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TECHNICAL INFORMATION CHART

Model/Art. #	Pump Liter/Hr	U.S. Gal./Hr	Water Column Height Max. in + M	Watts	Filtering Area
FLUVAL 103 Art. #A-650	390 L/Hr	103 u.s. Gal.	4.27 Ft./1.30 M	7 Watts	1.182 Liter
FLUVAL 203 Art. #A-660	420 L/Hr	111 u.s. Gal.	4.27 Ft./1.30 M	7 Watts	2.216 Liter
FLUVAL 303 Art. #A-670	840 L/Hr	222 u.s. Gal.	5.25 Ft./1.60 M	15 Watts	3.70 Liter
FLUVAL 403 Art. #A-675	1200 L/Hr	317 u.s. Gal.	6.56 Ft./2.00 M	22 Watts	6.48 Liter

*Outputs stated are for pump units

INTRODUCTION

For the complete enjoyment, use, and understanding of this power filter it is recommended that this manual is thoroughly followed. Failure to do so may result in loss of fish life and/or damage to this filter. Save this manual for future reference.

FLUVAL Canister Filters are one of the most advanced filters on the market. Its many user features allow for greater control over the purity and water characteristics in the aquarium. They provide a greater amount of media area than any comparable filter. Aquarists are able to utilize that spacious area in many ways, depending on the needs of the individual tank. Many use a canister filter as the only filter for their system. Others are content to filter just one type of problem such as softening water. Many find it an excellent addition to existing filtration. The canister design allows the greatest flexibility for any aquarist.

Water must pass through all media before it returns to the tank. Most filters cannot support the same mass of media. Because of this, the life of filter materials is much longer, so maintenance requirements are lessened, while general water purity remains constant. Other filters fill the media with debris much more rapidly and flow becomes clogged sooner. In addition, media design forces the water into many channels and pathways to thoroughly purify all the water. Other filter styles must increase flow rates to compensate for smaller amount of media they contain.

The canister filter is designed to be placed to the side or below an aquarium. They can be kept out of sight so nothing can detract from the beauty of the fish and their surroundings. There are instances where the tank has been built into a wall or bar and more conventional power filters do not attach easily. Other specially constructed tanks often have overlooked the needs of a filtration system. The canister style is the best solution to many of these filtration problems.

FEATURES

The **FLUVAL** power filter has been designed to provide optimum aquarium filtration using a combination of mechanical and biological capacities. This will ultimately result in healthier fish and aquatic plant life. This filter is adaptable to many specific filter media allowing for specialized or general applications. Its many features allow for easy use by the advanced or novice aquarist.

The nature of the canister allows it to be hidden in the local surrounding of a tank. **FLUVAL** accepts very adverse conditions and still operates with no difficulty. The hermetically sealed motor is epoxy filled and requires no maintenance. **FLUVAL** can be operated in closed spaces.

FLUVAL Valves have been developed to allow precise control of water flow. When closed completely they aid in removal and replacement of the canister. When completely open, the valves allow unimpeded water flow, the advanced design has no blockage in the hose when fully open.

Hose locks are provided for each hose connection. These ensure that hoses and valves stay exactly where they are put, reducing potential leakage while the filter operates. There are no tools required for removal or replacement, while at the same time providing positive water control.

FLUVAL provides excellent surface agitation and oxygenation of the water when the return is placed near the top of the aquarium. Output can be securely positioned with strong suction cups anywhere in the tank. If placed near the surface, a spray is produced that thoroughly agitates the water. This provides adequate carbon dioxide removal, and oxygen replacement. Wherever the outputs may be placed, the strong flow rate produces currents strong enough to keep all water in constant motion.

There is no motor maintenance with **FLUVAL** filters. The motor has no moving parts. The only moving part in the unit is the impeller, which should be rinsed during media maintenance. A self cleaning feature keeps debris from collecting in the impeller well. A clear impeller cover allows easy visual checks on the impeller.

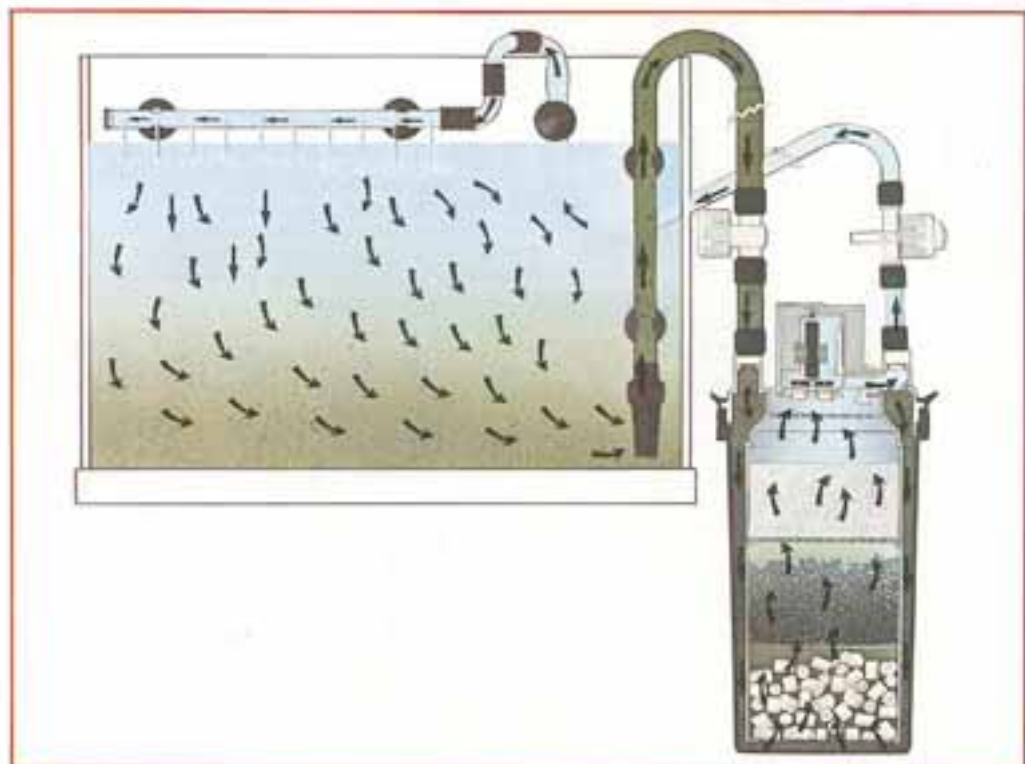
FLUVAL provides many alternatives to ordinary "wool"/carbon filtration. Three snap together filter modules allow an aquarist to pick the most effective media for his case. All the water must flow through each filter chamber before it is expelled. All water comes in contact with every type of media as it travels to the output hose. The triple chamber design makes the whole cleaning process less of a messy chore, while providing the opportunity to change only a portion of the media at one time. This preserves the bacterial action so important to a tank's well-being.

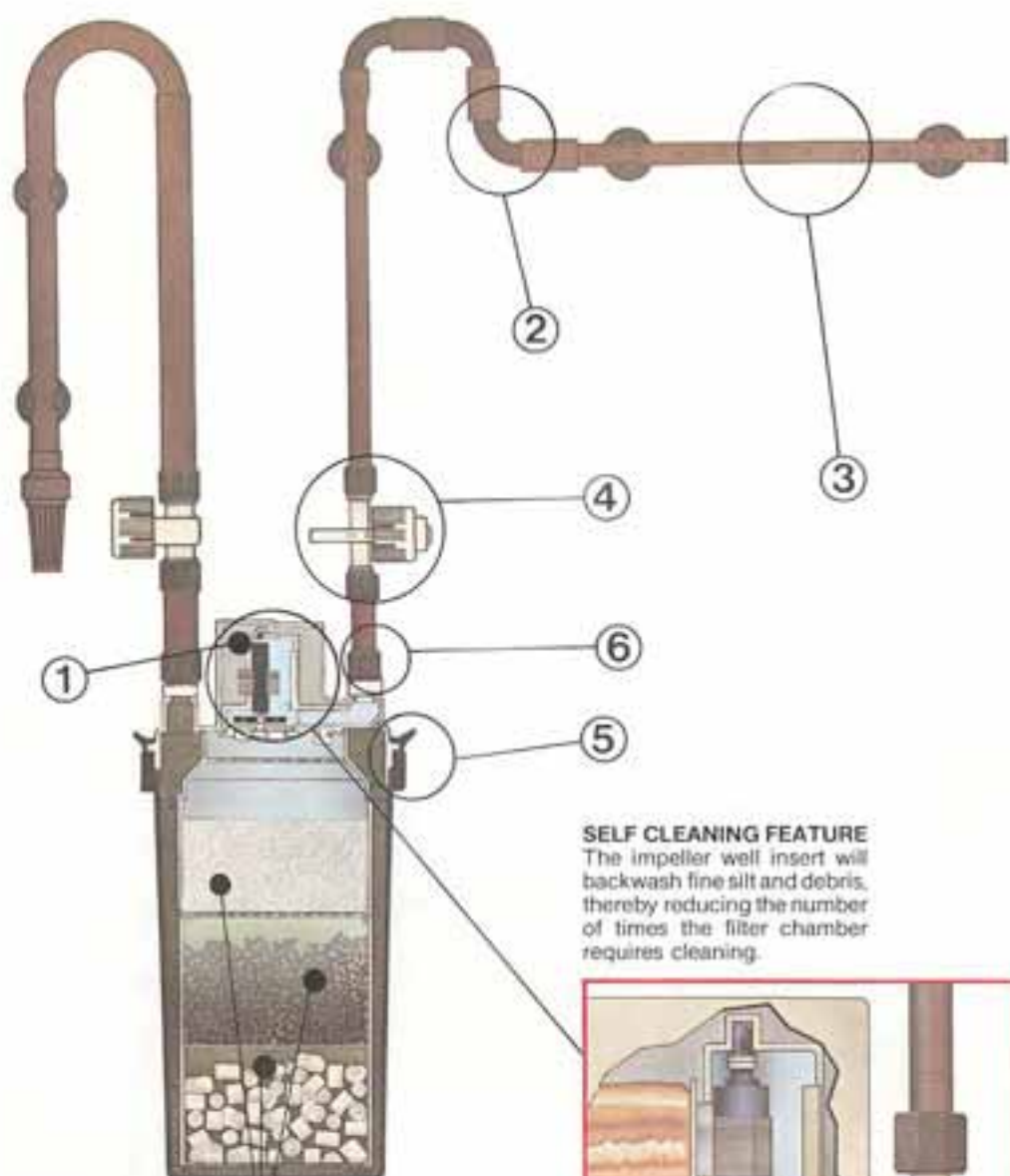
THE FILTER IN ACTION

The intake stem may be positioned anywhere within the tank. Preferably this will be in a location that is easily disguised by assorted decorations. The most usual placement is on the back wall of the aquarium. The intake stem draws water and debris near the aquarium's bottom into the filter unit by siphoning.

Water flows down the outside of the interlocked modules until it reaches the bottom of the filter case. It then enters the grid of the lowest module. The pump unit draws all water with its debris upwards through all three filter modules. Filter media removes particles and liquid impurities and can be used to change the chemical characteristics of the water, depending on the aquarist's needs. The water brings oxygen into the filter, feeding the needs of the beneficial bacteria, which make up a biological filter.

Purified water enters the impeller well to be pumped back to the aquarium. The return spray bar forces the water into numerous small streams of water. These agitate the surface as they enter the water. The spray produces currents to ensure no stagnant or "dead spots" are found in the tank.

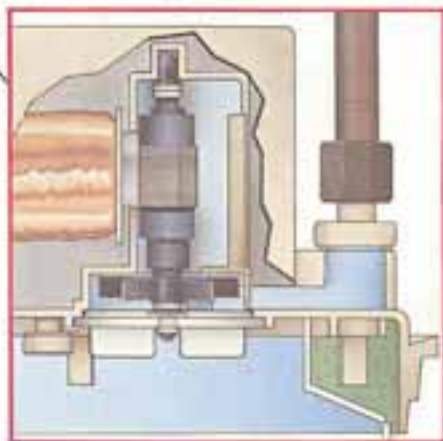




FILTER MEDIA MODULES
 3 interlocking modules allow easy, full or partial, Filter Media changes. Large filter media volume produces superb water purification. Each module provides maximum flexibility in filter media selection and use.

SELF CLEANING FEATURE

The impeller well insert will backwash fine silt and debris, thereby reducing the number of times the filter chamber requires cleaning.

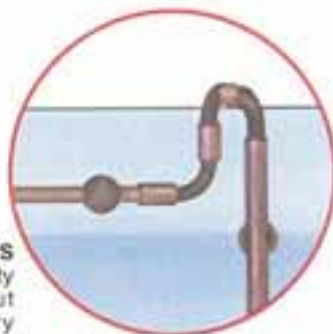




①

MOTOR UNIT

Strong, silent, hermetically sealed epoxy filled motor for safe, cool, and reliable operation in damp and wet areas. No motor maintenance is required. Energy saving low wattage.



②

RIGID ELBOWS

Provide maximum flexibility for installation without producing unnecessary water resistance. They allow easy exhaust stem installation to desired position in aquarium.



③

EXHAUST STEM

Provides water surface agitation and partial aeration if positioned above water level. Exhaust stem can be submerged in any desired location to encourage water movement throughout the entire aquarium.



④

HOSE VALVES

Specially designed to provide unimpeded water flow when completely open. Valve allows total control of water flow rate in and out of aquarium. O-ring construction produces positive closure to eliminate leakage during removal of filter for media changes.



⑤

FILTER CASE CLIPS

Plastic non-corrosive clips which lock motor onto filter case, prevents seepage.



⑥

HOSE LOCK NUTS

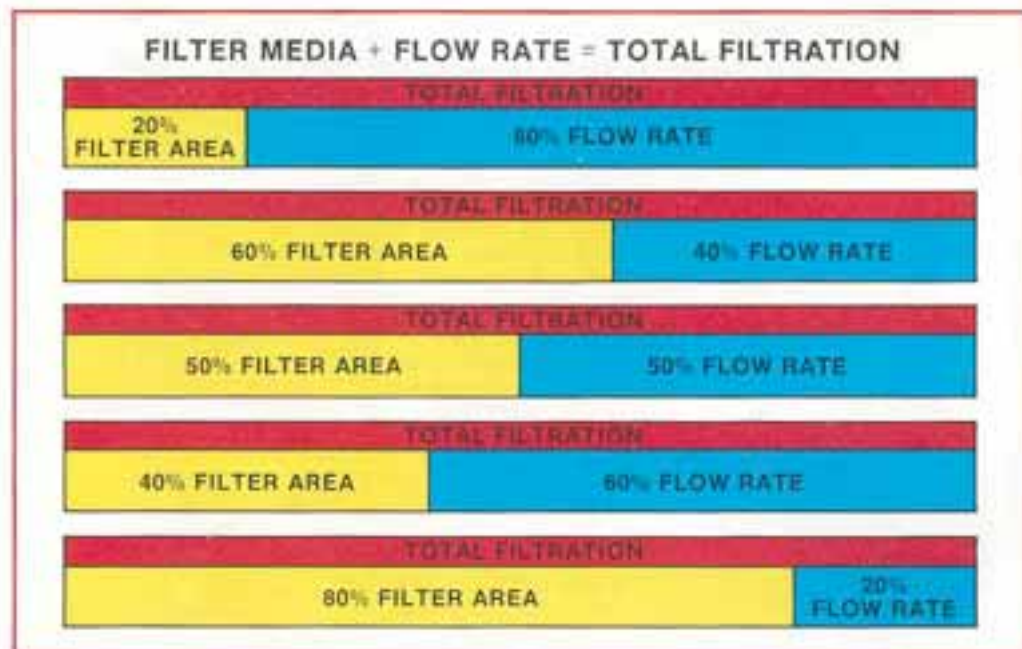
Safety connectors to ensure tight leak-proof seal and avoid accidental loosening or removal of hoses.

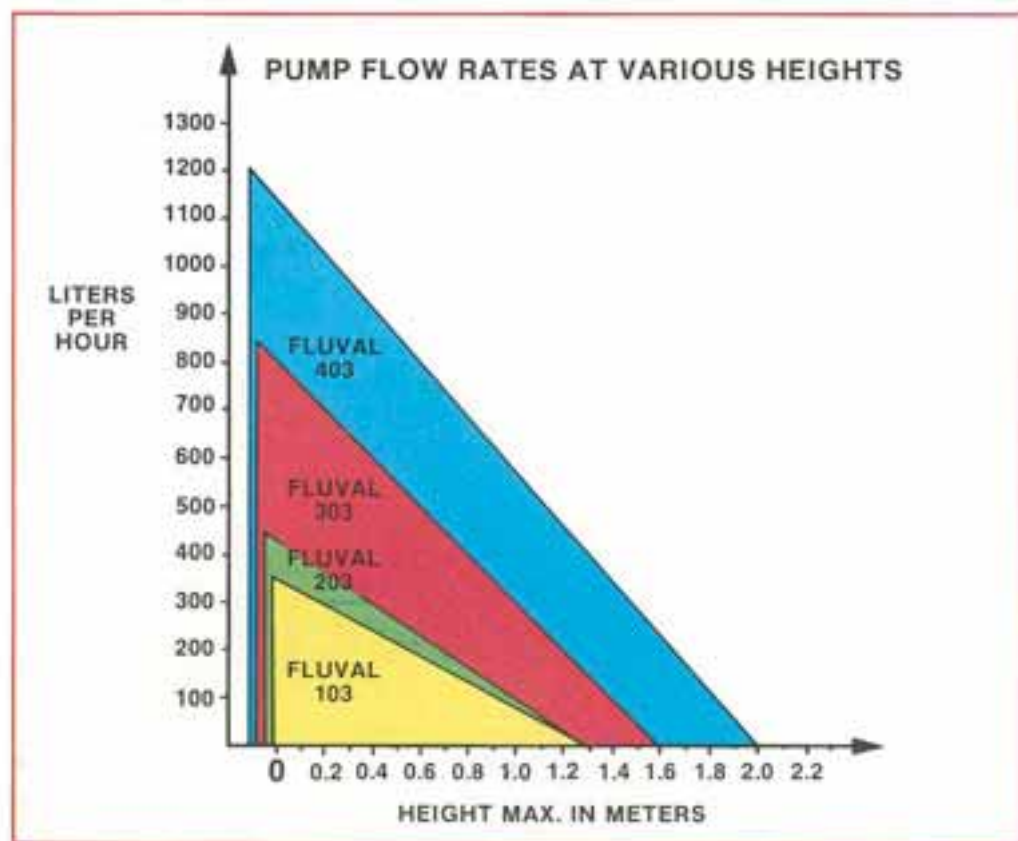
FLOW RATES

One important aspect of any filter is the amount of water circulated through the filter. As water enters the filter, it carries oxygen, an important requirement for bacteria. The more water filtered per hour, the cleaner the tank will remain.

FLUVAL filters have four sizes to handle all tank requirements from smallest to the largest commercial tanks available. Flow rates vary from 103 to 317 gallons per hour output depending on the model. An important factor in the choice of any filter is actual flow rate. The graph to the right shows the flow rates of the **FLUVAL** pumps at different heights. The flow rates, when the filters are installed, are also influenced by exhaust stems, valves, pipes elbows, and filter media.

FLUVAL return consists of flexible and rigid tubes to allow the return to be placed anywhere in an aquarium. Strong suction cups are provided to assure output tubes remain in position. The rigid spray bar can be used to spray water rather than a single stream. It is usually desirable to translate return flow into surface agitation with the spray bar. It is very important for oxygen to enter the water, and excess carbon dioxide be released to the atmosphere. This exchange can occur only at the surface. The more agitation, the more water molecules are brought to the surface to release carbon dioxide and accept oxygen.





The criteria for selection of the proper size filter are:

1. **FLOW RATE.**
2. **FILTER AREA.** More filter area means greater biological activity with purer output.
3. **ORGANIC LOAD.** Heavy populations require much greater filter capacity than tanks with few occupants.
4. **SPECIALIZED APPLICATIONS.** Some specially shaped tanks require greater filter capacities than standard shapes. This is especially true for tall tanks with little surface area.

It doesn't hurt to have extra filters in the aquarium set up. Increased filtration will never harm the fish, but too little in a tank can be deadly.

INSTALLATION INSTRUCTIONS

**** NOTE ****

READ ALL INSTRUCTIONS BEFORE ATTEMPTING TO INSTALL FILTER

A) REMOVE MOTOR FROM FILTER CASE

Unsnap all filter case clips along the top rim of the filter case. Hold motor and case cover firmly and withdraw from case. The media modules and contents will remain in the case.

B) LOAD FILTER MODULE

Remove the filter modules from case: Disassemble individual modules and cover, hold modules firmly and twist. When the module will turn no further, pull apart. All new media should be rinsed to remove excess dust or debris before use.

Efficiency is directly affected by the filter materials used. In **FLUVAL** units it is crucial that proper procedures be carefully followed. Otherwise, the mechanical or biological filtration of the unit may be impaired. Although numerous types of media are available, the normal procedure for all is similar. To ensure the maximum utility of the filter, the following basic sequence should be followed.

BOTTOM MODULE: This should always contain a large sieving material specifically designed to trap large debris before it can reach and clog the finer meshes of higher chambers. **FLUVAL** Pre-Filter is perfect for the job, the inert ceramic rings trap large particles while at the same time providing a location for beneficial bacteria.

MIDDLE MODULE: This module can contain the greatest variety of filter media. Carbon, Peat, Ammonia Remover are some of the materials available. Quantity and type depends on the specific job(s) to be done.

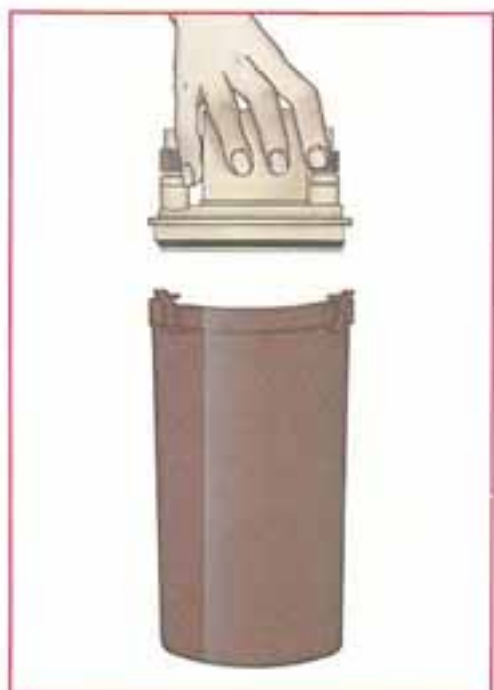
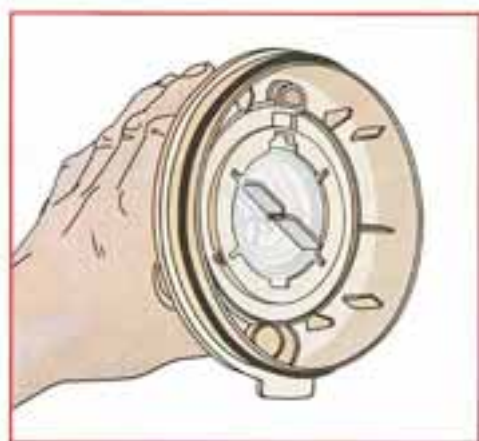
This chamber is normally used to remove liquid impurities from the water. Carbon is the most effective for this. If there are multiple filtering requirements, materials can be combined in this chamber as necessary. If there is insufficient space in the middle chamber, excess media can be placed in any space remaining in the bottom chamber after the pre-filter has been added.

TOP MODULE: This module should be filled only with the proper **FLUVAL** Foam Block. Foam blocks completely fill the chamber and do not compress or become clogged. There can be no disintegration of material into the impeller. The foam is used to remove the fine particles that have travelled through the rest of the modules. Another major function is to provide adequate attachment points for beneficial bacterial populations to enhance biological filtration.

After each module has been loaded, assemble the modules and cover. Place the assembled modules into the filter case.

Wet filter seal ring and mount on the bottom ledge of filter cover. To prevent kinking, stretch seal ring.

Place motor unit onto filter case. Press down evenly to seat firmly into filter case. Lock with case clips. Ensure the filter seal ring is seated properly.



FILTER ASSEMBLY

1. Place filter in desired location beside or beneath the aquarium. Be sure the filter is situated below the water level of the aquarium.

FILTER MUST NEVER BE ABOVE WATER LEVEL.

2. Measure the required amount of hosing for intake and exhaust system and cut to desired length.

3. Three hose connectors are provided (four only for the **FLUVAL 403**). Cut one piece of hose of about 2 - 3 inches (5 - 7 cm) from each hose to install the hose valves.



4. Attach one connector hose to intake spout and one to output spout. Lock into place with hose lock nut.

5. Install a hose valve into end of each positioned connector hose and tighten hose lock nut.

6. Attach hose to valve on the IN spout, and tighten with hose lock nut.

7. Place strainer on bottom of long end of intake stem. Measure and cut intake hose to proper length between intake stem and canister valve. Attach intake hose to short end of intake stem. Position two suction cups on intake stem and attach to tank.

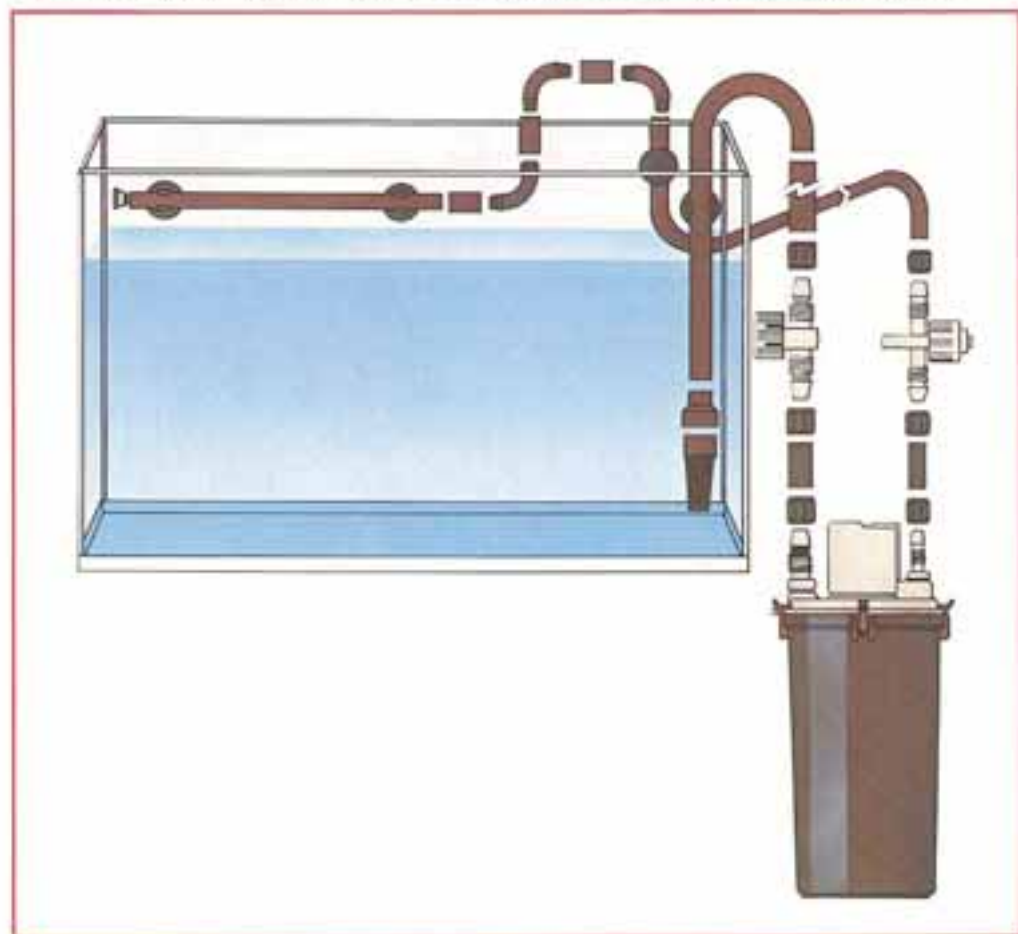
8. Attach hose to OUT spout valve, and fasten with hose lock nut.

CONNECTOR HOSE CHART

Art. # 650	Fluval 103	— 5	2"-3" (5-7 cm) Hose Connectors
Art. # 660	Fluval 203	— 5	2"-3" (5-7 cm) Hose Connectors
Art. # 670	Fluval 303	— 4	12mm Diam. 2"-3" (5-7 cm) Hose Connectors
		— 1	14mm Diam. 2"-3" (5-7 cm) Hose Connectors
Art. # 675	Fluval 403	— 6	14mm Diam. 2"-3" (5-7 cm) Hose Connectors

9. (For **FLUVAL 403**; Connect both spray bars together with connector hose, if desired, otherwise.) Determine position of spray bar and attach two suction cups on spray bar. Plug end away from rigid elbow with exhaust plug, join open end to rigid elbow with connector hose. Use remaining connector hoses and rigid elbows to form angle over aquarium side. Measure the hose from the output of the filter to the rigid elbow. Cut to appropriate length.

10. Fully open both valves. Before final connection of exhaust assembly, air must be sucked from the exhaust hose. This will create a vacuum in the intake tube. Be sure the tube fills with water as it flows into the canister. The siphon effect will fill the filter unit with water. As canister fills, complete exhaust installation by connecting hose to elbow. Once water level in the hosing is at the same height as the aquarium, connect to electrical supply. Be sure no air is in the intake tube, and that the spray bar is operating. In case of airlock, hold unit sideways in such a way as to release any trapped air in pump unit.



MAINTENANCE PROCEDURES

MEDIA MAINTENANCE

Filter materials must be periodically replaced or cleaned. The various **FLUVAL** media have instructions for use on the individual packaging. Actual lifespan of any type of media varies according to usage and the individual characteristics of an aquarium.

Unplug filter. Close both hose valves. Loosen hose connectors under valve and remove filter. If hoses become dirty, remove from tank and clean with **FLUVAL** Hose Cleaner Brush. Otherwise, it is not necessary to remove hose installation. Filter may now be removed for cleaning.

Unclip case and remove the motor assembly from filter case. Remove modules. Separate modules, rinse or replace media as required. The filter case should be rinsed whenever media is changed. Use warm water. Never use soap or detergents when cleaning. Any traces may damage sensitive fish tissues. Re-assemble modules and replace in canister. Do any required impeller care. Position filter seal ring, close and clip case.

Re-locate filter, connect hose connectors and open OUT valve first. Then open IN valve. If the valve is below aquarium water level, water should begin to siphon. If it does not, remove hose from spray bar and blow excess air out of filter case and intake tube. When siphoning starts, re-assemble exhaust to hose. Connect power and ensure all is working correctly.

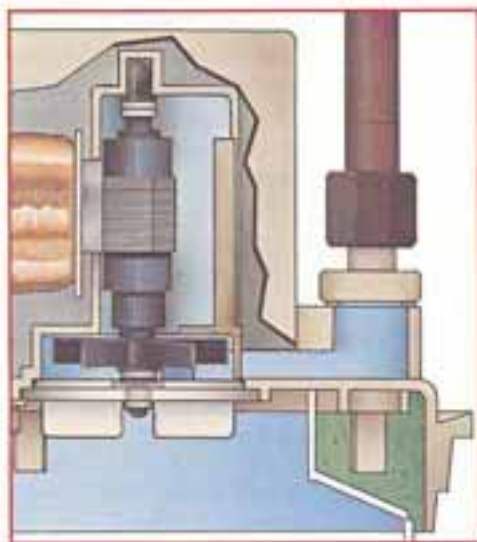
IMPORTANT

Filter media should be changed at the regular recommended intervals. However, not all media should be replaced at one time. Stagger filter material changes so there is always old material in the filter. This enhances replacement of important bacterial colonies lost with discarded media by allowing more rapid seeding for continued bacterial action within the filter.

WARNING: PUMP MUST NEVER BE ALLOWED TO RUN DRY.

MOTOR MAINTENANCE

The motor unit is hermetically sealed and as such does not require lubrication or other care. The impeller rests in a clear see-through cover to allow occasional spot checks for dirt and grime when the media is being changed. The impeller well has an effective self cleaning feature, but regular maintenance will help to lengthen the life of the impeller and motor unit. Rinse dirt or slime from impeller well periodically.



The impeller should be cleaned during every filter change. Twist cover until it comes free, and withdraw impeller with cover. Dirt and slime should be rinsed from the impeller before replacing. Be sure that all parts on the impeller shaft are not lost during cleaning.



Occasional removal of the plastic well insert to ensure free water movement is recommended. To remove, press finger against insert to filter case and pull upward until insert is free. See Diagram.



Replace impeller. Place the rubber shaft mount closest to plastic impeller fan into the impeller cover. Slide impeller into well, position cover and turn cover until it is secure.

NEVER

PLACE IMPELLER IN IMPELLER WELL AND THEN TRY TO POSITION COVER, THIS CAN JAM IMPELLER.

The impeller will wear over a longer period of time. Replacement parts may be ordered from your local pet dealer.



TYPES OF FILTRATION

It is most important to remove particulate waste suspended in water before it can decay or otherwise foul the biosphere.

“Mechanical Filtration” refers to passing dirty water through some form of sieve to remove impurities. **FLUVAL** filters use foam and **PRE-FILTER** media to do this job. Both materials force water into many channels where it goes up, down, and through complicated pathways before passing out of the filter. This complex path actually increases actual filtering area many times the measurable volume. Carbon or charcoal also remove liquid impurities from water by trapping them in the carbon matrix.

“Biological Filtration” is extremely important. It reduces organic poisons created in the aquatic chain of life. Urination, defecation, and respiration by fish produce ammonia as a by-product. Excessive feeding, dead or decaying plant and animal matter also produce ammonia as it is degraded by bacteria. Ammonia in aquarium water is deadly to fish even in minute quantities. Fortunately, there are “helpful” bacteria that use ammonia as an energy source. *Nitrosomonas* bacteria reduce ammonia to nitrite.

Nitrite is also extremely toxic to fish. In new tanks, levels of both nitrite and ammonia can build to toxic levels rather rapidly if there are too many fish and not enough beneficial bacteria. A second strain of bacteria (*Nitrobacter*) reduces nitrite to less harmful nitrate. This can only be removed by regular water changes.

These important bacteria require a place to attach and multiply to become effective for biological filtration. **FLUVAL** filters provide a suitable substrate to promote a healthy population of bacteria with standard **FLUVAL** media. Foam inserts and Pre-Filter provide a generous surface area for biological filtration to develop. Other media in the filter case also provide some attachment nodes.

"**Chemical Filtration**" refers to active change of water conditions by chemical means. Ammonia and a number of other toxins can be reduced chemically. Peat is used to soften and acidify water naturally for specialized breeding purposes. There are numerous ion exchangers and water conditioning media available for many specific jobs. Crushed coral or coral sand is often used to buffer water. Canister filters allow a number of chemically oriented jobs to be combined with other filtering activities.

FLUVAL FILTER MEDIA

FLUVAL FOAM INSERTS come packaged for each size **FLUVAL** filter. The construction of the foam inserts allows plentiful bacterial populations for biological action. Abundant pores in the foam provide multiple attachment points for bacteria. Porous construction also enhances mechanical removal of smaller wastes missed by lower modules. The numerous pathways that the water is forced to travel as it flows through the block also increases the filtering efficiency. The actual area the water must travel through can be greater than ten times the measurable volume of the foam block. Although not permanent, the sponge inserts can be rinsed and re-used a number of times before replacement.





FLUVAL PRE-FILTER consists of inert ceramic rings used to trap large particles before they clog the finer sieves of the modules above. The media forces water into many complex paths as it moves through this layer, further increasing its mechanical and biological activity and filtering area. An additional benefit, it supports large populations of bacteria for proper biological action on ammonia and nitrite. This reduces the need for frequent changes of the active filter media. **PRE-FILTER** is permanent, and requires only occasional rinsing.

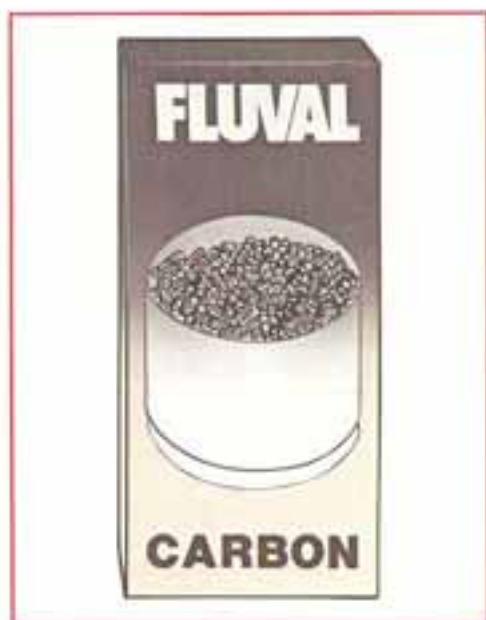
FLUVAL AMMONIA REMOVER removes ammonia before it can harm fish. An effective addition to normal filter media, it reduces unacceptable levels of ammonia. In chloramine treated water, it helps remove excess ammonia created when the chloramine bond is broken.





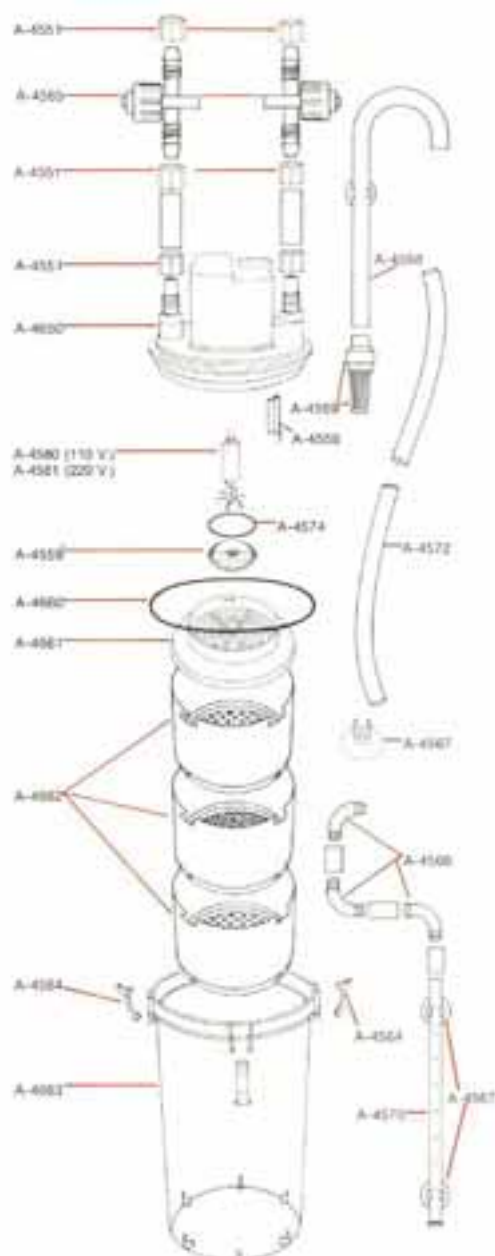
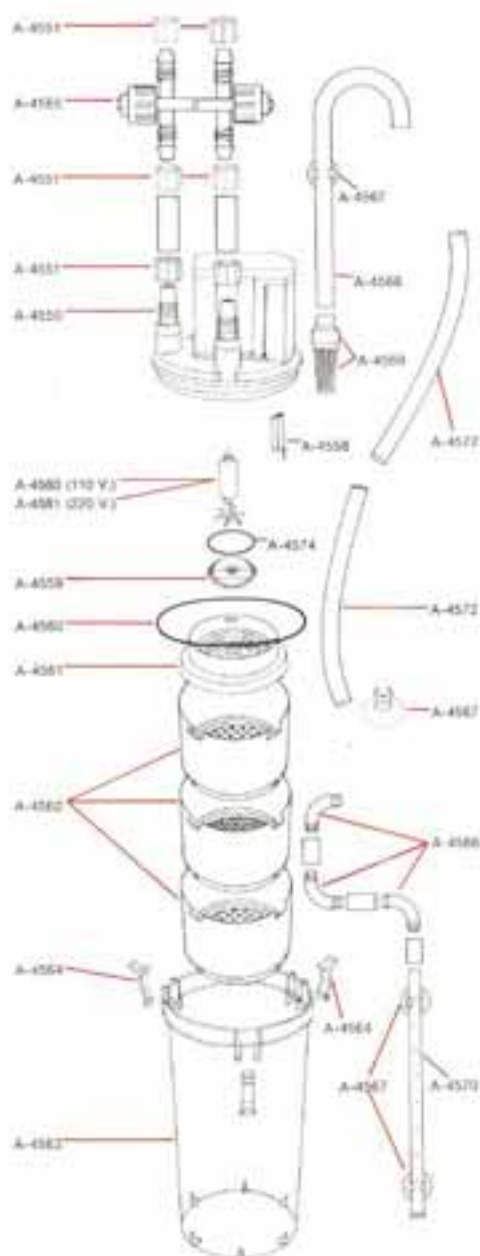
FLUVAL PEAT softens, darkens, and acidifies aquarium water for fish. Peat is used to produce suitable water for spawning fish which require soft, acid water to breed. It imparts a brownish tinge found in some native jungle habitats. Many advanced aquarists require this to safely recreate the Amazonian environment and other tropical conditions for fish that require them for successful spawning. Peat often safely reduces hardness or alkalinity found in some water supplies to acceptable levels for fish.

FLUVAL ACTIVATED CARBON provides many benefits. The high quality carbon provides a large porous area to trap minute particles. Besides providing a small sieve for mechanical trapping of organic wastes, carbon also removes liquid wastes from water. These include urine, dyes, or impurities in solution. This action provides sparkling clear water in the aquarium. The large internal surface area also provides numerous points for important bacterial colonies to form and thrive. Carbon should always be removed during medication.

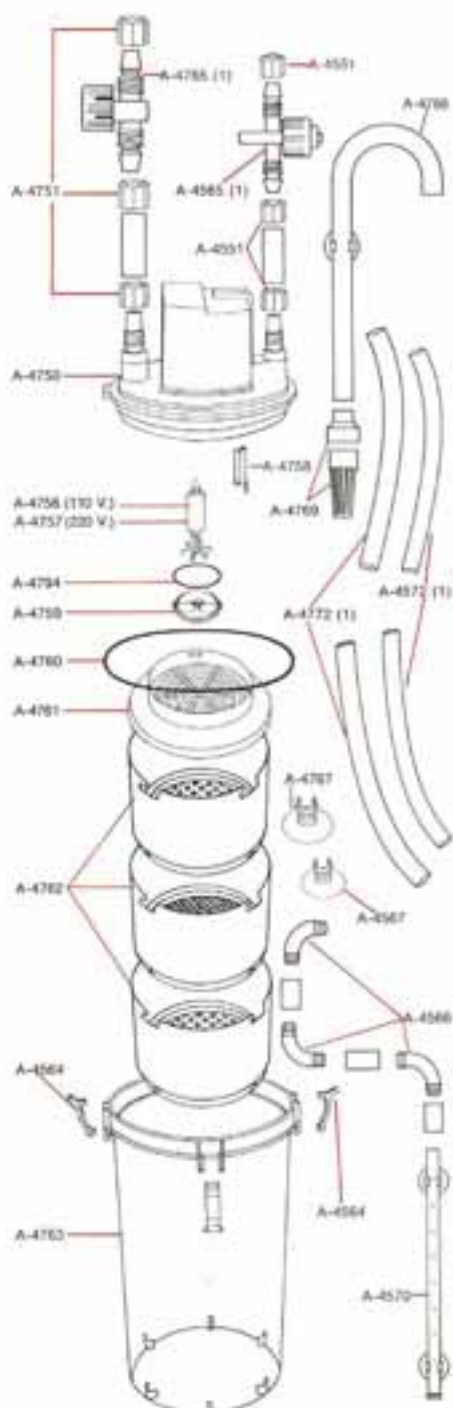


PART DESCRIPTION**PART #**

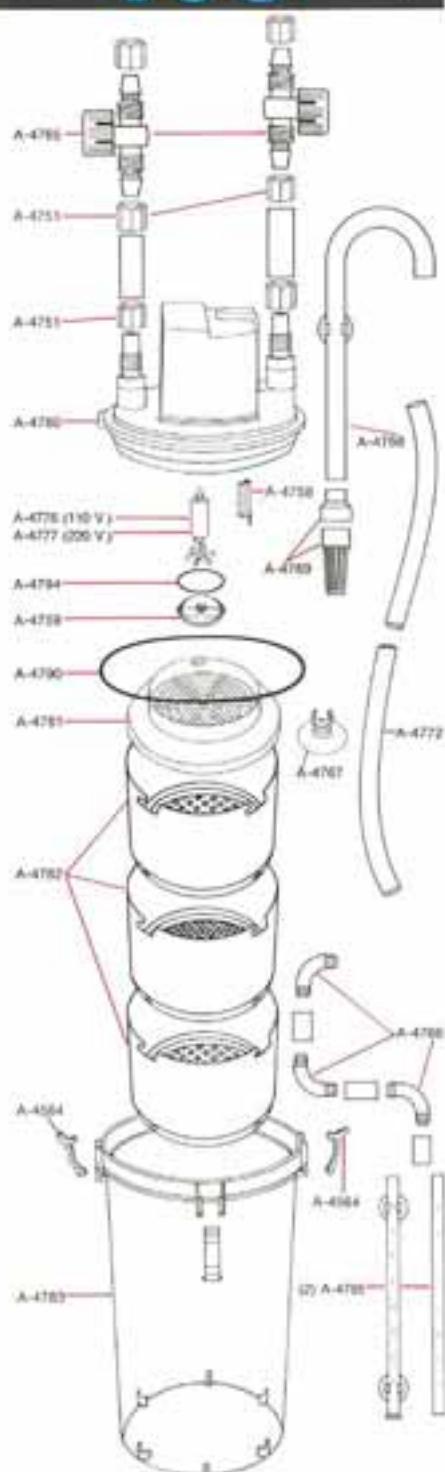
Pump Unit 103	A-4550
Pump Unit 203	A-4650
Pump Unit 303	A-4750
Pump Unit 403	A-4780
Hose Lock Nut \varnothing 12 mm.	A-4551
Hose Lock Nut \varnothing 14 mm.	A-4751
Complete Impeller 110 V	A-4580
Complete Impeller 220 V	A-4581
Complete Impeller 110 V	A-4756
Complete Impeller 220 V	A-4757
Complete Impeller 110 V	A-4776
Complete Impeller 220 V	A-4777
Impeller Well Insert 103, 203	A-4558
Impeller Well Insert 303, 403	A-4758
Impeller Well Cover 103, 203	A-4559
Impeller Well Cover 303, 403	A-4759
Seal Ring \varnothing 40 mm. (Cover)	A-4574
Seal Ring \varnothing 60 mm. (Cover)	A-4794
Seal Ring \varnothing 105 mm. (Case)	A-4560
Seal Ring \varnothing 130 mm. (Case)	A-4660
Seal Ring \varnothing 160 mm. (Case)	A-4760
Seal Ring \varnothing 185 mm. (Case)	A-4790
Filter Module Cover 103	A-4561
Filter Module Cover 203	A-4661
Filter Module Cover 303	A-4761
Filter Module Cover 403	A-4781
Filter Module 103	A-4562
Filter Module 203	A-4662
Filter Module 303	A-4762
Filter Module 403	A-4782
Filter Case 103	A-4563
Filter Case 203	A-4663
Filter Case 303	A-4763
Filter Case 403	A-4783
Filter Case Clip	A-4564
Hose Valve \varnothing 12 mm.	A-4565
Hose Valve \varnothing 14 mm.	A-4765
Rigid Elbow \varnothing 12 mm.	A-4566
Rigid Elbow \varnothing 14 mm.	A-4766
Suction Cup \varnothing 12 mm.	A-4567
Suction Cup \varnothing 14 mm.	A-4767
Intake Stem \varnothing 12 mm.	A-4568
Intake Stem \varnothing 14 mm.	A-4768
Intake Strainer \varnothing 12 mm.	A-4569
Intake Strainer \varnothing 14 mm.	A-4769
Exhaust Stem \varnothing 12 mm.	A-4570
Exhaust Stem \varnothing 14 mm.	A-4795
Water Hose \varnothing 12 mm.	A-4572
Water Hose \varnothing 14 mm.	A-4772
Fluval Hose Brush	A-1227



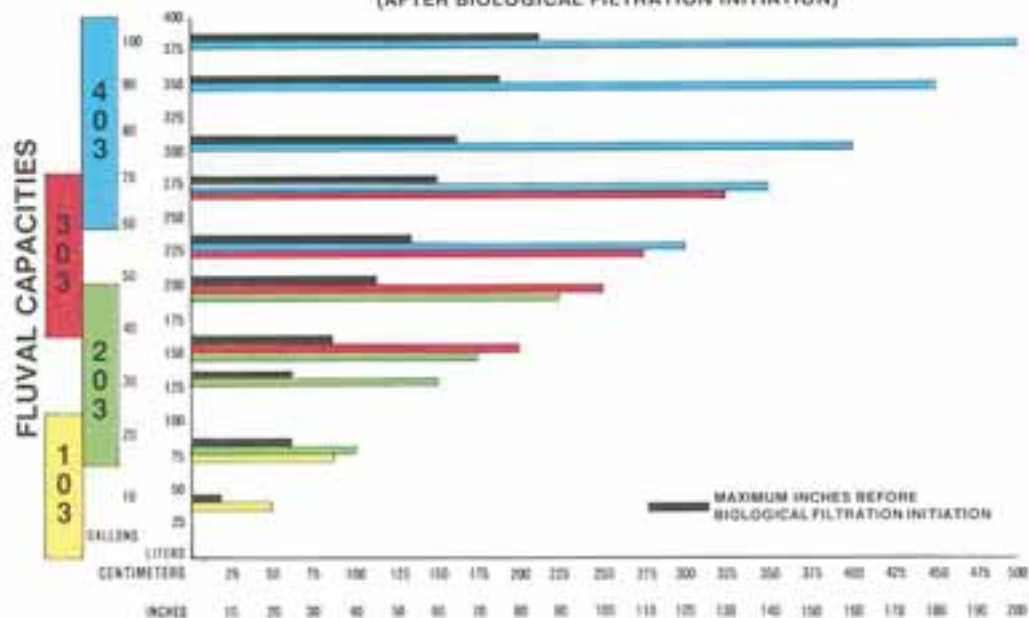
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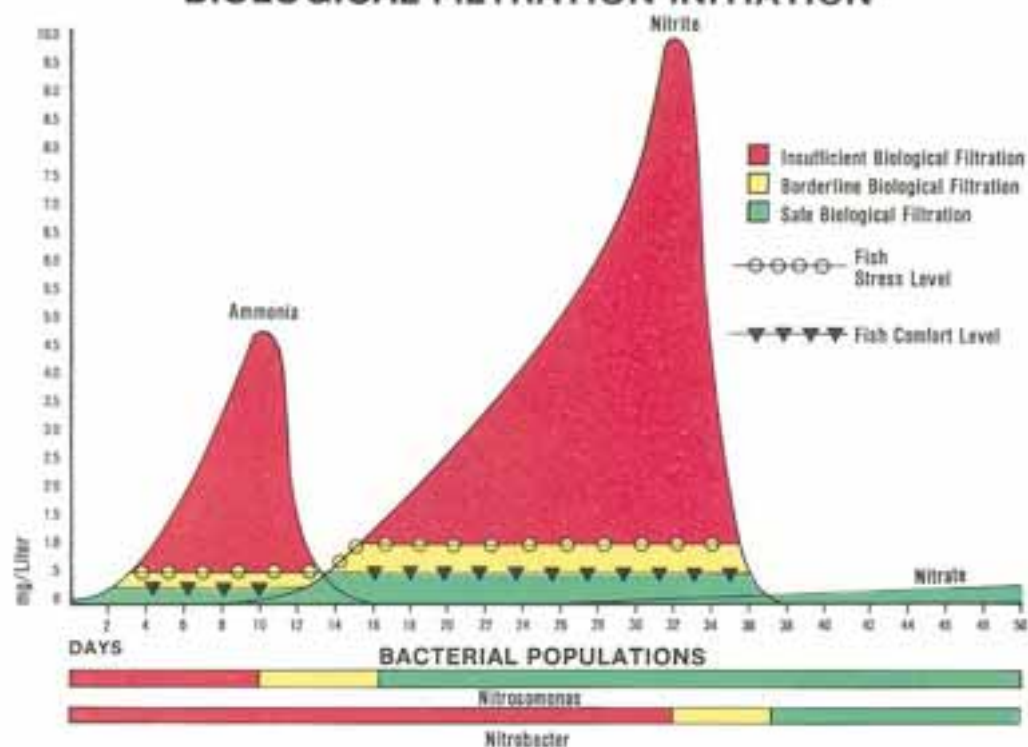
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MAXIMUM FISH CAPACITY IN INCHES (AFTER BIOLOGICAL FILTRATION INITIATION)



BIOLOGICAL FILTRATION INITIATION



FLUVAL

GUARANTEE

The **FLUVAL** motor filter is unconditionally guaranteed for defects in material and workmanship for a one year period from date of purchase. This guarantee is limited to the repair or replacement of the motor unit only, and excludes damage to any animate or inanimate matter, in contact with the filter. For guarantee service or spare parts contact your local **FLUVAL** dealer or write to the **FLUVAL** representative in your country.

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