

total Hardness

**Test kit for performing titrimetric tests
on total hardness in surface water and sewage**

Method:

Complexometric titration

Magnesium and calcium ions, which cause hardness, are combined by the complexing agent EDTA to form chelates. The test is carried out by titration using a metal indicator which changes colour when all of the hardness-producing substances have combined.

Contents:

sufficient for 110 tests at an average hardness of 10 °d

8 mL GH-1	
2 x 30 mL GH-2	
1	specimen jar with ringed markings
1	plastic syringe 5 mL
1	instructions for use

Hazard warning:

This test does not contain any harmful substances which must be specially labelled as hazardous.

Instructions for use:

1. Pour a **5 mL water sample** into the specimen jar using the plastic syringe.
2. Add **2 drops of GH-1** and shake the jar to mix the contents. The water sample turns **red**. If the water sample turns green, this means that there are no hardness-producing substances.
3. Hold the dropping bottle **GH-2** absolutely vertical and add GH-2 drop by drop, shaking the specimen at the same time to mix until it turns **green**. Count the number of drops. One drop corresponds to one degree of total water hardness (°d).
4. After use, rinse out the specimen jar thoroughly.
5. Seal the dropping bottles immediately after use. Do not touch the dropping pipettes.

This method can be applied also for the analysis of sea water after dilution (1:30).

Disposing of the samples:

The used analysis specimens can be flushed down the drain with tap water and channelled off to the local sewage treatment works.

Interferences:

Copper(II) ions may delay the indicator change or even block this change if higher levels are present. Therefore, in the case of copper pipes, let the water run for a sufficient amount of time before taking the sample.

Conversion table:

°d	°e	°f	mg/L CaO	mg/L CaCO ₃	mmol/L
1	1.3	1.8	10	18	0.18
2	2.5	3.6	20	36	0.36
3	3.8	5.4	30	54	0.54
4	5.0	7.1	40	71	0.71
5	6.3	8.9	50	89	0.89
6	7.5	10.7	60	107	1.07
7	8.8	12.5	70	125	1.25
8	10.0	14.3	80	143	1.43
9	11.3	16.1	90	161	1.61
10	12.5	17.8	100	178	1.78

Notes:

For the determination of total hardness in the presence of copper ions, please contact MACHEREY-NAGEL for special working instructions.

The test kits *VISOCOLOR® ECO* Total Hardness and *VISOCOLOR® ECO* Calcium (REF 931 012) can be used also for the determination of magnesium:

[total hardness in mmol/L – calcium hardness in mmol/L] x 24.3 = mg/L Mg²⁺

Storage:

Store the test kit in a cool (< 25 °C) and dry place.