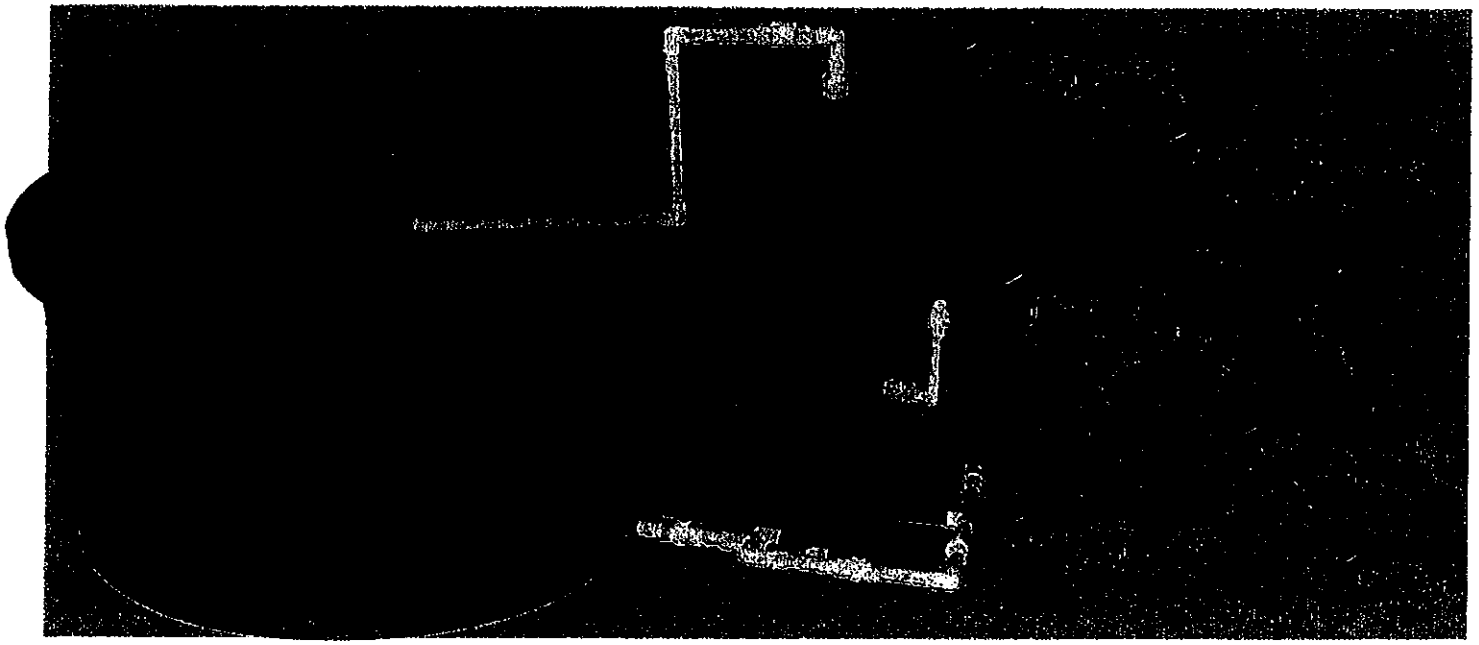
AQUACENTER

Introduces

The Fish School



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INTRODUCTION

The Fish Systems from Aquacenter are newly designed closed systems ideal for the hobbyist, educator, researcher, or commercial grower. With a Fish System you can be part of the multi billion dollar industry know as aquaculture.

Aquaculture is a booming industry with fish production at its highest yet. In the United States, aquaculture is growing at a tremendous rate. This type of farming includes the production of everything from algae to alligator and spans the entire globe. Aquaculture is used for the production of food fish, tropical aquarium fish, organisms for biomedical research, and endangered and game species for restocking purposes.

RECIRCULATING SYSTEMS

The Fish Systems are recirculating systems. A recirculating system is a unique water reuse technique which involves the cycling of water through a culture system and various filtering components. Recirculating or closed systems have become more prevalent among aquaculturists for many reasons: the need for conservation, better control over water quality, and the ability to grow any species in any climate. These are just a few factors which have all contributed to the success of recirculating systems.

The idea of recirculating systems is not new. It utilizes the technique of water reuse, familiar to the waste water treatment industry and even aquarium hobbyists. In most cases a recirculating system is composed of a culture tank(s), a solids removal device(s), and biofiltration unit.

The biofilter is probably the most important component of the recirculating system. It is here, that beneficial bacteria are concentrated to help break down some of the toxic compounds that build up in a closed system. Ammonia is a waste product of protein metabolism in aquatic species. It can also accumulate as a result of uneaten food. Ammonia is present in both ionized and unionized forms, with the latter being most toxic. The bacteria turn toxic unionized ammonia into less toxic nitrite and then to nitrate through a process called nitrification. The biofilter should contain some type of medium for the bacteria to grow on. At best this material should have a high surface area. The media should constantly be exposed to water and oxygen because nitrification is an aerobic (oxygen requiring) process.

ABOUT YOUR FISH SCHOOL

Your Fish School includes a 300 gallon culture tank, a state-of-the-art bead filter, water pump, and all the necessary piping and fittings . The Fish School can be used to grow up to 25 pounds of fish in superior water quality. This category of water quality is made possible by your bead filter. Bead filters were perfected by Louisiana State University in the 1980's and now are one of the most effective means of filtration available. These filters provide both solids removal and biofiltration (ammonia removal) in a single unit with easy cleaning. The dense layer of beads within the filter, traps solids and also provides a tremendous amount of surface area for nitrifying bacteria (Nitrosomonas and Nitrobacter) which remove toxic ammonia. These bacteria grow and thrive on the entire surface of the beads.

The Fish School is a excellent tool for the classroom. It offers the study of engineering, physics, business, mathematics and chemistry, all in a "hands on" environment. Planning and designing experiments to be implemented with the Fish System can only add to the learning experience.

This system is also very appropriate for the small scale grower. Channel catfish, trout, tilapia, pacu, redfish, stripped bass, bait fish, koi, red claw, and tropical fish are just a few species which can be raised in the Fish School.

Setup Tips - Read Completely before assembling fish school.

*You will need the following tools for setup: large pliers, pvc glue, silicone, hand drill, channel lock pliers and a clean funnel.

*Bulkhead fittings can't withstand intense heat. If you are not planning to set up your system right away, remove bulkhead from package and store in a cool place. It is advised that you store the entire setup in a place out of direct sunlight and heat.

*Carefully consider the site you choose for the Fish School. If placed in direct sunlight, algal blloms are sure to occur thereby causing fluctuations in your pH and oxygen levels. A shade cloth is recommended for green houses or areas with intense sunlight.

*Lay out all the pieces of the Fish School and go through the directions to make sure everything is present. This will also give you the opportunity to see what you have to work with.

*Before gluing any of the pieces put the entire system togethere to ensure that everything is in the right place and positioned correctly.

*Do not glue the spray bars or the intake pipes so that you may detach them for cleaning.

*Be sure to glue all other slip pieces, teflon seal all threaded pieces, and silicone the bulkheads in place to avoid any leaks.

*Be careful in the placement of your pipes to avoid having any piping over the water pump.

*It may be to your advantage to add some extra piping or a discharge hose of some type to allow for the draining of the bead filter.

*If unchlorinated water is not available, a reserve of dechlorinated water should be present in case of emergency and for regular water exchanges.

*To "seed your bead filter it is very effective to use Fritz-Zyme water conditioner. This formula contains the beneficial bacteria needed for the biofilter for elimination of nitrogenous wastes.

*Note: Lay out all parts of bead filter and Fish School. Each piece is numbered for more efficient assembly. If parts are missing or broken contact us immediately at 1-800-748-8921 for a replacement.

ASSEMBLE FIRST TO MAKE SURE PARTS FIT.....THEN GLUE.

Fish School Assembly

1. Remove filter from packaging and lay on side.
2. Install bottom (2) Bottom Screen. Hand tighten first, then tighten ½ to 3/4 turn with pliers or a wrench. DO NOT OVERTIGHTEN
3. Screw (1) Side release valve through hole in the side bottom hole of bead filter.
4. Insert (3) Elbow 1 ½" onto (2) Bottom Screen.
5. Insert (4) 3 ½" PVC 1 ½" into (3) Elbow 1 ½"
6. Insert (5) Tee 1 ½" onto (4) 3 ½" PVC 1 ½"
7. Insert (6) Bushing reducer 1 ½" to 1" into (5) Tee 1 ½" on right side.
8. Insert (7) 13" PVC 1" into (6) Bushing Reducer 1 ½" to 1"
9. Insert (8) Ball Valve 1" onto (7) 13" PVC 1"
10. Insert (9) 4" PVC 1 ½" into (5) Tee 1 ½" on left side.
11. Insert (10) 1 ½" Swing check valve sxs onto (9) 4" PVC 1 ½"
12. Insert (11) Bushing Reducer 1 ½" to 1" into (10) 1 ½" Swing check valve sxs
13. Insert (12) 4" PVC 1" into (11) Bushing Reducer 1 ½" to 1".
14. Insert (13) Ball Valve 1" onto (12) 4" PVC 1" into.
15. Insert (14) 2 1/4" PVC 1" into (13) Ball Valve 1".
16. Insert (15) Elbow 1" onto (14) 2 1/4" PVC 1"
17. Insert (16) 5 ½" PVC 1" into (15) Elbow 1".
18. Insert (17) Elbow 1" onto (16) 5 ½" PVC 1"
19. Insert (18) 4 ½" PVC 1" into (17) Elbow 1"
20. Insert (19) Elbow 1" txs onto top outlet of 3MDQX Water Pump.
21. Insert (20) 4" Nipple 1" into inlet side of 3MDQX Water Pump
22. Insert (21) Female threaded sleeve 1" txs onto (20) 4" Nipple 1"
23. Insert (22) 2 ½" PVC 1" into (21) Female threaded sleeve 1"
24. Insert (23) Ball Valve 1" onto (22) 2 ½" PVC
25. Insert (24) 4 11/16" PVC 1" into (23) Ball Valve 1" and into bulkhead on side of tank.
26. Insert (25) 25" PVC 1" with holes and end cap into bulkhead on inside of tank with slats facing up.
20. Insert (18) 4 ½" PVC 1" into (19) Elbow 1" txs
21. Insert (26) Air intake valve into middle hole of bead filter.
22. Insert (27) Top screen into top hole of bead filter.
23 Insert (28) Bushing Reducer 1 ½" to 1" into (27) Top screen
24. Insert (29) 2" PVC 1" into (28) Bushing Reducer
25. Insert (30) Ball Valve 1" onto (29) 2" PVC 1"
26. Insert (31) 2" PVC 1" into (30) Ball Valve 1"
27. Insert (32) Elbow 1" onto (31) 2" PVC 1".
28. Insert (33) 6" PVC 1" into (32) Elbow 1"
29. Insert (34) Elbow 1" onto (33) 6" PVC 1"
30. Insert (35) 28" PVC 1" with holes and end cap with slats down into (34) Elbow 1"

WATER QUALITY

Ammonia, as mentioned earlier, is usually measured in the ionized form as total ammonia. From this reading, a simple calculation will give you the measure of the unionized (toxic) ammonia concentration, usually in mg/l. The unionized ammonia concentration is dependent on pH and temperature. It becomes more toxic as pH and temperature rise. Unionized ammonia is stressful to warm water fish when it reaches concentrations of .1 mg/l and can be lethal at concentrations greater than .5 mg/l. Should you run into a problem with ammonia, the problem may stem from a crash in your biofilter, an overloaded system, or improper cleaning maintenance. A quick fix would involve a simple water change. Zeolite is another option. This material will cause the ammonia to bond to the zeolite, pulling it out of the water. Fritz-Zyme contains the bacteria needed in your biofilter and following a crash, can help replenish their populations. Fish show signs of ammonia stress by exhibiting erratic swimming behavior and/or gasping at the surface.

pH is the measure of hydrogen ions in the water. This number will read between 0 and 14 with 0-6 being considered acidic, 7 is neutral, and 8-14 being alkaline. For fresh water, the pH should not go far below 6.5 or above 9.5. The bacteria in your biofilter prefer a pH from 7-8. In recirculating systems, there is a trend for the pH to slowly drop over time as the bacteria produce acid as a by-product of nitrification. Carbon dioxide can also lower the pH, with the formation of carbonic acid. A pH problem can be remedied with the addition of a buffer (see alkalinity).

Alkalinity is the measure of alkaline substances in the water. This parameter offers a buffer to sudden fluctuations in the pH. The alkalinity can be maintained by the addition of carbonates and bicarbonates. Sodium bicarbonate (baking soda) is commonly used. A concentration of at least 150 mg/l should be maintained.

The temperature of your tank should reflect the optimal temperature for the growth of your fish. For example, tilapia grow best at temperatures of 79-90 degrees. They will normally stop eating at temperatures less than 70 degrees and will die at temperatures less than 50 degrees. In this case, the use of a heater or heated building is recommended for the colder months. If using a heater, be sure to allow the recommended heat-up time. Trout, on the other hand, require temperatures normally 50-69 degrees. So, in this application a chiller may be required.

Oxygen is being constantly supplied to your fish by way of a small linear compressor. The Fish System is capable of handling the respiration of up to 150 pounds of warm water fish. However, should you experience algal blooms and very warm temperatures it may be wise to monitor oxygen levels. Most fish require a concentration of at least 3 mg/l oxygen and the bacteria in the biofilter require at least 2 mg/l . Fish show signs of oxygen stress by gasping at the surface of the water. As fish metabolize feed, they consume more oxygen so if an oxygen problem should occur, discontinue feeding until corrected.

7) Insert (12) through tank hole into (11).

8) Insert (13) with slats down inside tank through the bulkhead.

Use this chart to record your daily water quality analysis. The Ionized Ammonia is usually measured with your test kit. From this, the Unionized Ammonia (toxic) can be calculated. Recording the amount of feed that is eaten will better help you determine the growth rates of your fish.

Day	Ionized Ammonia	Unionized Ammonia	pH	Temp	Alkalinity	D.O.	Feed
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
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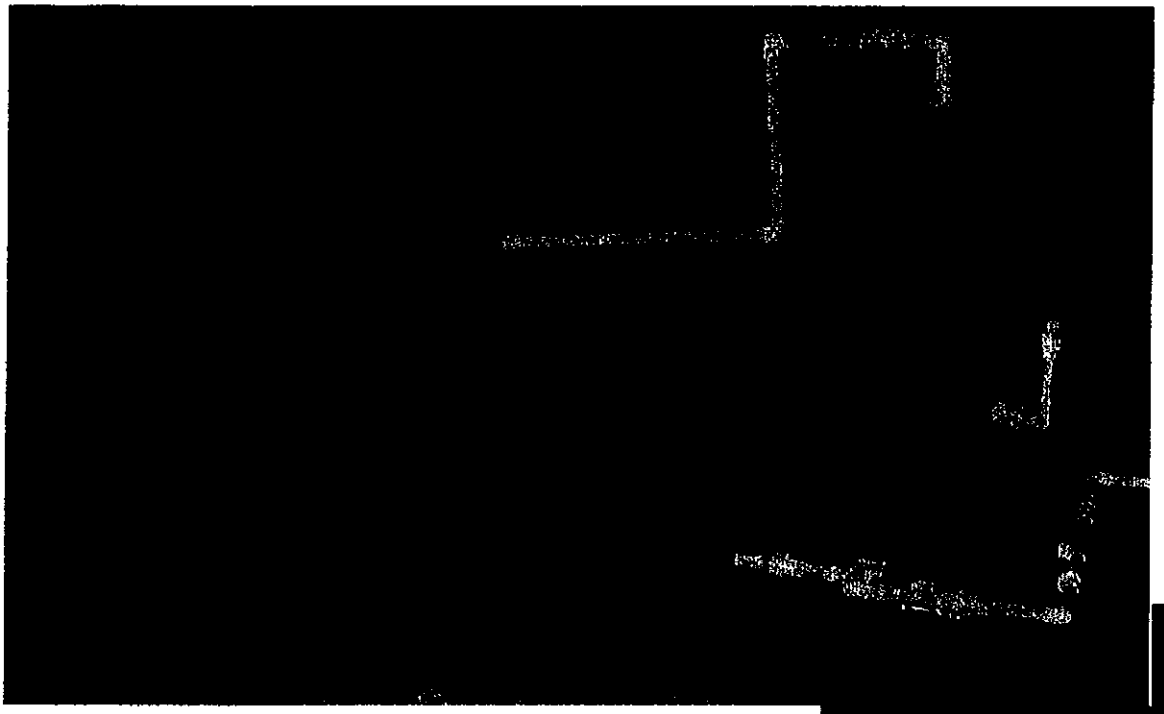
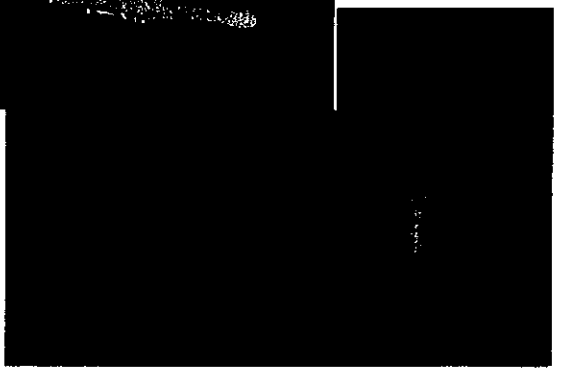
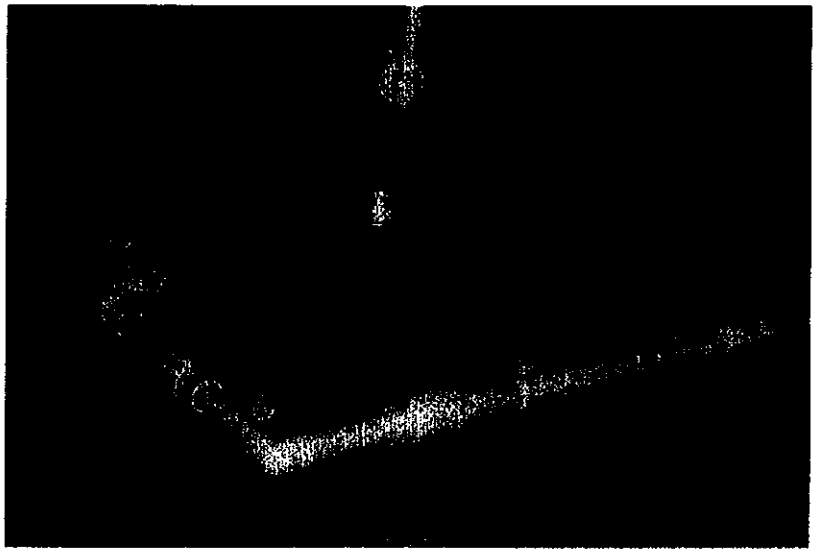
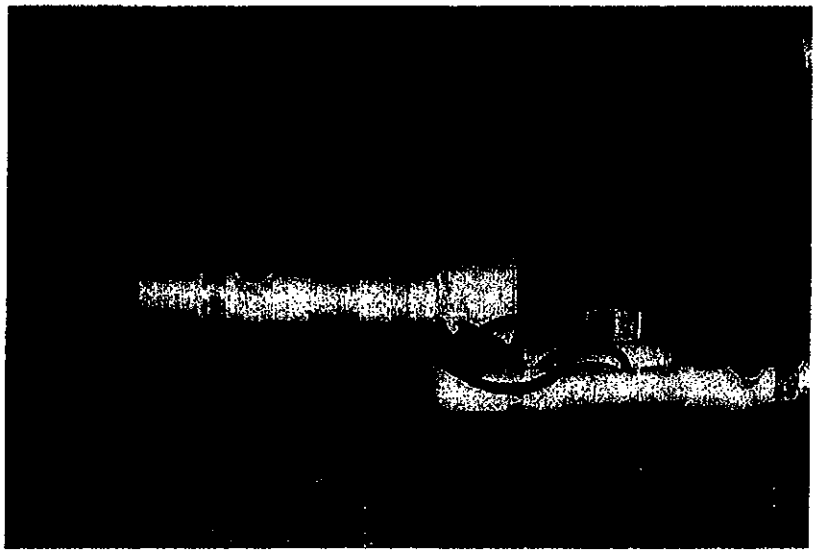




inside tank view



rear view of bead filter and plumbing (see steps 2 through 5)



side view of bead filter and plumbing (see steps 2 through 5)

Fish School Parts Check List

	Description	Labeled Part Number
_____	300 gallon tank and bead filter	Not labeled
_____	Bulkhead 1"	Not labeled
_____	Bag of beads	Not labeled
_____	Instructions	Not labeled
_____	Teflon Tape	Not labeled
_____	3MDQX Water Pump	Not labeled
_____	Side Release Valve	1
_____	Bottom Screen	2
_____	Elbow 1 ½"	3
_____	3 ½" PVC 1 ½"	4
_____	Tee 1 ½"	5
_____	Bushing Reducer 1 ½" to 1"	6
_____	13" PVC 1"	7
_____	Ball Valve 1"	8
_____	4" PVC 1 ½"	9
_____	Swing Check Valve 1 ½"	10
_____	Bushing Reducer 1 ½" to 1"	11
_____	4" PVC 1"	12
_____	Ball Valve 1"	13
_____	2 1/4" PVC 1"	14
_____	Elbow 1"	15
_____	5 ½" PVC 1"	16
_____	Elbow 1"	17
_____	4 ½" PVC 1"	18
_____	Elbow 1" txs	19
_____	4" Nipple 1"	20
_____	Female threaded sleeve 1" txs	21
_____	2 ½" PVC 1"	22
_____	Ball Valve 1"	23
_____	4 11/16" PVC 1"	24
_____	25" PVC 1" with holes and end cap	25
_____	Air Intake Valve	26
_____	Top screen	27
_____	Bushing Reducer 1 ½" to 1"	28
_____	2" PVC 1"	29
_____	Ball Valve 1"	30
_____	2" PVC 1"	31
_____	Elbow 1"	32
_____	6 in" PVC 1"	33
_____	Elbow 1"	34
_____	28" PVC 1" with holes and end cap	35