

## MT 73.1 Total Hardness of Water

### SCOPE

The method is suitable to determining the total hardness of water.  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  are expressed as their contribution to the total hardness in terms of calcium carbonate and not as their individual ionic contributions.

### OUTLINE OF METHOD

The total hardness of water is determined by titration of alkaline earth ions in water with chelating agent using colorimetric end point determination. Commercially available reagents are used.

### APPARATUS

*Conical flask* 250 ml

*Pipette* 100 ml

*Burette* 50 ml

### REAGENTS

*\*Indicator buffer tablet for the determination of water hardness with Titriplex or Idranal solutions*

*Ammonia solution 25%*

*\*Titriplex B or Idranal B (EDTA chelating agent solution, Note 1)*

### PROCEDURE

Pipette 100 ml of water sample into the conical flask. Solve the indicator buffer tablet and add 2 ml of ammonia solution 25%. Titrate with EDTA chelating agent solution from red to a distinct green end point ( $t$  ml).

$$\text{Hardness as calcium carbonate} = t \times 17.85 \text{ ppm}$$

*Note 1* If using *Titriplex A* or *Idranal A* solution as alternative, multiply the result by a factor of 5.6.

\* Titriplex® registered trademark of Merck, Idranal® registered trademark of Sigma-Aldrich.