

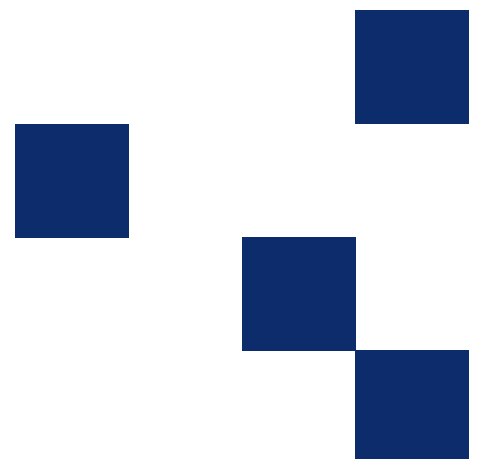


Transport
Roads & Maritime
Services

Test method T1001

Total hardness of water

NOVEMBER 2012



Revision Summary

Ed/Rev Number	Clause Number	Description of Revision	Authorisation	Date
		Reformatted and Revision Summary Added	D.Dash	June 2001
Ed 2/ Rev 0	All	Reformatted RMS template	J Friedrich	November 2012

Note that Roads and Maritime Services is hereafter referred to as 'RMS'.

The most recent revision to Test method T1001 (other than minor editorial changes) are indicated by a vertical line in the margin as shown here.

Test method T1001

Total hardness of water

1. Scope

This method sets out the procedure for the determination of the hardness of water by the EDTA method. The method is derived from the British Drug Houses Ltd. Publication 'Analytical Applications of Diaminoethane-tetra-acetic acid'.

2. Reagents

- (a) Buffer Solution. Add 67.5 g of ammonium chloride to 570 mL of concentrated ammonia ($d = 0.880$) and dilute to 950 mL with distilled water. Dissolve 0.616 g of magnesium sulphate ($MgSO_4 \cdot 7H_2O$) and 0.93 g of disodium EDTA in 50 mL of distilled water and add this solution to the ammonia – ammonium chloride mixture.

The inclusion of 2 mL of this solution in 100 mL of water is equivalent to the addition of 5 parts per million of magnesium in terms of calcium carbonate and its equivalent of EDTA.

- (b) Indicator solution. Dissolve 0.5 g of solochrome black T (eriochrome black T) and 4.5 g of hydroxylamine hydrochloride in 100 mL of alcohol.
- (c) EDTA Solution. (0.01M). Dissolve 3.72 g of disodium dihydrogen ethylene diamine tetra acetate dehydrate in distilled water and dilute to 1 litre. Standardise this solution against a known mass of $CaCO_3$ dissolved in a minimum amount of HCl.

3. Apparatus

Laboratory glassware including burette, pipettes, flasks etc.

4. Procedure

- (a) If the water contains an appreciable amount of suspended matter filter to clear.
- (b) Place 100 mL of the water sample in a conical flask and add 2 mL of buffer solution together with 6 drops of indicator solution.
- (c) Titrate with the 0.01M EDTA solution until all traces of red colour disappears. The final colour is usually a true blue, but with some waters a neutral grey end point is obtained.
- (d) When the total hardness exceeds 250 ppm, use a 50 mL portion for titration.

5. Calculation and Reporting

$$\text{Total Hardness} = \frac{\text{Titration in mL} \times 1000}{\text{Volume of sample in mL}} \text{ ppm}$$

In terms of $CaCO_3$