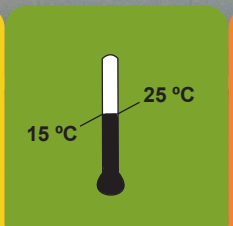
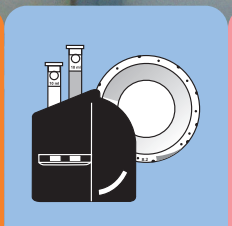
Lovibond® Water Testing

Tintometer® Group

Closed System Engineers Test Kit

56I701600





Closed System Engineers Test Kit

Cooling Water Monitoring

The Closed Water Test Kit is designed for use on all types of Closed Water Systems such as Chilled Water Circuits and Heating Systems. The kit should be used to monitor water conditions to ensure that the systems are under control and do not exhibit signs of corrosion, scaling or microbiological fouling.

Note:

1. Further instructions can be found with the corresponding product.

Alkalinity M 56I700120

50 - 2400 mg/L $CaCO_3$

EN

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

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

Remarks

1. The M refers to methyl orange, the indicator originally used for titrating Total Alkalinity.
2. Nowadays 4.5 indicator is used but the old M terminology has remained.

Alkalinity Relationship

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

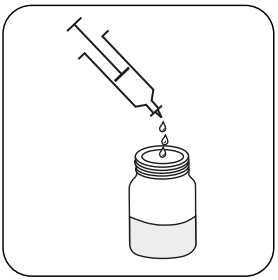
If	OH	CO_3	HCO_3
P = 0	0	0	M
P < M/2	0	2P	M - 2P
P = M/2	0	2P	0
P > M/2	2P - M	2 (M - P)	0
P = M	M	0	0

Sampling

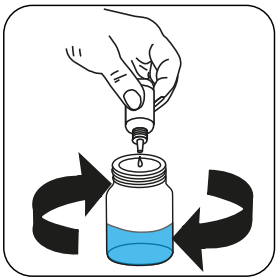
Select the sample volume from the table according to the expected measuring range and read off the factor to calculate the result.

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 PA2/TA2	40 mL	20
400-1200 mg/L	Alkalinity HR Titrant PA2/TA2	20 mL	40
800-2400 mg/L	Alkalinity HR Titrant PA2/TA2	10 mL	80

EN



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 drops of **Alkalinity LR Titrant TA3 or Alkalinity HR Titrant PA2/TA2** to give a **orange/ yellow** colour.

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

Chloride 56I700190

20 - 12000 mg/L Cl^-

EN

Material

Reagents	Packaging Unit	Part Number
Chloride LR Titrant CC2	65 mL	56L014265
Chloride HR Titrant BC2	65 mL	56L014165
Chloride Indicator BC1/CC1	65 mL	56L714065

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
Syringe, plastic, 5 mL	1 Pieces	56A008501

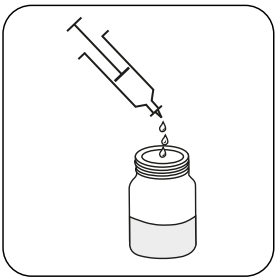
Remarks

1. Alkaline samples such as boiler water will require neutralisation prior to testing.
2. Colours may vary depending on sample and test conditions.
3. Dilute samples of less than 10 mL to approximately 10-20 mL with distilled or deionised (chloride free) water.

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
20-75 mg/L	Chloride LR Titrant CC2	40 mL	2.5
50-150 mg/L	Chloride LR Titrant CC2	20 mL	5
100-400 mg/L	Chloride LR Titrant CC2	10 mL	10
100-400 mg/L	Chloride HR Titrant BC2	40 mL	10
200-600 mg/L	Chloride HR Titrant BC2	20 mL	20
400-1000 mg/L	Chloride HR Titrant BC2	10 mL	40
800-3000 mg/L	Chloride HR Titrant BC2	5 mL [3]	80
2000-6000 mg/L	Chloride HR Titrant BC2	2 mL [3]	200
4000-12000 mg/L	Chloride HR Titrant BC2	1 mL [3]	400



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

Add **10** drops of **Chloride Indicator BC1/CC 1 (Potassium Chromate)** to give a **yellow** colour.

Attention! Record the number of drops that will be added.
Note: Make sure to swirl the jar after adding each drop!

Add **Chloride LR Titrant CC2 or Chloride HR Titrant BC2** drop by drop to the sample until colouration turns from **yellow** to **orange/brown** .

Calculate test result: Chloride (as Cl^-) mg/L = Number of drops x factor (see table)

Hardness, total 56I700280

5 - 600 mg/L $CaCO_3$

EN

Material

Reagents	Packaging Unit	Part Number
Hardness Total Buffer TH2	65 mL	56L016065
Hardness Total Indicator TH1P	Powder / 40 g	56P028340
Hardness LR Titrant TH3	65 mL	56L016265
Hardness HR Titrant TH4	65 mL	56L014565

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

Remarks

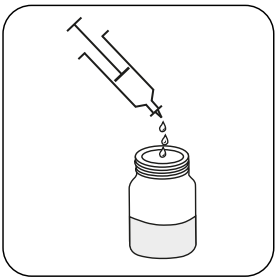
1. Colours may vary depending on sample and test conditions.
2. More than 1 ppm copper in the sample will prevent the pure blue endpoint from occurring.
3. To remove copper interference, add 1 drop of Iron Reagent FE6 before the addition of Hardness Total Buffer TH2. Iron Reagent FE6 is not supplied as standard in the hardness test pack, but can be purchased separately. (56L006365)

Sampling

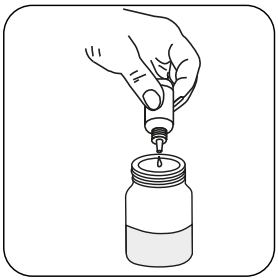
Select the sample volume from the table according to the expected measuring range and read off the factor to calculate the result.

Expected Range	Titrant used	Sample Size	Factor
5-15 mg/L $CaCO_3$	Hardness LR Titrant TH3	40 mL	0.5
10-30 mg/L $CaCO_3$	Hardness LR Titrant TH3	20 mL	1
20-60 mg/L $CaCO_3$	Hardness LR Titrant TH3	10 mL	2
50-150 mg/L $CaCO_3$	Hardness HR Titrant TH4	40 mL	5
100-300 mg/L $CaCO_3$	Hardness HR Titrant TH4	20 mL	10
200-600 mg/L $CaCO_3$	Hardness HR Titrant TH4	10 mL	20

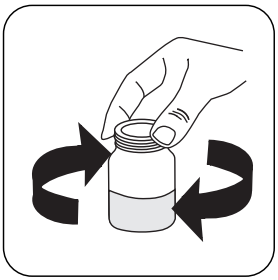
EN



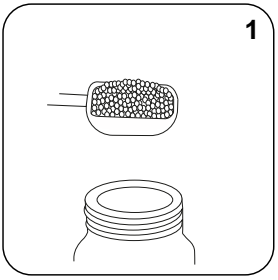
Attention!Select the appropriate sample volume according to the instructions in the chapter Sampling.



Add **4** drops of **Hardness Total Buffer TH2** per **10 mL** of sample.



Swirl to mix.

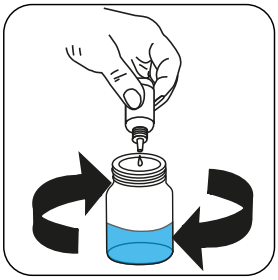


Add **1 measuring scoop(s) Hardness Total Indicator TH1P** .

Swirl to mix.

The sample will turn **wine red** .

Attention! Record the number of drops that will be added.
Note: Make sure to swirl the jar after adding each drop!



Add **Hardness LR Titrant TH3 or Hardness HR Titrant TH4** drop by drop to the sample until colouration turns from **wine red** to **blue**.

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

Nitrite 56I700300

10 - 2000 mg/L $NaNO_2$

EN

Material

Reagents	Packaging Unit	Part Number
Nitrite Indicator N1	65 mL	56L017165
Nitrite Titrant N2	65 mL	56L017265

The following accessories are required.

Accessories	Packaging Unit	Part Number
Syringe, plastic, 20 mL	1 Pieces	56A006501
Test Tube 5/10 mL + Cap	1 Pieces	56A600401
Titration jar with cap, plastic, 60 mL	1 Pieces	56A006701
Plastic syringe, 1 ml	1 Pieces	56A013501

Remarks

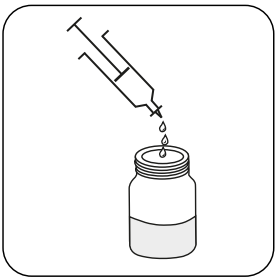
1. Colours may vary depending on sample and test conditions.
2. This test can be used to determine the nitrite reserve in cooling systems. Note that other reducing agents such as sulphite and ascorbic acid will increase the observed result.
3. Results from this test are expressed as sodium nitrite ($NaNO_2$). To convert from mg/L as sodium nitrite to mg/L as nitrite (NO_2), multiply the result obtained by 0.67.

Sampling

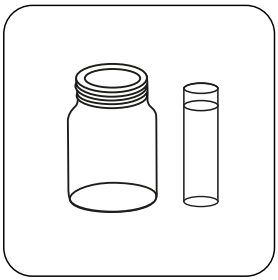
Select the sample volume from the table according to the expected measuring range and read off the factor to calculate the result.

Expected Range	Titrant used	Sample Size	Factor
10-40 mg/L	5 drops of Nitrite Indicator N1	40 mL	1.25
25-100 mg/L	4 drops of Nitrite Indicator N1	20 mL	2.5
50-150 mg/L	3 drops of Nitrite Indicator N1	10 mL	5
100-400 mg/L	2 drops of Nitrite Indicator N1	5 mL	10
300-1000 mg/L	1 drop of Nitrite Indicator N1	2 mL	25
500-2000+ mg/L	1 drop of Nitrite Indicator N1	1 mL	50

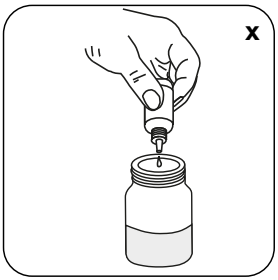
EN



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



Use a titration jar for larger samples or test tube for smaller samples (5 mL or less).

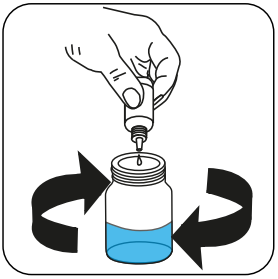


Add **X** drops of **Nitrite Indicator N1** reagent to the sample, according to the selected sample volume (see table in the notes).

Swirl to mix.

The sample will turn **orange (if nitrite is present)**.

Attention! Record the number of drops that will be added.
Note: Make sure to swirl the jar after adding each drop!



Add **Nitrite Titrant N2** drop by drop to the sample until colouration turns from **orange** to **blue**.

The color should persist for at least **10** seconds.

Calculate test result: Nitrite (as $NaNO_2$) mg/L = Number of drops x factor (see table)

Glycol

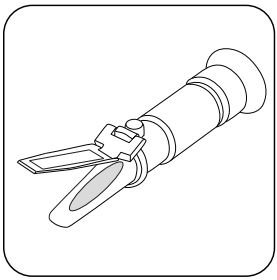
% PEG/MEG

Glycol/ Refractometer

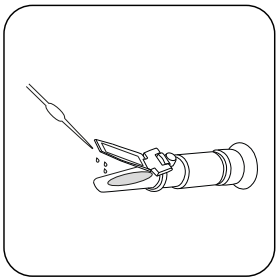
EN

Remarks

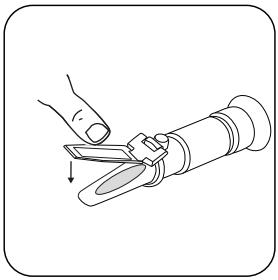
1. The description of the calibration is described in the detailed operating instructions. A detailed instruction manual is enclosed with the device.
2. Point the front end of the refractometer towards a bright light source when you want to take a reading.
3. After the measurement, wipe the measuring solution on the surface of the prism and the cover plate with a damp cotton cloth. Never immerse the device in water or hold it under running water as water may enter the device.
4. After drying, the refractometer should be stored safely. The refractometer is an optical measuring instrument and therefore very sensitive. Please handle it with care. Do not touch or scratch the optical surfaces. The refractometer should be stored in a dry, clean environment to prevent moisture and dust. Please avoid strong shaking.



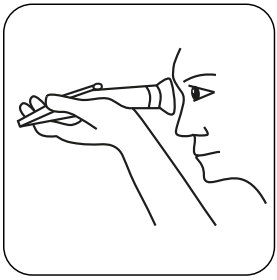
Lift the prism cover.



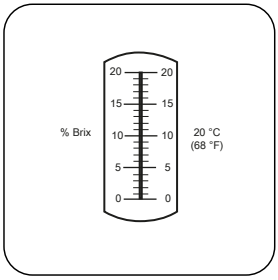
Place a few drops of the sample on the prism face.



Close the daylight plate and press it lightly.



Look through the eyepiece at the measuring scale.



Read the result at scale of light/dark boundary.

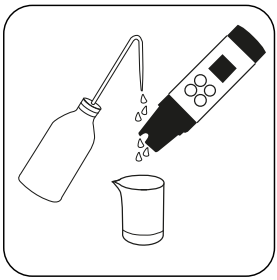
Conductivity SD / Con

0 - 20 mS/cm

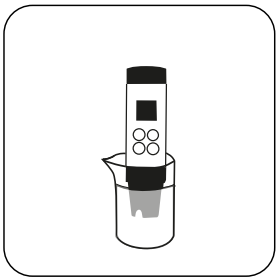
EN

Remarks

1. The description of the calibration and the device settings are described in the detailed operating instructions. Detailed operating instructions are enclosed with the device.



Rinse the electrode with distilled or deionised water and carefully wipe with a paper towel.



Hold the tester without protective cap in the sample water to be measured so that the electrode and temperature probe is immersed in the sample water not deeper than the seal ring.

The measurement result is displayed.

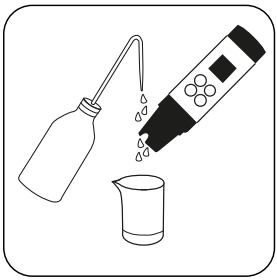
pH **SD / pH**

0 - 14

EN

Remarks

1. The description of the calibration, the preparation of the buffer solutions and the device settings are described in the detailed operating instructions. Detailed operating instructions are enclosed with the device.



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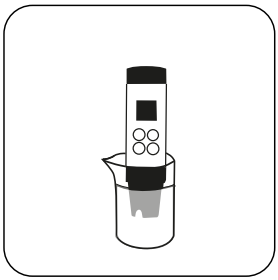

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The measurement result is displayed.

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