Lovibond® Water Testing

Tintometer® Group





ΕN

Engineers Kit System

Monitoring of water quality in closed circuits, evaporative cooling systems and boiler systems is an essential part of any water treatment Engineers daily tasks.

It has been proven that testing industrial waters on a regular basis can mitigate risks and system issues before they become problematic; including early detection of corrosion, scale and biofouling. This early detection allows water treatment professionals to make assessments of system efficacy and integrity in a timely manner, enabling decisions on treatment programs to achieve optimal system performance

This test kit provides the user with the primary tests in order to complete their daily tasks.

Note:

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

Alkalinity (P, M, OH) 50 - 2400 mg/L CaCO₃ 561700130

ΕN

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 pc.	56A006501
Titration jar with cap, plastic, 60 mL	1 pc.	56A006701

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	ОН	CO ₃	HCO₃
P = 0	0	0	М
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

Notes

- 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.
- 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.



number of drops that will be added. **Note:** Make sure to swirl the

Attention! Record the

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)

ΕN

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 CaCO₃) 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.

Add Alkalinity LR Titt TA3 or Alkalinity HR Titrant PA2/TA2 drop

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 CaCO₃) mg/L = Number of drops x factor (see table)

ΕN

Chloride 561700190

20 - 12000 mg/L Cl

Material

ΕN

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 pc.	56A006501
Titration jar with cap, plastic, 60 mL	1 pc.	56A006701
Syringe, plastic, 5 mL	1 pc.	56A008501

- 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 Calcium 5 - 600 mg/L CaCO₃

561700270

EN

Material

Reagents	Packaging Unit	Part Number
Hardness Calcium Buffer CH2	65 mL	56L014465
Hardness Calcium Indicator CH1P	Powder / 20 g	56P021620
Hardness LR Titrant TH3	65 mL	56L016265
Hardness HR Titrant TH4	65 mL	56L014565
Hardness Total Indicator TH1P	Powder / 40 g	56P028340
Hardness Total Buffer TH2	65 mL	56L016065

The following accessories are required.

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

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	Hardness LR Titrant TH3	40 mL	0.5
10-30 mg/L	Hardness LR Titrant TH3	20 mL	1
20-60 mg/L	Hardness LR Titrant TH3	10 mL	2
50-150 mg/L	Hardness HR Titrant TH4	40 mL	5
100-300 mg/L	Hardness HR Titrant TH4	20 mL	10
200-600 mg/L	Hardness HR Titrant TH4	10 mL	20

Determination of Hardness Calcium



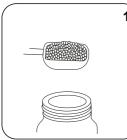
Attention! Select the appropriate sample volume according to the instructions in the chapter Sampling.



Add 4 drops of Hardness Calcium Buffer CH2 per 10 mL of sample.



Swirl to mix.



Add 1 measuring scoop(s) Hardness Calcium Indicator CH1P.



Swirl to mix.



The sample will turn wine red .



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

Add Hardness LR Titr
TH3 or Hardness HR
Titrant TH4 drop by dr

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 CaCO₃) mg/L = Number of drops x factor (see table)

Hardness, total

561700280

5 - 600 mg/L CaCO₃

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 pc.	56A006501
Titration jar with cap, plastic, 60 mL	1 pc.	56A006701

Notes

- 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)

ΕN

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

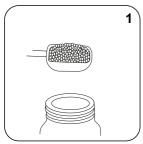
Attention!Select the appropriate sample volume according to the instructions in the chapter Sampling.



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 CaCO₃) mg/L = Number of drops x factor (see table)

Hydrogen Peroxide 15 - 500 mg/L H₂O₂

561700290

ΕN

Material

Reagents	Packaging Unit	Part Number
Hydrogen Peroxide Buffer HP1	65 mL	56L041565
Hydrogen Peroxide HR Titrant HP2	65 mL	56L719965
Hydrogen Peroxide LR Titrant HP3	65 mL	56L649665

The following accessories are required.

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

- 1. Colours may vary depending on sample and test conditions.
- Other oxidising agents such as raw water residual chlorine will be included in the result but is not significant compared with the usual high concentration of peroxide employed in sanitising operations.

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
1-12.5 mg/L	Hydrogen Peroxide LR Titrant HP3	40 mL	0.5
2-25 mg/L	Hydrogen Peroxide LR Titrant HP3	20 mL	1
4-50 mg/L	Hydrogen Peroxide LR Titrant HP3	10 mL	2
15-125 mg/L	Hydrogen Peroxide HR Titrant HP2	40 mL	5
25-250 mg/L	Hydrogen Peroxide HR Titrant HP2	20 mL	10
50-500 mg/L	Hydrogen Peroxide HR Titrant HP2	10 mL	20



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

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Add 25 drops Hydrogen Peroxide Buffer HP1.



Swirl to mix.



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

Add Hydrogen Per or added.

Add Hydrogen Per or Hydrogen Peroxid

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



Add Hydrogen Peroxide HR Titrant HP2 or Hydrogen Peroxide LR Titrant HP3 drop by drop to the sample until colouration turns from colourless to pink.



The color should persist for at least **30** seconds.

Calculate test result: Hydrogen Peroxide (as H_2O_2) mg/L = Number of drops x factor (see table)

Nitrite 561700300

10 - 2000 mg/L NaNO₂

Material

ΕN

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 pc.	56A006501
Test Tube 5/10 mL + Cap	1 pc.	56A600401
Titration jar with cap, plastic, 60 mL	1 pc.	56A006701
Plastic syringe, 1 ml	1 pc.	56A013501

- 1. Colours may vary depending on sample and test conditions.
- 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.
- Results from this test are expressed as sodium nitrite (NaNO₂). To convert from mg/L as sodium nitrite to mg/L as nitrite (NO₂), multiply the result obtained by 0.67.

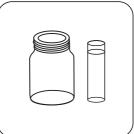
Sampling

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	



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 NaNO₂) mg/L = Number of drops x factor (see table)

Phosphonate

561700320

0 - 20 mg/L HEDP

Material

ΕN

Reagents	Packaging Unit	Part Number
Phosphonate Neutraliser P1/2	65 mL	56L070465
Phosphonate Indicator P4L	65 mL	56L017565
Phosphonate pH Adjuster P3	65 mL	56L718365
Phosphonate Titrant P5	65 mL	56L017665

The following accessories are required.

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

- Carry out the test on the Treated Water (Result A) and then on Untreated Water (Result B).
- 2. Colours may vary depending on sample and test conditions.
- 3. This test is suitable for measuring AMP and HEDP type products.
- 4. Good results have also been obtained with PBSAM.
- For accurate results the test should be calibrated to each product at typical system dose levels.
- Standards should be prepared in water as similar as possible to system water (e.g. hard or soft).
- 7. Add factors into table.
- 8. Samples less than 20 mL should be diluted to approximately 20 mL with deionized 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
	Phosphonate Titrant P5		
	Phosphonate Titrant P5		
	Phosphonate Titrant P5		

ΕN



Fill the jar with 20 mL of the sample.

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Add sufficient drops of **Phosphonate Neutraliser** P1/2 to give a yellow colour.



Swirl to mix.



Add drops of Phosphonate Swirl to mix. pH Adjuster P3 until the sample is colourless.





Add 10 drops Phosphonate Indicator P4L.



Swirl to mix.



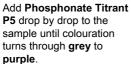
The sample will turn light green .



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

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







Perform this test with treated (Result A) and untreated water (Result B).

Calculate test result: Product mg/L = Number of drops (result A - result B) x factor (see table)

Sulphite

561700360

25 - 150 mg/L Na₂SO₃

Material

ΕN

Reagents	Packaging Unit	Part Number
Sulphite Indicator S1	Powder / 40 g	56P018640
Sulphite Titrant S2	65 mL	56L018765

The following accessories are required.

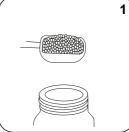
Accessories	Packaging Unit	Part Number
Syringe, plastic, 20 mL	1 pc.	56A006501
Titration jar with cap, plastic, 60 mL	1 pc.	56A006701

- 1. Colours may vary depending on sample and test conditions.
- 2. Catalysed sulphite reacts quickly with atmospheric oxygen when hot, so the sample should be cooled during collection with the minimum of contact with air. It should be tested immediately after it has cooled. Care should be taken when obtaining samples.
- 3. Ignore any undissolved material after powder/tablet addition.
- 4. For concentrations of sodium sulphite above 150 mg/L take a 10 mL sample and use a factor of 10 (i.e. each drop of Sulphite Titrant S2 used = 10mg/L Na₂SO₃).
- 5. Sulphite reserve may be expressed in different ways. To convert readings from sodium sulphite multiply the result obtained by the following factors. Sodium sulphite to sodium metabisulphite x 0.8 Sodium sulphite to sulphite x 0.63

Determination of Sodium sulphite in boiler water



Fill the jar with 20 mL of the cooled sample.



Add 1 measuring scoop(s) Sulphite Indicator S1.



Swirl to mix.



Attention! Record the added.

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



Add Sulphite Titrant S2 number of drops that will be drop by drop to the sample until colouration turns from colourless to blue.

Calculate test result: Sulphite (as Na₂SO₃) mg/L = Number of drops x 5

Tannin 561700370

50 - 300 mg/L Tannin

Material

ΕN

Reagents	Packaging Unit	Part Number
Tannin Indicator TN1	Powder / 50 g	56P014650
Tannin Titrant TN2	65 mL	56L019965

The following accessories are required.

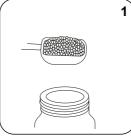
Accessories	Packaging Unit	Part Number
Syringe, plastic, 20 mL	1 pc.	56A006501
Titration jar with cap, plastic, 60 mL	1 pc.	56A006701

- 1. Colours may vary depending on sample and test conditions.
- 2. Tannin is the name for lignin type compounds and therefore the factor in this method is of a general nature in line with the type of products in general use.
- 3. It is not necessary for all of the Tannin Indicator TN1 to dissolve.

Determination of Tannin in boiler water



Fill the jar with 20 mL of the cooled sample.



Add 1 measuring scoop(s) Tannin Indicator TN1.



Swirl to mix.



Attention! Record the number of drops that will be drop by drop to the sample added.

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



Add Tannin Titrant TN2 until colouration turns from colourless to pink.



The color should persist for at least 10 seconds.

Calculate test result: Tannin (as Tannin) mg/L = Number of drops x 10

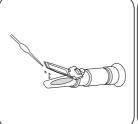
Glycol Glycol/
Refractometer
% PEG/MEG

ΕN

- 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.
- 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.







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.

Hardness (Yes/No) 8 - 20 mg/L CaCO₃

ΕN

Material

Reagents	Packaging Unit	Part Number
Hardness Yes/No	Tablet / 100	515360BT

Sampling

1. Let the sample water flow for 30 seconds before taking the sample.

Notes

- 1. Colours may vary depending on sample and test conditions.
- 2. This test may be used to determine the performance of a softener unit by measuring the total hardness of softened water taken from the outlet. It is important to monitor hardness levels regularly as hardness breakthrough is indicative of exhausted resin and regeneration would be required.
- 3. Test result:

Green Sample Colour: Hardness is less than the threshold level Red Sample Colour: Hardness is more than the threshold level

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 mg/L	1 Tablette Hardness Yes/No	20 mL	
20 mg/L	1 Tablette Hardness Yes/No	10 mL	
16 mg/L	2 Tabletten Hardness Yes/No	25 mL	
8 mg/L	1 Tablette Hardness Yes/No	25 mL	

Determination of Hardness (Yes/No)



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



Add x Hardness Yes/No tablet(s). (See chapter Sampling under Titrant in the table.)



The sample will turn **red or green (See chapter Notes.)**.

Read the test result: Note the color of the sample (red or green) (see Notes).

Tintometer GmbH

Lovibond® Water Testing 44287 Dortmund Tel.: +49 (0)231/94510-0 sales@lovibond.com

Tintometer South East Asia

Lebuh Nilam 2, Bandar Bukit Tinggi, Klang, 41200, Selangor D.E Tel.: +60 (0)3 3325 2285/6 Fax: +60 (0)3 3325 2287 lovibond.asia@tintometer.com

Tintometer India Pvt. Ltd.

Door No: 7-2-C-14, 2°d, 3° & 4° Floor Sanathnagar Industrial Estate, Hyderabad, 500018 Telangana Toll Free: 1 800 599 3891/3892 indiaoffice@lovibond.in www.lovibondwater.in India

The Tintometer Limited

Amesbury, SP4 7GR Tel.: +44 (0)1980 664800 Fax: +44 (0)1980 625412 sales@lovibond.uk

Tintometer Brazil

Caixa Postal: 271 CEP: 13201-970 Tel.: +55 (11) 3230-6410 sales@lovibond.us www.lovibond.com.br

Tintometer Spain

08080 Barcelona Tel.: +34 661 606 770 sales@tintometer.es www.lovibond.com Spain

Tintometer China

Beijing, 100020 Customer Care China Tel.: 4009021628 Tel.: +86 10 85251111 App. 330 Fax: +86 10 85251001 www.lovibond.com China

Tintometer Inc.

Sarasota, FL 34243 Fax: 941.727.9654 sales@lovibond.us www.lovibond.us







