METHOD #: 212.3 Approved for NPDES (Issued 1974)

**TITLE:** Boron (Colorimetric, Curcumin)

**ANALYTE:** CAS # B Boron 7440-42-8

**INSTRUMENTATION:** Spectrophotometer

STORET No. Total 01022

Dissolved 01020 Suspended 01021

### 1.0 Scope and Application

- 1.1 This colorimetric method finds maximum utility for waters whose boron content is below 1 mg/L.
- 1.2 The optimum range of the method on undiluted or unconcentrated samples is 0.1-1.0 mg/L of boron.
- 1.3 This method is applicable to drinking, and surface waters, domestic and industrial wastes.

## 2.0 Summary of Method

2.1 When a sample of water containing boron is acidified and evaporated in the presence of curcumin, a red-colored product called rosocyanine is formed. The rosocyanine is taken up in a suitable solvent, and the red color is compared with standards photometrically.

#### 3.0 Comments

- 3.1 Nitrate nitrogen concentrations above 20 mg/L interfere.
- 3.2 Significantly high results are possible when the total of calcium and magnesium hardness exceeds 100 mg/L as CaC0<sub>3</sub>. Passing the sample through a cation exchange resin eliminates this problem.
- 3.3 Close control of such variables as volumes and concentrations of reagents, as well as time and temperature of drying, must be exercised for maximum accuracy.
- 3.4 Data to be entered into STORET must be reported as µg/L.

#### 4.0 Precision and Accuracy

4.1 A synthetic sample prepared by the Analytical Reference Service, PHS, containing 240  $\mu$ g/L B, 40  $\mu$ g/L As, 250  $\mu$ g/L Be, 20  $\mu$ g/L Se, and 6  $\mu$ g/L V in distilled water, was analyzed by the curcumin method with a relative standard deviation of 22.8% and a relative error of 0% in 30 laboratories.

# 5.0 Reference

5.1 The procedure to be used for this determination is found in: Standard Methods for the Examination of Water and Wastewater, 14th Edition, p 287, Method 405A (1975).