

## **PLAIN ENGLISH INSTRUCTIONS FOR HACH WATER QUALITY KITS**

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### **General Instructions on Using HACH Kits**

1. Keep glassware clean and rinse with pond water between tests.
2. Follow directions carefully and be precise when measuring volumes or counting drops. Slight errors will be greatly magnified due to small sample sizes.
3. All the reagents and pillows should be replaced if over one year old. The pH solutions may need to be replaced every six months.
4. Do not get chemicals on skin or clothing. Read all warnings provided with kit.

Trade names are used to provide specific information. Mention of a trade name does not constitute a guarantee of the product nor does it imply endorsement over comparable products that are not named by Alabama Fish Farming Center and its cooperating agencies.

### **DISSOLVED OXYGEN**

1. Fill glass-stopped bottle with pond water - cap under water without trapping bubbles under stopper.
2. Add one pillow of D.O. I and one pillow of D.O. II.
3. Shake to mix.
4. Allow broken floc to form. Let stand until floc has settled halfway. Shake again. Let it settle.
5. Add D.O. III pillow. Shake to mix.
6. Fill plastic measuring tube level full with prepared sample.
7. Pour into mixing bottle.
8. Add sodium thiosulfate solution drop by drop while swirling bottle. Count drops until solution changes from yellow to clear.
9. Each drop is equal to 1 ppm dissolved oxygen.

TIP: Hold eyedroppers straight up and down when releasing drops - Eyedropper's position will affect the size of the drop! Also, don't let eyedropper touch side of bottle.

### **CARBON DIOXIDE (CO<sub>2</sub>)**

1. Fill mixing bottle very slowly without shaking to 15 ml with pond water. It's preferable to do this test on the pond bank for accurate results.
2. Add two drops of phenolphthalein. If it immediately turns pink then no CO<sub>2</sub> is present.
3. Add Sodium Hydroxide solution (.01N) drop by drop. Count drops until light pink color persists for thirty seconds.
4. Each drop equals 2.0 ppm CO<sub>2</sub>.

TIP: One part per million (ppm) is equal to one milligram per liter (mg/l).

### **NITRITE-NITROGEN (NO<sub>2</sub>-N)**

1. Prepare viewing apparatus. (Be sure red nitrite wheel is inside box.)
2. Fill two glass tubes up to the white lines with pond water.
3. Add one NitrVer pillow to one tube. Shake for one minute. Place prepared sample in right hole. Untreated sample goes in left hole.
4. If nitrite is present prepared sample will turn light pink to dark cherry red. Read results after 5 to 10 minutes.

TIP: The nitrite color wheel only reads up to 1/2 ppm nitrite-nitrogen. If the sample is redder than the wheel a dilution must be performed. See dilution instructions for nitrite and ammonia.

### **CHLORIDES (SALT)**

1. Add 46ml of pond water to oxygen bottle. Use square bottle to measure.
2. Add one Chloride 2 pillow, swirl to mix.
3. Add silver nitrate solution drop by drop and swirl to mix. Be sure to shake silver nitrate before using.
4. Count drops until water changes from yellow to red-brown. Yellow color must completely disappear.
5. Each drop is equal to 3.75 ppm chloride.

## **TOTAL AMMONIUM NITROGEN (TAN or N-NH<sub>3</sub>)**

1. Prepare viewing apparatus. (Be sure yellow ammonia wheel is in the box.)
2. Fill two glass tubes up to the white lines with pond water.
3. If the water sample is high in hardness ( over 200 ppm) or high in chlorides ( over 200 ppm) , use one drop of Rochelle Salt Solution to each glass tube.
4. Add three drops of Nessler reagent to one of the tubes and place in right hole. Left hole gets the unprepared sample.
5. Wait 5-10 minutes for color development.
6. Read the results. Compare reading with ammonia stress chart.

TIP: The ammonia wheel only reads up to 3.0 ppm total ammonium nitrogen. If the prepared sample is darker than the wheel a dilution must be performed. See the dilution instructions.

## **pH**

1. Prepare viewing apparatus. (Be sure pH color wheel is in the box.)
2. Fill two glass tubes up to the while lines with pond water.
3. Add 6 drops of pH indicator solution to one tube and place in the right hole. Untreated sample goes in left hole.
4. Match the color of the tube with the wheel and read the results. Sometimes the colors will not match exactly.

TIP: pH levels will change during the day in fish pond. High readings occur near sundown and low readings occur at sunrise.

## **TOTAL ALKALINITY**

1. Fill the plastic measuring tube with pond water. Empty into square mixing bottle.
2. Add one Brom-Cresol Green Methyl Red powder pillow and swirl to mix.
3. Add Sulfuric Acid Standard Solution drop by drop until color changes from blue-green to orange or pink. Swirl while adding drops.
4. Each drop is equal to 17.1 ppm Total Alkalinity.

TIP: If three drops or less of sulfuric acid causes a color change, use three tubes full of pond water and multiply the number of drops by 5.7 for more accurate results.

## **TOTAL HARDNESS**

1. Fill plastic measuring tube with pond water. Pour into square mixing bottle.
2. Add three drops of buffer solution, Hardness 1, to mixing bottle and swirl.
3. Add two drops of ManVer hardness indicator solution to bottle and swirl.
4. Add Titrant Reagent, Hardness 3, drop by drop swirling until color changes from pink to blue.
5. Each drop is equal to 17.1 ppm Total Hardness.

TIP: For better fry survival and production, fry ponds should have equal hardness and alkalinity. See a biologist for assistance.

## **Dilution Instructions For Total Ammonium-Nitrogen and Nitrite**

If the prepared sample is darker than the maximum reading on the wheel, the sample must be diluted with distilled water.

1. Start all over.
2. Using a 5ml pipet, place 1 ml of pond water in both tubes.
3. Add 4 ml of distilled water to each tube, shake to mix.
4. Add Nessler or Nitrite chemical to only one tube. Shake. Place in box.
5. Wait 5-10 minutes. Read results and multiply wheel reading by 5.

## MANAGEMENT OF WATER QUALITY IN CATFISH PONDS

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WATER QUALITY PROBLEM	TREATMENT	COMMENTS
Low Alkalinity Less than 30 ppm	Calcium hydroxide (hydrated lime)	Add 50 lbs/surface acre then check alkalinity level.
	Sodium bicarbonate	About 3.7 lbs./acre foot will increase the alkalinity one ppm.
	Agricultural limestone	Apply at 1-2 ton/ surface acre to pond. For more accurate application rates determine the mud lime requirement every 2-3 years.
Low Chlorides Less than 10	Sodium chloride (salt)	45 lbs/acre foot of salt will increase the chlorides 10 ppm.
High pH 9.5 - 11.0	Sodium bicarbonate	Add up to 200 lbs./surface acre, then check pH. Limited effectiveness in ponds with alkalinity over 100 ppm.
	Gypsum	$(TA - TH) \times 2.2 \times 2.71 =$ lbs of gypsum per acre foot
	Alum	Contact a Fisheries Biologist or an Extension Aquaculturist
Low pH 4-5.9	Sodium bicarbonate	Add up to 200 lbs./acre, then check.
	Calcium hydroxide	Add 100 lbs/acre, then check again. Check carbon dioxide level also.
High Ammonia Levels 5.0 and up	Pump in fresh water.	Fresh pond or well water may provide a small area of acceptable water to the stressed fish.
	Reduce feeding rate.	Do not use algicides. Fertilize pond to stimulate algae bloom. Do not use fertilizers to stimulate algae blooms if there is an existing aquatic weed problem.
High Nitrite Levels(fish are visibly stressed)	Sodium chloride	100 lbs/acre-foot for every 1 ppm nitrite- nitrogen. Dump salt near edge of water and use pto paddlewheels to disperse.
High Carbon Dioxide Levels Greater than 25 when D.O. less than 4 ppm	Calcium hydroxide	About 25 lbs./acre-foot to remove 10 ppm carbon dioxide.
	Aerate	This is only useful if oxygen levels are low. Do not use sodium bicarbonate (baking soda) to remove carbon dioxide!
Hydrogen Sulfide Poisoning	Potassium permanganate	Put about 5 ppm in area of net landing.