# Salt Water Aquaculture



**Test Kit Instruction Manual** Code 3635-05





This booklet provides step-by-step detailed instructions for the Code 3635-05 test kit. It is important to review these instructions thoroughly before attempting to perform the tests by the short-form instructions contained in the case lid.

To order individual reagents or test kit components, use the specified code number.

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# SAFETY/ TESTING HINTS / REAGENT CARE

\*Reagent is a potential health hazard. **READ SDS:** lamotte.com. **Emergency information:** Chem-Tel USA 1-800-255-3924 Int'l, call collect, 813-248-0585



To order individual reagents or test kit components, use the specified code number.



Tightly close all reagent containers immediately after use. Be sure not to interchange caps and pipets from different containers.



Avoid prolonged exposure of equipment and reagents to direct sunlight. Protect reagents and components from extreme heat and cold.

Wipe up any reagent chemical spills, liquid or powder, as soon as they occur. Refer to label and SDS for proper reagent disposal.







# ANALYTICAL TECHNIQUE

- Clean glassware is a must for accurate results. Thoroughly rinse test tubes before and after each test. Caps and stoppers should also be cleaned after each use.
- Use test tube caps or stoppers, not your fingers, to cover test tubes and flasks during shaking or mixing.
- 3. When adding sample to calibrated test tube, be sure vial is filled to the appropriate mark. The bottom of the liquid (meniscus) should be level with the desired mark. (Fig. 1)
- When dispensing reagents from bottles filled with dropper plug and cap, be sure to hold bottle vertically and gently squeeze to dispense the appropriate number of uniform drops. (Fig. 2)
- 5. For those reagents to be added with the screwcap pipet assemblies enclosed, remove polyseal cap on bottle and replace with the screwcap pipet. NOTE: Place the polyseal caps back on the reagent bottles for longer periods of storage. Be sure that both pipet assemblies and polyseal caps are thoroughly cleaned before placing on bottles to avoid contamination.
- 6. When dispensing reagents from pipets, hold pipet vertically to assure uniform drop size. This is extremely important when performing drop count titrations. (Fig. 3)
- 7. To fill pipets, squeeze rubber bulb and immerse into reagent. Release bulb to fill. (Fig. 4)
- 8. To accurately dispense powdered reagents with spoon, tap spoon on edge of reagent container to remove excess reagent. [Fig. 5]
- 9. When performing tests that include Octa-Slide 2 Comparators, the comparator should be positioned between the operator and non-direct sunlight. This allows the light to enter through the light-diffusing screen at the back of the comparator for optimum color comparison.



# **GENERAL SAFETY PRECAUTIONS**



In the event of an accident or suspected poisoning, immediately call the Poison Center phone number in the front of your local telephone directory or call a physician. Additional information for all LaMotte reagents is available in the United States, Canada, Puerto Rico, and the US Virgin Islands from Chem-Tel by calling 1-800-255-3924.

For other areas, call 813-248-0585 collect to contact Chem-Tel's International access number. Each reagent can be identified by the four digit number listed on the upper left corner of the reagent label, in the contents list and in the test procedures.

# **TEST METHODS**

### USE OF THE Octa-slide 2 viewer

#### DILUTIONS

The calibrated test tubes (0106) included in this kit may be used to perform dilutions for the Ammonia Nitrogen and Nitrite Nitrogen tests. Distilled or deionized water is needed to perform dilutions.

The following table provides a quick reference guide for dilutions of various proportions. Once the dilution is prepared, use this diluted sample to perform the test, and multiply the result by the dilution factor to obtain the actual concentration.

Sample Size	Distilled Water to Bring to 10 mL	<b>Dilution Factor</b>
5.0 mL	5.0 mL	2
2.5 mL	7.5 mL	4

# TITRIMETRIC: DIRECT READING TITRATOR

In a titrimetric method, titrating solution (or titrant) is added to a treated sample until a color change occurs. The volume of titrant required to reach this endpoint is proportional to the concentration of the factor being tested. Direct Reading Titrators provide results directly in the appropriate concentration for the test—no counting of drops, no calculations.

The Titrator consists of a plastic barrel, a plastic plunger, and a plastic adapter tip. The adapter tip reduces the size of the drops that are dispensed, increasing the precision of the test results. DO NOT the plunger or adapter tip from the Titrator.



# **TEST PROCEDURES**

### INTRODUCTION

Proper control of water quality is an essential part of successful aquaculture operation. Immediate test results provided by on-site water analysis equipment can confirm a healthy environment, or give early warning signals for required treatment.

- 1. Develop a routine testing schedule.
- 2. Keep records! Historical data is extremely important if treatments are required. Note environmental conditions, fish activity, feeding habits, etc.
- 3. Observe fish to note any particular behavior or feeding rates, as this may be a sign of stress.
- 4. Stable characteristics, such as alkalinity and hardness, do not have to be tested as frequently as ones that fluctuate, such as ammonia nitrogen, nitrite nitrogen, pH, dissolved oxygen and temperature. Keep in mind that these factors fluctuate throughout the day and in some cases are interdependent.
- 5. Be alert to sudden changes in one factor, as it may be a clue to perform further analysis.



# Alkalinity

CODE
2311-PG-E
*4493DR-H
0608
0382

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The Direct Reading Titrator is calibrated in terms of total alkalinity expressed as parts per million (ppm) Calcium Carbonate (CaCO<sub>3</sub>). Each minor division on the Titrator scale equals 4 ppm CaCO<sub>3</sub>.

## ALKALINITY TEST PROCEDURE



# Ammonia Nitrogen

DESCRIPTION	CODE
*Salicylate Ammonia #1	*3978LWT-G
*Salicylate Ammonia #2	*3979WT-G
Salicylate Ammonia #3	3982WT-G
Test Tube, 2.5-5-10 mL, plastic, w/cap	0106
Octa-Slide 2 Viewer	1101
Ammonia Nitrogen Octa-Slide 2 Bar, 0-2.0 ppm, Salt Water	3441-01-SW

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# AMMONIA NITROGEN TEST PROCEDURE



Calculations:

```
To express results as Ammonia (NH<sub>3</sub>):
Ammonia (NH<sub>3</sub>) = ppm Ammonia Nitrogen (NH<sub>3</sub>-N) x 1.2
```

```
To express results as Ammonium (NH<sub>4</sub>+):
Ammonium (NH<sub>4</sub>+) = ppm Ammonia Nitrogen (NH<sub>3</sub>-N) x 1.3
```

Ammonia in water occurs in two forms: toxic unionized ammonia  $[NH_3]$  and the relatively non-toxic form, ammonium ion  $[NH_4^+]$ . This test method measures both forms as ammonia-nitrogen  $[NH_3^-N]$  to give the total ammonia-nitrogen concentration in water. The actual proportion of each compound depends on temperature, salinity, and pH. A greater concentration of unionized ammonia is present when the pH value and salinity increase.

- 1. Consult the table below to find the percentage that corresponds to the temperature, pH and salinity of the sample.
- To express the test result as ppm Unionized Ammonia Nitrogen (NH<sub>3</sub>-N), multiply the total ammonia-nitrogen test result by the percentage from the table.

	10	°C	15	°C	20	°C	25	°C
рН	FW1	SW2	FW	SW	FW	SW	FW	SW
7.0	0.19		0.27		0.40		0.55	
7.1	0.23		0.34		0.50		0.70	
7.2	0.29		0.43		0.63		0.88	
7.3	0.37		0.54		0.79		1.10	
7.4	0.47		0.68		0.99		1.38	
7.5	0.59	0.459	0.85	0.665	1.24	0.963	1.73	1.39
7.6	0.74	0.577	1.07	0.836	1.56	1.21	2.17	1.75
7.7	0.92	0.726	1.35	1.05	1.96	1.52	2.72	2.19
7.8	1.16	0.912	1.69	1.32	2.45	1.90	3.39	2.74
7.9	1.46	1.15	2.12	1.66	3.06	2.39	4.24	3.43
8.0	1.83	1.44	2.65	2.07	3.83	2.98	5.28	4.28
8.1	2.29	1.80	3.32	2.60	4.77	3.73	6.55	5.32
8.2	2.86	2.26	4.14	3.25	5.94	4.65	8.11	6.61
8.3	3.58	2.83	5.16	4.06	7.36	5.78	10.00	8.18
8.4	4.46	3.54	6.41	5.05	9.09	7.17	12.27	10.10
8.5	5.55	4.41	7.98	6.28	11.18	8.87	14.97	12.40

3. To express the test result as ppm lonized Ammonia Nitrogen (NH<sub>4</sub>+-N), subtract the unionized ammonia nitrogen from the total ammonia-nitrogen.

<sup>1</sup> Freshwater data from Trussel (1972).

<sup>2</sup> Seawater values from Bower and Bidwell (1978). Salinity for Seawater values = 34 ppt at an ionic strength of 0.701 m.

#### FOR EXAMPLE:

A fresh water sample at 20°C has a pH of 8.5 and the test result is 1.0 ppm as Total Ammonia-Nitrogen.

- 1. The percentage from the table is 11.18% (or 0.1118).
- 2. 1 ppm total Ammonia-Nitrogen x 0.1118 = 0.1118 ppm Unionized Ammonia-Nitrogen
- 3. Total Ammonia-Nitrogen 1.0000 ppm Unionized Ammonia-Nitrogen - 0.1118 ppm

Ionized Ammonia-Nitrogen = 0.8882 ppm

# Carbon Dioxide

DESCRIPTION	CODE
*Phenolphthalein Indicator, 1%	*2246-E
Carbon Dioxide Reagent B	4253DR-H
Direct Reading Titrator, 0-50 Range	0380
Test Tube, 5-10-12.9-15-20-25 mL, glass, w/cap	0608

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The Direct Reading Titrator is calibrated in terms of carbon dioxide expressed as parts per million (ppm) free CO2. Each minor division on the Titrator scale equals 1.0 ppm CO2.



DESCRIPTION	CODE
*Manganous Sulfate Solution	*4167-G
*Alkaline Potassium Iodide Azide Reagent	*7166-G
*Sulfuric Acid, 1:1	*6141WT-G
Sodium Thiosulfate, 0.025N	4169-H
Starch Indicator Solution	4170WT-G
Direct Reading Titrator, 0-10 Range	0377
Test Tube, 5-10-12.9-15-20-25 mL, glass, w/cap	0608
Pipet, plain, plastic, w/cap	0392
Water Sampling Bottle, 60 mL, glass	0688-D0

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The Titrator is calibrated in terms of Dissolved Oxygen expressed as ppm Dissolved Oxygen. Each minor division on the Titrator scale equals 0.2 ppm Dissolved Oxygen.

### Part 1 - Collecting the Water Sample





NOTE: Be careful not to introduce air into the sample while adding the reagents.

NOTE: At this point the sample has been "fixed" and contact between the sample and the atmosphere will not affect the test result. Samples may be held at this point and titrated later.



NOTE: If small air bubbles appear in the titrator barrel, expel them by partially filling the barrel and pumping the titration solution back into the reagent container. Repeat until bubble disappears.



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Read the test result directly from the scale where the large ring on the Titrator meets the Titrator barrel. Record as ppm Dissolved Oxygen. Each minor division on the Titrator scale equals 0.2 ppm.

NOTE: When testing is complete, discard the titrating solution in the Titrator. Rinse Titrator and titration tube thoroughly. DO NOT remove plunger or adapter tip.



DESCRIPTION	CODE
*Mixed Acid Reagent	*V-6278-J
*Nitrate Reducing Reagent	*V-6279-C
Spoon, 0.1 g, plastic	0699
Test Tube, 2.5-5-10 mL, plastic, w/cap	0106
Dispenser Cap	0692
Octa-Slide 2 Viewer	1101
Nitrate Nitrogen Octa-Slide 2 Bar, 0.25-10.0 ppm	3109 -01

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NOTE: Place Dispenser Cap (0692) on \*Mixed Acid Reagent (V-6278). Save this cap for refill reagents.



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Match sample color to color standard. Record results as  $\,\rm ppm$  Nitrate Nitrogen [NO\_3-N].

Conversions: ppm Nitrate-N (NO<sub>3</sub>-N) x 4.4 = ppm Nitrate (NO<sub>3</sub>)

# Nitrite Nitrogen

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NOTE: Place Dispenser Cap (0692) on \*Mixed Acid Reagent (V-6278-J). Save this cap for refill reagents.



DESCRIPTION	CODE
*Wide Range Indicator	*2218-G
Test Tube, plastic, w/cap	0106
Octa-Slide 2 Viewer	1101
Wide Range pH Octa-Slide 2 Bar, 5.0-10.0	3483-01

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# Salinity

DESCRIPTION	CODE
*Salinity Indicator Reagent A	*7460-E
*Salinity Titration Reagent B	*7461-H
Demineralizer Bottle	1151
Test Tube, 5-10-12.9-15-20-25 mL, glass, w/cap	0608
Direct Reading Titrator, 0-20 Range	0378
Direct Reading Titrator, 0-1.0 Range	0376

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### Deminerlizer Bottle (Code 1151)

The Demineralizer Bottle will be the source of demineralized water for the salinity test. It is partially filled with an ion exchange resin containing an indicator to show when the exchange resin has been exhausted. The indicator will change from dark green to yellow amber at which point the resin should be replaced.

#### Instructions For Use

- 1. Remove cap and fill bottle with water to be demineralized.
- 2. Recap, make sure spout is closed, and shake vigorously for 30 seconds.
- 3. Open spout, invert bottle, and gently squeeze to dipense the demineralized water.

#### Care and Storage

- 1. Do not heat water over 100°F.
- 2. Keep resin covered with water at all times.
- 3. Store bottle filled with enough water to cover resin completely.

The Titrator is calibrated in terms of Salinity expressed as ppt Salinity. Each minor division on the Titrator scale equals 0.4 ppt Salinity.

### SALINITY TEST PROCEDURE



Note: Each Titration Division = 0.4 ppt Salinity

3635-05



### LaMOTTE COMPANY

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