppm CaCO<sub>3</sub> units.

#### Monitoring System Requirements

Principal applications are in cooling or boiler water and low hardness process water.