

Alkalinity (P, M, OH)

56I700130

50 - 2400 mg/L CaCO₃

Material

Reagents	Packaging Unit	Part Number
Alkalinity 4.5 Indicator TA4	65 mL	56L013865
Alkalinity LR Titrant TA3	65 mL	56L013965
Alkalinity HR Titrant PA2/TA2	65 mL	56L013665
Acidity / Alkalinity P Indicator PA1	65 mL	56L013565
Alkalinity OH Reagent PA3	65 mL	56L013765

The following accessories are required.

Accessories	Packaging Unit	Part Number
Syringe, plastic, 20 mL	1 Pieces	56A006501
Titration jar with cap, plastic, 60 mL	1 Pieces	56A006701

Application List

- Cooling Water
- Boiler Water
- Others

Preparation

Alkalinity Relationships:

The separate contributions to alkalinity from free caustic, carbonate and bicarbonate can be estimated using the P & M alkalinity relationship in the table below.

If	OH	CO ₃	HCO ₃
P = 0	0	0	M
P < M/2	0	2P	M-2P
P = M/2	0	2P	0
P > M/2	2P-M	2(M-P)	0
P = M	M	0	0

Remarks

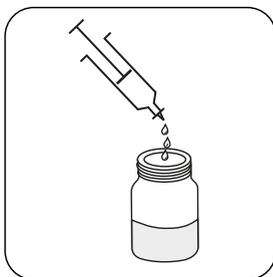
1. Alkalinity P: The P refers to phenolphthalein the indicator originally used for titrating P Alkalinity. The colour change occurs at pH 8.3. Less hazardous alternatives are now used.
2. Alkalinity M: The M refers to methyl orange, the indicator originally used for titrating Total Alkalinity. Nowadays 4.5 indicator is used but old M terminology has remained.
3. Alkalinity OH: Barium chloride precipitates with carbonate ions to produce a white precipitate in the test. the remaining alkalinity present in the same sample attributed to the presence of hydroxide ions (OH).

Sampling

Select the sample volume from the table according to the expected measuring range and read off the factor to calculate the result.

Expected Range	Titrant used	Sample Size	Factor
50-150 mg/L	Alkalinity LR Titrant TA3	40 mL	5
100-300 mg/L	Alkalinity LR Titrant TA3	20 mL	10
200-600 mg/L	Alkalinity LR Titrant TA3	10 mL	20
200-600 mg/L	Alkalinity HR Titrant PA2TA2	40 mL	20
400-1200 mg/L	Alkalinity HR Titrant PA2TA2	20 mL	40
800-2400 mg/L	Alkalinity HR Titrant PA2TA2	10 mL	80

Determination of Alkalinity-P



Attention! Select the appropriate sample volume according to the instructions in the chapter Sampling.



Add drops of **Acidity / Alkalinity P Indicator PA1** to give a **pink** colour. Note: If sample remains colourless, report the P Alkalinity as zero.



Attention! Record the number of drops that will be added.

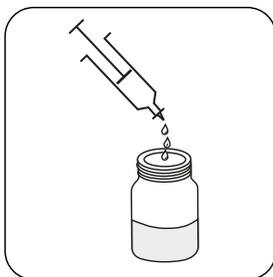
Note: Make sure to swirl the jar after adding each drop!



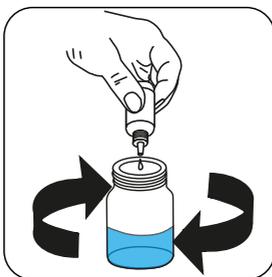
Add **Alkalinity LR Titrant TA3** or **Alkalinity HR Titrant PA2/TA2** drop by drop to the sample until discolouration turns from **pink to colourless**.

Calculate test result: P Alkalinity (as CaCO₃) mg/L = Number of drops x factor (see table)

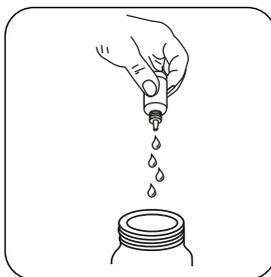
Determination of Alkalinity-M



Attention! Select the appropriate sample volume according to the instructions in the chapter Sampling.



Add drops of **Alkalinity 4.5 Indicator TA4** to give a **pure blue** colour.



Attention! Record the number of drops that will be added.

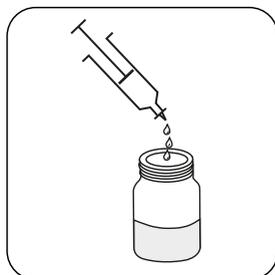
Note: Make sure to swirl the jar after adding each drop!



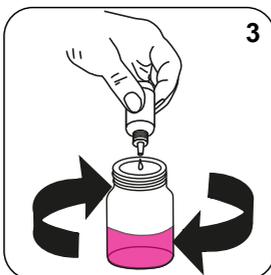
Add **Alkalinity LR Titrant TA3** or **Alkalinity HR Titrant PA2/TA2** drop by drop to the sample until colouration turns from **blue** to **orange/yellow**.

Calculate test result: Total Alkalinity (as CaCO_3) mg/L = Number of drops x factor (see table)

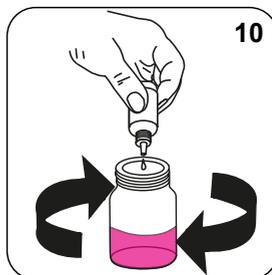
Determination of Alkalinity-OH



Attention! Select the appropriate sample volume according to the instructions in the chapter Sampling.



Add 3 drops of **Acidity / Alkalinity P Indicator PA1** to give a pink colour.



Add 10 drops **Alkalinity OH Reagent**. Note: If sample remains colourless, report the P Alkalinity as zero.



Attention! Record the number of drops that will be added.

Note: Make sure to swirl the jar after adding each drop!



Add **Alkalinity LR Titrant TA3 or Alkalinity HR Titrant PA2/TA2** drop by drop to the sample until discolouration turns from pink to colourless.

Calculate test result: OH Alkalinity (as CaCO_3) mg/L = Number of drops x factor (see table)