



Aquarium Technical Reference Booklet
Featuring the Professional Guide for the Fish Retailer
for Minimising Fish Loss



Table of contents

Professional Guide for the Tropical Fish Retailer to Minimise Fish Loss	59
Tropical Fish Medications	65
MelaFix®	65
PimaFix™	65
White Spot Cure™	66
Liquid Fungus Cure™	66
API® Aquarium Salt	66
Tap Water Filtration System	67
Tap Water Filter™	67
Water Chemistry Products	69
Proper pH®	69
pH UP® and pH DOWN®	70
Ammo-Lock®	71
Water Softener Pillow	73
Tap Water Conditioner	73
Stress-Zyme®	73
Stress Coat®	74
Accu-Clear®	75
Fish Feeders	77
The 7-Day Pyramid Fish Feeder™	77
The 3-Day Pyramid Fish Feeder™	77
Filtration Products	78
Activated Filter Carbon	78
Ammo-Chips®	79
Bio-Chem Stars®	79
Bio-Chem Zorb®	80
Phos-Zorb™	81
Nitra-Zorb™	81
Water Testing Products	84
Freshwater pH Test Kit	84
Freshwater/Saltwater High Range pH Test Kit	84
pH Test Kit & Adjuster	84
Freshwater/Saltwater Ammonia Test Kit	84
Freshwater/Saltwater Nitrite Test Kit	84
Freshwater/Saltwater Nitrate Test Kit	84
Freshwater Gh & KH Test Kit	85
Freshwater/Saltwater KH Test Kit	85
Freshwater Master Test Kit	85
Saltwater Master Test Kit	85
Freshwater/Saltwater Professional Liquid Test Kit	85
Saltwater Calcium Test Kit	86
Freshwater/Saltwater Copper Test Kit	86
Freshwater/Saltwater Phosphate Test Kit	86
Aquarium Plant Products	87
First Layer® Pure Laterite	87
Leaf Zone®	87
Root Tabs	87

A professional guide for the tropical fish retailer to minimise fish loss:

Introduction

Nothing is more important to the success of the tropical fish retail business than providing healthy fish to customers. Fish health in a store strongly depends on how they are handled and prepared for sales, although disease in new shipments of fish is sometimes unavoidable. The following guide outlines ways to practice preventive maintenance in order to minimise fish illness and loss. The techniques that are discussed are the result of years of research in tropical fish handling, stress reduction and disease prevention.

Receiving Tropical Fish – The “All In/All Out” Technique

Research has shown that all aquarium fish carry a variety of pathogenic organisms (e.g. bacteria, fungi and parasites). The aquarium itself also harbours these disease-causing organisms, particularly in the gravel bed. If aquarium fish are in good health, are well-fed and are provided with the appropriate water conditions, their immune system will resist attack from disease organisms. However, newly arrived tropical fish experience stress due to handling and less-than-ideal water quality in their shipping containers, leaving them vulnerable to disease. That is why, when possible, new fish should not be mixed with fish already in the store aquariums. Consolidating existing fish stock into a few aquariums and keeping them isolated from new arrivals will prevent the spread of disease. This is called the ALL IN/ALL OUT technique. If new fish are found to be diseased, it is far more economical to treat one or two aquariums than every aquarium in the store.

Preparing for New Fish

Here are some additional preventive measures:

- Consolidate your existing stock of fish according to compatibility as much as possible.
- Perform a large water change and siphon the gravel bed.
- When possible, adjust the pH level of aquarium water for the needs of the particular tropical fish being received.
- Add aquarium salt to help reduce stress of newly arrived fish (except for salt-intolerant species). Aquarium salt aids fish in osmoregulation, and the exchange of oxygen, carbon dioxide and ammonia across gill membranes.

[Add 3/4 cup (220 g) of **API® AQUARIUM SALT** for every 50 gallons (190 L) of aquarium water.]

- Check the water temperature. Most tropical freshwater fish require a temperature range of 23-26°C (74-78°F). Goldfish prefer cooler water, ideally between 20-22°C (68-72°F).
- Draw on your prior experience with new shipments of fish to anticipate problems. Some species may show vulnerability to a particular disease, so be prepared to treat these fish when they arrive.

Protect the Slime Coat

Fish possess a natural slime coating which helps prevent the loss of electrolytes from their gills and skin and provides a protective barrier from disease. Unfortunately, this protective slime coating is disturbed every time fish are netted, significantly increasing the risk of disease.

Added Disease Protection

Adding **STRESS COAT®** and **MELAFIX®** to aquarium water will reduce stress and assist in maintaining fish health. **STRESS COAT®** provides fish with a synthetic slime coat to reduce electrolyte loss and vulnerability to pathogens. It contains an extract of Aloe Vera that has been shown through an independent study to aid in healing of damaged fish tissue, (see page 74).

MELAFIX® has powerful antibacterial properties to treat wounds and promote rapid tissue healing, as proven by independent study. **MELAFIX®** also promotes rapid repair of damaged fish tissue and fins. New growth has been seen in as little as four days of treatment. **MELAFIX®** is an all-natural medication derived from the leaves of Melaleuca, the scientific name for the tea tree. The extensive evidence for both **STRESS COAT®** and **MELAFIX®** has led to the granting of both International and United States patents. Additionally, using **STRESS COAT®** will neutralize any chlorine, chloramines and heavy metals in aquarium water. Add 1/4 cup (50 ml) of **STRESS COAT®** and 1 teaspoonful of **Professional Strength MELAFIX®** to each 50 U.S. gallons (190 L) of aquarium water to protect fish. Repeat **MELAFIX®** treatment each day for 3 consecutive days.

ADDITIONAL TIPS

Never add fish to an aquarium along with the shipping water.

The shipping water may contain disease organisms, ammonia and organic pollutants and should be discarded. Instead, pour new fish out of shipping bags into a net and then add the fish to prepared aquariums. It is not necessary to add aquarium water to shipping bags. Fish adjust quickly to well-oxygenated, ammonia-free aquarium water and do not need to be acclimated to it.

Immediately inspect the new fish and remove dead or dying fish.

In most cases, dying fish will not respond to treatment. If they are left in the aquarium to die, they could infect other fish. Never allow healthy fish to eat dead fish; direct transmission of disease organisms could result.

Continue to observe new fish closely for 48 hours after arrival.

Look for the disease symptoms described in this guide. Begin treatment with appropriate medication as soon as symptoms are observed.

Using Medications: Treatment for Parasites

- New stock may be harbouring external parasites, such as the protozoans Ichthyophthirius (whitespot parasite) and Trichodina. Most of these parasites are invisible to the naked eye. A routine treatment with a general protozoal remedy such as **WHITE SPOT CURE™** will control many of these external parasites.
- Secondary bacterial and fungal infections can arise from skin abrasions or fighting damage incurred during shipment, or from damage caused by certain parasitic infections. An antibacterial treatment like **MELAFIX®** can be used in conjunction with an anti-fungal, such as **PIMAFIX™**, to help prevent and combat bacterial and fungal infections in fish.

Bacterial and Fungal Infections in Aquarium Fish

Disease-causing organisms are present in all aquariums. Any time a physical abrasion damages fish tissue, bacterial and fungal pathogens seize the opportunity to infect the fish. Shipping, netting, and poor water quality also weaken the fish's immune system, permitting disease problems to occur. Skin and fin abrasions are an unavoidable part of fishkeeping. Therefore, the potential for disease problems occurs with every new fish arrival, whether it is at the hatchery, fish wholesaler, aquarium shop, or in the home aquarium.

External bacterial infections cause a variety of symptoms including split and ragged fins. In extreme cases the fins erode back to the body. Eyes may become coated with a whitish slime or protrude from the head. Bacterial infections cause hazy, slimy patches to form on the body. These patches may develop into red ulcers. "Mouth Fungus," caused by *Flavobacterium* (formerly *Flexibacter*), causes mouth tissue to deteriorate and may appear as tufts of cotton.

Fungal infections usually occur as a secondary infection, invading tissue already damaged by bacterial and parasitic diseases. Fungi also attack fish that have been weakened by rough handling, shipping, exposure to ammonia and nitrite, improper netting, and malnutrition. Fungal pathogens use digestive enzymes to feed on the fish tissue. These enzymes damage nearby healthy tissue, allowing the disease to spread. Common symptoms include white cottony growths on fins, skin, and mouth of fish. Healing of the damaged tissue will speed the elimination of the fungal disease.

Treatment for Bacterial Infections

- Always complete a regimen of treatment with a general antibacterial (such as **MELAFIX**[®]). Stubborn or severe bacterial infections (e.g. internal bacterial infections) may require a course of antibiotic treatment, available on prescription from a vet (antibiotics should not be used in aquariums with live plants).
- **MELAFIX**[®] is a natural antibacterial medication and can be used in planted aquariums.
- With some bacterial infections, a treatment may be ineffective due to drug resistance. Bacterial resistance to certain antibiotics is particularly common. In such cases, another antibiotic or natural antibacterial medication must then be chosen and applied. **MELAFIX**[®] can be used with any **API**[®] medication, if necessary.

Disease Treatment Guide

Use the following guide to detect the most common symptoms of parasitic, fungal and bacterial diseases, and then follow the recommended treatments. In some cases, several medication choices are listed to treat a particular disease. Make your treatment selection in the order that these medications are recommended. Bacterial pathogens are sometimes resistant to one of the medications; thus, if the first medication does not cure the disease, it will be necessary to use the next medication listed.

I. Parasites ICH (WHITESPOT)

Causative Agent:

Ich, also known as white spot disease, is caused by the skin parasite

Ichthyophthirius

multi-filiis. The life-cycle involves a parasitic stage within the fish's skin followed by free-living stages in the gravel or water. The infective stage (known as a theront) occurs in the water and is invisible to the naked eye. When an actively swimming theront contacts a fish it burrows into its skin or gill tissue. It then transforms into the parasitic "trophont" stage that feeds and grows until it reaches the size of a sugar grain. Once mature, the trophont exits the fish and falls to the bottom of the aquarium or pond where it rounds up to form the reproductive "cyst". Each cyst eventually releases up to 2000 infective theronts, so completing one generation. Ich causes damage by breaching the protective skin and gill layers, rendering these tissues vulnerable to secondary bacterial or fungal infections. Damage to the skin and gills also results in loss of electrolytes and respiratory stress.

Appearance:

- Early symptoms of this infection in fish include darting in the aquarium and scratching against the gravel and ornaments.
- Fish exhibit laboured breathing and may remain at the water's surface, near filters and aeration devices.
- White spots may or may not be visible on fish.

Treatment:

1. Quarantine the aquarium. Do not remove fish from or add fish to the infected aquarium; parasites can be spread to other aquariums by nets, algae scrapers and wet hands.
2. Optional: raise water temperature to 29°C (85°F) (assuming the fish species in question will tolerate this high temperature). Parasites can be



killed only while they are in the free-swimming theront stage before they attach to fish. Raising the temperature speeds up the life cycle of the parasite, bringing it to the treatable, theront stage.

3. To aid osmoregulation and ease stress of infected fish, add 1 tablespoonful (18 g) of **API**[®] **AQUARIUM SALT** for each 5 gallons (19 L) of aquarium water. (except for salt-intolerant species)
4. Remove activated carbon and continue aeration. Add one dose of **WHITE SPOT CURE**[™] to the aquarium as directed. Wait 48 hours and repeat the dose.
5. Wait another 48 hours, then change 25% of the aquarium water. Add fresh activated carbon to remove residual medication from the aquarium.
6. This treatment process may be repeated if necessary.
7. Deal with any secondary infections using **MELAFIX**[®] or **PIMAFIX**[™], as appropriate. Bear in mind that, even if the Ich itself is eliminated, some fish may die as a result of an untreated secondary infection.

Attention:

- Some scaleless fish are sensitive to **WHITE SPOT CURE**[™]. Treatment with 1/2 the normal dose of **WHITE SPOT CURE**[™] is therefore recommended for aquariums containing scaleless fish.

VELVET

Causative Agent:

Velvet is caused by parasites, most often *Amyloodinium ocellatum* in marine aquariums and *Piscinoodinium* species in freshwater aquariums. (Note: Velvet was formerly called *Oodinium* by aquarium hobbyists and in some older texts.)

Appearance:

- Heavy infestations on the skin cause a golden, velvety appearance on the sides of the fish.
- Gills are also infested, causing fish to breathe in a laboured manner and to scratch on objects in the aquarium.

Treatment:

1. Quarantine the aquarium. Remove any dead fish immediately. Do not remove fish from or add new fish to the infected aquarium; parasites can be spread to other aquariums by nets, algae scrapers and wet hands.
2. Optional: Raise water temperature to 29°C (85°F) (assuming the fish species in question will tolerate this high temperature). Parasites can be killed only while they are in the free-swimming dinospore stage before



they attach to fish. Raising the temperature speeds up the life cycle of the parasite bringing it to the treatable dinospore stage. In the case of freshwater velvet (*Piscinoodinium*) it can also be beneficial to keep the aquarium in darkness during an outbreak.

This prevents the parasites from acquiring energy through photosynthesis. The light-reduction strategy has no effect on marine velvet (*Amyloodinium*) as these parasites do not photosynthesize.

- To aid osmoregulation and ease stress of infected fish, add 1 tablespoonful (18 g) of **API® AQUARIUM SALT** for each 5 gallons (19 L) of aquarium water (except for salt-intolerant species).
- Remove activated carbon and continue aeration. Add one dose of **WHITE SPOT CURE™** to the aquarium as directed. Wait 48 hours and repeat the dose.
- Wait another 48 hours, then change 25% of the aquarium water. Add fresh activated carbon to remove residual medication from the aquarium.
- This treatment process may be repeated if necessary.

Attention:

- WHITE SPOT CURE™** can be used in conjunction with **API®** antibacterial medications.
- Some scaleless fish are sensitive to **WHITE SPOT CURE™**. Treatment with 1/2 the normal dose of **WHITE SPOT CURE™** is therefore recommended for aquariums containing scaleless fish.

FLUKES/PARASITIC WORMS

Causative Agent:

Dactylogyrus and *Gyrodactylus* are parasitic worms, commonly called flukes, that attack fins, skin and especially gills of tropical fish, goldfish and koi. Parasitic worms are frequently found on newly imported fish. The worms attach to the skin or gills of fish via hooks, where they can feed on blood and body fluids. Secondary bacterial or fungal infections may occur following infestation by these parasites.

Appearance:

- Most parasitic worms are not visible without the aid of a microscope.
- Fish that are suffering from skin-parasitic flukes will scratch against submerged objects (e.g. rocks; plant stems) and may appear listless. A greyish film may appear on affected areas of the body.
- Parasite damage to the gills can result in respiratory stress,



manifesting as gasping at the water surface and rapid gill movements. Badly affected fish may sit on the bottom of the aquarium. Where parasite damage to the gills is severe, this will result in suffocation and death.

Treatment:

- Quarantine the aquarium. Do not remove fish from or add fish to the infected aquarium; parasites can be spread to other aquariums by nets, algae scrapers and wet hands.
- Optional: Raise water temperature to 29°C (85°F) (assuming the fish species in question will tolerate this high temperature). This will either speed up the life cycle of the parasites or create unfavourable conditions for them which will enhance the effectiveness of the treatment.
- To aid osmoregulation and ease stress of infected fish, add 1 tablespoonful (18 g) of **API® AQUARIUM SALT** for each 5 gallons (19 L) of aquarium water.
- Ensure the aquarium is well aerated – this may help alleviate any respiratory stress
- To combat flukes and other parasitic worms it may be necessary to use special drugs (known as anthelmintics). Some of these “wormer” treatments are prescription-only, from a vet.
- MELAFIX®** and/or **PIMAFIX™** can be used to deal with any secondary bacterial or fungal infections that may arise following parasite damage.

ANCHOR WORMS

Causative Agent:

Anchor worms (*Lernaea*) are copepod parasites that attach to the bodies of tropical fish, goldfish and koi. Fertilized female *Lernaea* penetrate the skin and embed an anchor-like attachment into the fish, then begin to develop visible egg sacs. Secondary bacterial or fungal infections may occur following infestation by these parasites.

Appearance:

- Lernaea* can be easily identified as a grayish worm attached to a fish. These parasites may reach 5 - 10 mm in length. Fish tissue is often red at the point of the worm's attachment; the worm develops two egg sacs at its opposite end.

Treatment:

- Quarantine the aquarium. Remove any dead fish immediately. Do not remove fish from or add new fish to the infected aquarium; parasites can be spread to other aquariums by nets, algae scrapers and wet hands.



- To aid osmoregulation and ease stress of infected fish, add 1 tablespoonful (18 g) of **API® AQUARIUM SALT** for each 5 gallons (19 L) of aquarium water (except for salt-intolerant species).
- Lernaea* can be carefully removed from the fish using tweezers.
- Medicate the water with **MELAFIX®** to help prevent secondary infections of the parasite-damaged skin.
- Treat the fish using a special anti-crustacean remedy (from a vet or specialist veterinary medicines supplier). It is important to treat the entire aquarium in order to eliminate the parasite's microscopic larval stages that may be present in the water.

FISH LICE

Causative Agent:

The parasitic crustacean, *Argulus*, moves over the external surfaces of tropical fish and goldfish, piercing the skin and sucking blood and tissue fluids. The piercing mouthparts damage fish skin, leading to secondary bacterial and/or fungal infections.

Appearance:

- The adult *Argulus* is visible to the naked eye, appearing as a disc-shaped creature that may reach 1 cm in diameter. It may be seen to occasionally move about on the fish's body surface.
- Heavy *Argulus* infestations, which are uncommon, may cause patches of opaque skin to develop.
- The parasite's feeding wounds appear as small red spots on the skin.
- Badly affected fish may appear listless and lose their appetite.

Treatment:

- Quarantine the aquarium. Remove any dead fish immediately. Do not remove fish from or add new fish to the infected aquarium; parasites can be spread to other aquariums by nets, algae scrapers and wet hands.
- Optional: Raise water temperature to 29°C (85°F) (assuming the fish species in question will tolerate this high temperature). This will either speed up the life cycle of the parasites or create unfavourable conditions for them which will enhance the effectiveness of the treatment.
- To aid osmoregulation and ease stress of infected fish, add 1 tablespoonful (18 g) of **API® AQUARIUM SALT** for each 5 gallons (19 L) of aquarium water.
- Argulus* can be carefully removed from the fish using tweezers.



- Medicate the water with **MELAFIX®** to help prevent secondary infections of the parasite-damaged skin.
- Treat the fish using a special anti-crustacean remedy (from a vet or specialist veterinary medicines supplier). It is important to treat the entire aquarium in order to eliminate the parasite's microscopic larval stages that may be present in the water.

HOLE-IN-THE-HEAD DISEASE

Causative Agent:

Hole-in-the-head is a symptom rather than a specific disease and may have multiple causes. This condition affects mostly cichlids, particularly South American species such as discus. In many cases an internal parasite problem (caused by *Spironucleus* or *Hexamita protozoa*) has been implicated. These parasites normally dwell in the intestinal tract of the fish. Stress, poor nutrition, bacterial infection, or adverse water conditions have also been suggested to cause, or aggravate, Hole-in-the-Head.



Appearance:

- The most obvious symptom is the pitting and erosion of skin and muscle tissue around the face of the fish. This erosion appears to be a symptom of the parasite's presence in the intestinal tract, not on the surface of the fish.
- Affected fish may pass white, stringy faeces.
- Many fish exhibit poor appetite, weight loss and nervousness; death ultimately results.

Treatment:

- Quarantine the aquarium. Remove any dead fish immediately. Do not remove fish from or add new fish to the infected aquarium; parasites can be spread to other aquariums by nets, algae scrapers and wet hands.
- To aid osmoregulation and ease stress of infected fish, add 1 tablespoonful (18 g) of **API® AQUARIUM SALT** for each 5 gallons (19 L) of aquarium water (except for salt-intolerant species).
- Many cases respond to a treatment of Metronidazole (available on veterinary prescription) which is added to the fish's food or water. A course of antibiotics (on veterinary prescription) may be required in some cases. Deal with any possible contributory factors, such as stress or poor nutrition.
- Treat any secondary bacterial infections using **MELAFIX®**

NEON TETRA DISEASE

Causative Agent:

Neon tetra disease is caused by a microscopic spore-forming parasite, *Pleistophora hypheosobryconis*, that invades the fish's muscles. The disease primarily affects neon tetras, glowlight tetras and penguin tetras (and possibly other fish such as barbs, angelfish, and zebra danios). It appears not to affect cardinal tetras. There is also "false neon tetra disease" which gives rise to similar symptoms but is caused by a bacterium (*Flavobacterium* species).



Appearance:

- A *Pleistophora* infection is characterised by fading of the fish's colours, development of white patches on the skin, and damage to the muscles (including localised muscle swelling), leading to bodily distortion and abnormal swimming. Badly affected fish become emaciated and die. Fish loss can be high and treatment is problematic. With "false neon disease" there is also colour fading which may be accompanied by tail rot.

Treatment:

- Quarantine the aquarium. Remove any dead fish immediately. Do not remove fish from or add fish to the infected aquarium; microsporidian infection can be spread to other aquariums by nets, algae scrapers and wet hands.
- To aid osmoregulation and ease stress of infected fish, add 1 tablespoonful (18 g) of **API® AQUARIUM SALT** for each 5 gallons (19 L) of aquarium water (except for salt-intolerant species).
- Remove activated carbon and continue aeration. For treating false neon disease, add one dose of **MELAFIX®** to the aquarium as directed. Repeat dose daily for 7 days.
- After 7 days, change 25% of the aquarium water.
- Add fresh activated carbon to remove residual medication from the aquarium.
- This treatment process may be repeated if necessary.

Attention:

- True neon disease (*Pleistophora*) is very difficult to treat. Permanently isolate suspected cases to reduce the risk of spreading this disease to other vulnerable tetras.
- MELAFIX®** can be used in conjunction with all **API®** medications.

SUBCLINICAL PARASITIC INFESTATION

Causative Agents:

Trichodina, *Ichthyobodo*, and *Chilodonella* are protozoan parasites that infect the skin and gills of fish.



Appearance:

- Fish may scratch on objects in the aquarium.
- Slimy skin may develop on fish and fins may be clamped.
- Laboured breathing may be observed.

Treatment:

- Quarantine the aquarium. Do not remove fish from or add fish to the infected aquarium; parasites can be spread to other aquariums by nets, algae scrapers and wet hands.
- To aid osmoregulation and ease stress of infected fish, add 1 tablespoonful (18 g) of **API® AQUARIUM SALT** for each 5 gallons (19 L) of aquarium water (except for salt-intolerant species).
- Remove activated carbon and continue aeration. Add one dose of **WHITE SPOT CURE™** to the aquarium as directed. Wait 48 hours and repeat the dose.
- Wait another 48 hours, then change 25% of the aquarium water. Add fresh activated carbon to remove residual medication from the aquarium.
- This treatment process may be repeated if necessary.

Attention:

- WHITE SPOT CURE™** can be used in conjunction with **API®** antibacterial medications.
- Some scaleless fish are sensitive to **WHITE SPOT CURE™**. Treatment with 1/2 the normal dose of **WHITE SPOT CURE™** is therefore recommended for aquariums containing scaleless fish.

II. Fungus

FUNGAL INFECTION

Causative Agents:

True fungal infections are caused by *Saprolegnia* and *Achlya* species.



Appearance:

- Whitish cottony tufts or patches appear on the mouth, skin and fins of tropical fish, goldfish and koi.

Treatment:

- Quarantine the aquarium. Do not remove fish from or add fish to the infected aquarium; fungi can be spread to other aquariums by nets, algae scrapers and wet hands.

- To aid osmoregulation and ease stress of infected fish, add 1 tablespoonful (18 g) of **API® AQUARIUM SALT** for each 5 gallons (19 L) of aquarium water (except for salt-intolerant species).
- Remove activated carbon and continue aeration. Add one dose of **PIMAFIX™** to the aquarium as directed. Repeat dose daily for 7 days.
- After 7 days change 25% of the aquarium water. Add fresh activated carbon to remove residual medication from the aquarium.
- If treatment appears to be ineffective, add one dose of **FUNGUS CURE™**. Wait 48 hours and repeat the dose. Wait another 48 hours, then change 25% of the aquarium water.
- Fungus rarely attacks uninjured, healthy fish, hence it is important to address any underlying causes (e.g. stress, physical injury, parasite damage, poor water conditions) in addition to treatment.

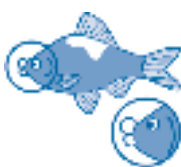
Attention:

- These medications can be used in conjunction with **API®** antibacterial medications.
- FUNGUS CURE** will cause a harmless green colour in the aquarium, which can be removed with activated carbon.

III. Bacteria
MOUTH FUNGUS
/SADDLE BACK DISEASE

Causative Agents:

Flavobacterium columnare is a common bacterium found on the slime coating of both healthy and sick fish. Although disease caused by this organism is commonly called mouth fungus, it is actually a bacterial infection.



Appearance:

- Raised, gray patches are observed on the fins and mouth areas of fish.
- Live bearers, such as guppies and mollies, develop grayish patches on their backs, giving rise to the name "saddle back disease."
- Infected areas may develop into red ulcers and infect the gills, causing rapid loss of fish.

Treatment:

- Quarantine the aquarium. Do not remove fish from or add fish to the infected aquarium; disease can be spread to other aquariums by nets, algae scrapers and wet hands.
- To aid osmoregulation and ease stress of infected fish, add 1 tablespoonful (18 g) of **API®**

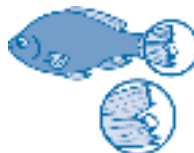
AQUARIUM SALT for each 5 gallons (19 L) of aquarium water (except for salt-intolerant species).

- Add 1 teaspoonful (5 ml) of **Professional Strength MELAFIX®** for every 50 U.S. gallons (190 L) of aquarium water or 1 teaspoonful (5 ml) of regular strength **MELAFIX®** for every 10 gallons (38 L) of aquarium water. Repeat dose daily for 7 days. After 7 days, make a 25% water change. Treatment can be continued if necessary.
- If treatment appears to be ineffective use **PIMAFIX™**.
- For best results, remove activated carbon during all treatments.
- Make a final 25% water change when treatment is complete. Add fresh activated carbon to remove residual medication from the aquarium.

FIN AND TAIL ROT

Causative Agent:

Several bacterial infections can cause degradation of the fins and tails of tropical fish, goldfish and koi. These pathogens include *Flexibacter columnare*, *Nocardia*, *Mycobacterium* and *Pseudomonas* species.



Appearance:

- Fins appear ragged and split. Disease can progress until fins and tail are completely eroded.
- Secondary fungal infections commonly occur.

Treatment:

- Quarantine the aquarium. Do not remove fish from or add fish to the infected aquarium; disease can be spread to other aquariums by nets, algae scrapers and wet hands.
- To aid osmoregulation and ease stress of infected fish, add 1 tablespoonful (18 g) of **API® AQUARIUM SALT** for each 5 gallons (19 L) of aquarium water (except for salt-intolerant species).
- Add 1 teaspoonful (5 ml) of **Professional Strength MELAFIX®** for every 50 U.S. gallons (190 L) of aquarium water or 1 teaspoonful (5 ml) of regular strength **MELAFIX®** for every 10 gallons (38 L) of aquarium water. Repeat dose daily for 7 days. After 7 days, make a 25% water change. Treatment can be continued if necessary.
- If treatment appears to be ineffective **PIMAFIX™** and **MELAFIX®** can be combined to treat a broader range of infections.
- For best results, remove activated carbon during all treatments.

- Make a final 25% water change when treatment is complete. Add fresh activated carbon to remove residual medication from the aquarium.

Attention:

- These medications can be used in conjunction with **API®** antiparasitic and antifungal medications.

DROPSY AND MALAWI BLOAT

Causative Agent:

Internal *Aeromonas* bacterial infections most commonly cause this disease. Viral and internal parasitic pathogens (*Myxobolus cerebralis*) have also been indicated, but are untreatable.



Appearance:

- Fish develop a bloated appearance due to accumulation of fluid in the body cavity.
- Scales may appear to stick out from the sides of fish.
- In advanced cases, some fish lose the ability to swim and float upside down.

Treatment:

- Quarantine the aquarium. Do not remove fish from or add fish to the infected aquarium; disease can be spread to other aquariums by nets, algae scrapers and wet hands.
- To aid osmoregulation and ease stress of infected fish, add 1 tablespoonful (18 g) of **API® AQUARIUM SALT** for each 5 gallons (19 L) of aquarium water (except for salt-intolerant species).
- Remove activated carbon, and continue aeration. Add one dose of **MELAFIX®** to the aquarium as directed. Repeat the dose for 7 days. After 7 days, change 25% of the aquarium water.
- Add fresh activated carbon to remove residual medication from the aquarium.
- The treatment process may be repeated if necessary.

Attention:

- MELAFIX®** can be used in conjunction with all **API®** medications.

CLOUDY EYE, POP EYE, AND BODY SLIME

Causative Agent:

Bacterial pathogens include *Pseudomonas*, *Mycobacterium* or *Streptococcus*. Parasitic pathogens include *Ichthyobodo*, *Trichodina* and *Chilodonella*. See also Subclinical Parasitic Infestation, page 62.



Appearance:

- Eyes develop a whitish haze and/or protrude from the head.

- Hazy or slimy patches appear on the bodies of fish.
- If infested with parasites, fish may scratch on objects in the aquarium and exhibit rapid breathing.

Treatment:

1. Quarantine the aquarium. Do not remove fish from or add fish to the infected aquarium; disease can be spread to other aquariums by nets, algae scrapers and wet hands.
2. To aid osmoregulation and ease stress of infected fish, add 1 tablespoonful (18 g) of **API® AQUARIUM SALT** for each 5 gallons (19 L) of aquarium water (except for salt-intolerant species).
3. Add 1 teaspoonful (5 ml) of **Professional Strength MELAFIX®** for every 50 U.S. gallons (190 L) of aquarium water or 1 teaspoonful (5 ml) of regular strength **MELAFIX®** for every 10 gallons (38 L) of aquarium water. Repeat dose daily for 7 days. After 7 days, make a 25% water change. Treatment can be continued if necessary.
4. If fish repeatedly scratch, treat for skin parasites by adding one dose of **WHITE SPOT CURE™** to the aquarium, as directed. Wait 48 hours and repeat the dose.
5. If treatment appears to be ineffective **PIMAFIX™** and **MELAFIX®** can be combined to treat a broader range of infections.
6. For best results, remove activated carbon during all treatments.
7. Make a final 25% water change when treatment is complete. Add fresh activated carbon to remove residual medication from the aquarium.

Attention:

- These medications can be used in conjunction with **API®** antiparasitic and antifungal medications.
- Some scaleless fish are sensitive to **WHITE SPOT CURE™**. Treatment with 1/2 the normal dose of **WHITE SPOT CURE™** is therefore recommended for aquariums containing scaleless fish.

ULCERS AND OPEN SORES

Causative Agent:

Several types of bacteria, including *Aeromonas* species, may cause skin ulcers and open sores in fish. Adverse water conditions, notably high ammonia levels, can also cause ulceration.



Appearance:

- Fish exhibit open red sores on the body.

Treatment:

1. Quarantine the aquarium. Do not remove fish from or add fish to the infected aquarium; bacteria can be

spread to other aquariums by nets, algae scrapers and wet hands.

2. To aid osmoregulation and ease stress of infected fish, add 1 tablespoonful (18 g) of **API® AQUARIUM SALT** for each 5 gallons (19 L) of aquarium water (except for salt-intolerant species).
3. Add 1 teaspoonful (5 ml) of **Professional Strength MELAFIX®** for every 50 U.S. gallons (190 L) of aquarium water or 1 teaspoonful (5 ml) of regular strength **MELAFIX®** for every 10 gallons (38 L) of aquarium water. Repeat dose daily for 7 days. After 7 days, make a 25% water change. Treatment can be continued if necessary.
4. Add fresh activated carbon to remove residual medication from the aquarium.
5. The treatment process may be repeated if necessary.

Attention:

- **MELAFIX®** can be used in conjunction with all **API®** medications.

BACTERIAL GILL DISEASE

Causative Agent:

Various types of bacteria, including *Flavobacterium* species.



Appearance:

- Visual diagnosis is often difficult.
- Fish may breathe heavily and show bright red gills.
- Fish may sit on the bottom of the aquarium or near filter return at the water's surface.

Treatment:

1. Quarantine the aquarium. Do not remove fish from or add fish to the infected aquarium; bacteria can be spread to other aquariums by nets, algae scrapers and wet hands.
2. To aid osmoregulation and ease stress of infected fish, add 1 tablespoonful (18 g) of **API® AQUARIUM SALT** for each 5 gallons (19 L) of aquarium water (except for salt-intolerant species).
3. Add 1 teaspoonful (5 ml) of **Professional Strength MELAFIX®** for every 50 U.S. gallons (190 L) of aquarium water or 1 teaspoonful (5 ml) of regular strength **MELAFIX®** for every 10 gallons (38 L) of aquarium water. Repeat dose daily for 7 days. After 7 days, make a 25% water change. Treatment can be continued if necessary.
4. If treatment appears to be ineffective **PIMAFIX™** and **MELAFIX®** can be combined to treat a broader range of infections.
5. For best results, remove activated carbon during all treatments.

6. Make a final 25% water change when treatment is complete. Add fresh activated carbon to remove residual medication from the aquarium.

Attention:

- These medications can be used in conjunction with **API®** antiparasitic and antifungal medications.

BLOOD STREAKS IN FINS, BACTERIAL HAEMORRHAGIC SEPTICAEMIA

Causative Agent:

Pseudomonas, *Aeromonas* or *Streptococcus* bacterial species can infect the bloodstream of fish.

Appearance:

- Fish show blood streaks in the fins and body.

Treatment:

1. Quarantine the aquarium. Do not remove fish from or add fish to the infected aquarium; bacteria can be spread to other aquariums by nets, algae scrapers and wet hands.
2. To aid osmoregulation and ease stress of infected fish, add 1 tablespoonful (18 g) of **API® AQUARIUM SALT** for each 5 gallons (19 L) of aquarium water (except for salt-intolerant species).
3. Add 1 teaspoonful (5 ml) of **Professional Strength MELAFIX®** for every 50 U.S. gallons (190 L) of aquarium water or 1 teaspoonful (5 ml) of regular strength **MELAFIX®** for every 10 gallons (38 L) of aquarium water. Repeat dose daily for 7 days. After 7 days, make a 25% water change. Treatment can be continued if necessary.
4. If treatment appears to be ineffective **PIMAFIX™** and **MELAFIX®** can be combined to treat a broader range of infections.
5. For best results, remove activated carbon during all treatments.
6. Make a final 25% water change when treatment is complete. Add fresh activated carbon to remove residual medication from the aquarium.

Attention:

- These medications can be used in conjunction with **API®** antiparasitic and antifungal medications

Tropical fish medications

ALL-NATURAL BOTANICALS

Maintaining fish health is a vital concern to aquarists and pond enthusiasts. Bacterial and fungal infections in particular have challenged fish health professionals and hobbyists alike. Many of today's current medications have become less effective due to resistant strains of pathogenic bacteria. **API®** is committed to the development of new and innovative botanical medications.

MELAFIX®

MELAFIX® is the result of over six years of research and development by **API®**.

MELAFIX® is an all-natural medication derived from the leaves of *Melaleuca* the scientific name for the tea tree. The healing properties of tea tree extract have been known for centuries. University studies and extensive laboratory tests showed that **MELAFIX®** is an effective antibacterial remedy for freshwater and marine fish. **MELAFIX®** also rapidly repairs damaged fish tissue and fins and promotes regrowth. Healing and tissue regeneration can usually be seen in the first four days of treatment. In laboratory tests, **MELAFIX®** was so effective that damaged fin rays and tissue were completely restored to their original condition, a result rarely seen with conventional medications. This proven ability to heal wounds and restore damaged tissue has led to the granting of United States and International patents for **MELAFIX®**.



RAPID REPAIR AND HEALING OF DAMAGED TISSUE USING MELAFIX®



DIRECTIONS FOR USE:

Shake well before using. For best results, remove activated carbon during treatment.

As a Disease or Wound Treatment:

Add 1 teaspoonful (5 ml) of regular strength **MELAFIX®** for every 10 U.S. gallons (40 L) of aquarium water or 1 teaspoon (5ml) of **Professional Strength MELAFIX®** for every 50 U.S. gallons (190 L) of aquarium water. Repeat dose daily for 7 days. After 7 days, make a 25% water change. Treatment can be continued if necessary.

When Adding New Fish to the Aquarium or when Netting and Handling Fish:

Add 1 teaspoonful (5 ml) of **Professional Strength MELAFIX®** for every 50 U.S. gallons (190 L) of aquarium water or 1 teaspoonful (5 ml) of regular strength **MELAFIX®** for every 10 gallons (38 L) of aquarium water. Repeat dose daily for 3 days.

MELAFIX® Sizes Available:

APIUK11G	118ml - Treats up to 893 L
APIUK11H	237ml - Treats up to 1,794 L
APIUK11J	473ml - Treats up to 3,581 L
APIUK11P	Melafix® Pro Strength 1.9ml - Treats up to 72,010 L

PIMAFIX™

PIMAFIX™ is an all-natural medication made from *Pimenta racemosa* (West Indian Bay Tree). **PIMAFIX™** is an effective antifungal remedy for freshwater and marine fish. **PIMAFIX™** also treats internal and external bacterial infections.

PIMAFIX™ contains multiple synergistic compounds to effectively and efficiently treat fungal infections. The many active compounds found in *Pimenta racemosa* not only provide broad spectrum treatment, but also eliminate the possibility of the development of resistant strains of disease-causing organisms. Until now, most antifungal medications resulted in unsightly water discoloration throughout the course of therapy. **PIMAFIX™** will not discolour the water or aquarium sealant. The proven ability to treat both fungal and bacterial infections has led to a United States patent and many foreign patents pending for **PIMAFIX™**.



Directions for Use

Shake well before using. For best results, remove activated carbon during treatment.

Add 1 teaspoonful (5 ml) of **PIMAFIX™** for every 10 U.S. gallons (40 L) of aquarium water. Repeat dose daily for 7 days. After 7 days, make a 25% water change. Treatment can be continued if necessary.

PERSISTENT INFECTIONS

In cases of persistent infections, **PIMAFIX™** and **MELAFIX®** can be used together to treat a broader range of infections. This is due to the fact that these botanical remedies provide many active compounds which work synergistically to cure fish diseases.

SAFE FOR ALL AQUARIUMS AND PONDS

MELAFIX® and **PIMAFIX™** are safe and effective medications for all freshwater and marine fish. Laboratory studies showed that both are safe for even the most delicate fish species including tetras, discus fry, and scaleless fish, like the clown loach. **MELAFIX®** and **PIMAFIX™** have been tested and found to be safe for use in reef aquariums containing invertebrates, such as live coral and anemones.

Treating with **MELAFIX®** and **PIMAFIX™**, together or separately, will not harm the biological filter in freshwater or saltwater aquariums or ponds. They will not colour the water and will not stain ornaments or silicone sealer. **MELAFIX®** and **PIMAFIX™** have no effect on pH and are harmless to live aquarium plants.

PRODUCT COMPATIBILITY

Both **MELAFIX®** and **PIMAFIX™** can be used with any **API®** water-conditioning products, including **STRESS COAT®**, **AMMO-LOCK®**, and **TAP WATER CONDITIONER™**. **MELAFIX®** and **PIMAFIX™** do not interfere with water test kits and can be used in conjunction with all **API®** medications.

PIMAFIX™ Sizes Available:

APIUK10G	118ml - Treats up to 893 L
APIUK10H	237ml - Treats up to 1,794 L

WHITE SPOT CURE

An effective treatment for Ich (White Spot) diseased fish, **WHITE SPOT CURE** kills the Ich (White Spot) parasite and helps replace the fish's natural slime layer which is destroyed by the disease. The synthetic slime replacement provided by **WHITE SPOT CURE** helps control secondary infection. For use in freshwater aquariums. Can also be used in saltwater aquariums that do not contain invertebrates. This medication will cause a harmless blue colour in the aquarium.

Active Ingredients: 1.9 mg benzaldehyde green and povidone/colloid mixture per teaspoonful.



DIRECTIONS FOR USE

Add one (1) teaspoonful (5 ml) for each 5 U.S. gallons (19 L) of aquarium water. Repeat dose after 48 hours. Caution: Some scaleless fish are sensitive to this medication. Therefore treat at half the dose.

WHITE SPOT CURE

Sizes Available:

APIUK12A	37 ml on card Treats up to 140 L
APIUK12B	118 ml - Treats up to 447 L

LIQUID FUNGUS CURE™

Developed for the complete treatment of Saprolegnia fungus infections, **LIQUID FUNGUS CURE™** contains a proven fungicide, plus medication which aids in the repair of the fish's natural, protective slime coating. This synthetic slime replacement combats secondary infection. For use in freshwater aquariums. This medication will cause a harmless green colour in the aquarium.

Active Ingredients: 22 mg neutroflavine and povidone/colloid mixture per teaspoonful.



DIRECTIONS FOR USE:

Add one (1) teaspoonful (5 ml) for each 5 U.S. gallons (19 L) of aquarium water. Repeat dose after 48 hours.

LIQUID FUNGUS CURE

Sizes Available:

APIUK13A	37 ml on card Treats up to 140 L
APIUK13B	118 ml - Treats up to 447 L

API® AQUARIUM SALT

- Reduces fish stress
- Adds natural electrolytes
- Improves gill function
- Protects fish against nitrite toxicity
- Can be used with most aquarium remedies to improve recovery from disease
- All-natural-made from evaporated sea water



Freshwater fish actively maintain a natural balance of electrolytes in their body fluids. Electrolytes such as potassium, sodium, chloride, calcium and magnesium are removed from the water by chloride cells located in the gills. These electrolytes are essential for the uptake of oxygen and the release of carbon dioxide and ammonia or ammonium across gill membranes. The lack of electrolytes can cause serious health problems for fish. **API® AQUARIUM SALT** is an all-natural salt, providing the essential electrolytes fish need to survive in an aquarium. **API® AQUARIUM SALT** is not just a table salt or rock salt (sodium chloride). It is made from evaporated sea water, which contains calcium, magnesium, potassium, sodium and chloride.

API® AQUARIUM SALT improves gill function to reduce stress

During periods of disease and stress, healthy gill function is disturbed. This can lead to the loss of electrolytes through the gills, a condition called osmotic shock. Osmotic shock reduces the intake of oxygen, as well as the release of carbon dioxide and ammonia or ammonium by the fish. **API® AQUARIUM SALT** reduces the risk of osmotic shock by replenishing natural electrolytes fish need.

API® AQUARIUM SALT reduces nitrite toxicity

Overcrowding and overfeeding can lead to elevated levels of nitrites, especially in newly established aquariums.

The nitrite ion NO₂⁻ enters the gills and prevents the blood from carrying oxygen, resulting in nitrite toxicity or "methemoglobinemia." **API® AQUARIUM SALT** will reduce the toxic effect of nitrites on fish by temporarily blocking the entry of nitrites through their gills.

DIRECTIONS FOR USE

1. As a General Tonic and Stress Reducer: Add one rounded table-spoonful (18 g) for every 5 U.S. gallons (19 L) of aquarium water or 3/4 cupful (220 g) for each 50 gallons (190 L) of aquarium water.

2. As a Tropical Fish Treatment or With an Aquarium Remedy: Add one rounded tablespoonful (18 g) for every 5 U.S. gallons (19 L) of aquarium water or 3/4 cupful (220 g) for each 50 gallons (190 L) of aquarium water. Maintain a water temperature of 26°C (80°F) during treatment, as when treating for parasitic infections.
3. To Hatch Brine Shrimp Eggs: Add 8 tablespoonfuls (144 g) for each U.S. gallon (3.8 L) of water in a shallow pan.
4. In Goldfish Bowls: Add 1/2 teaspoonful for each U.S. gallon (3.8 L) of water.
5. For Disease Treatment of External Parasites (Trichodina, Ichthyobodo or Epistylis) or Fungal Infection: A short-term salt bath is beneficial. Dissolve 2-1/2 cups (725 g) for each 10 U.S. gallons (38 L) of aquarium water in a separate container. Carefully place the infected fish in the container for 5 to 10 minutes, then place the treated fish back in the aquarium. A short-term salt bath may be repeated in 24 hours if necessary.

IMPORTANT NOTE: Once added to an aquarium, salt does not evaporate and is not filtered out. **API® AQUARIUM SALT** should only be added as directed with each water change

API® AQUARIUM SALT Sizes Available:

API106	453 g carton
API106B	933 g carton
API106C	1.8 kg carton

Tap water filtration systems

TAP WATER FILTER™

API® TAP WATER FILTER™

removes impurities from tap water, creating ultra-perfect deionized water that is free of all minerals, and organic and inorganic compounds. As the **TAP WATER FILTER™** removes these impurities, the cartridge gradually changes colour from light green to blue-violet, giving visual confirmation of impurity removal. For use with fresh and saltwater aquariums.

- Works with a single cartridge
- Filters 10 U.S. gallons (38 L) of water per hour with no waste
- Comes fully assembled
- Easily attaches to most faucets
- Makes perfect water for:
 - Discus, angelfish, tetras, and all soft water tropical fish
 - Freshwater community fish
 - Saltwater fish and reef aquariums
 - Planted aquariums
 - African cichlid aquariums
 - Multiple aquarium systems
 - Breeding fish

API® TAP WATER FILTER™ is easily and quickly connected to the faucet, and replacement filter cartridges are simple to install; no tools are required. On average, 10 U.S. gallons (38 L) of deionized water are made by the **TAP WATER FILTER™** in an hour. The actual yield of deionized water obtained per cartridge depends on the level of minerals and contaminants in the tap water source. If a cartridge produces less than 50 U.S. gallons (190 L) of deionized water, the tap water source being used contains higher than average levels of minerals and contaminants.

Why use the TAP WATER FILTER™?

Hobbyists, fish breeders and reef aquarists know that water quality is the most important factor in successful aquarium keeping. Television coverage, newspaper articles and scientific studies report that many ground and tap water supplies throughout the world are contaminated.^{9,11,13,16,17,22} The U.S. Environmental Protection Agency reports that 40% of natural fresh waters are "unusable," being too polluted with fertilizers, industrial



waste and sewage.²⁴ Various chemical treatments used to make water safe for drinking render it unhealthy for aquarium use. Common tap water disinfectants such as chlorine and chloramines are highly toxic to aquarium life. These same disinfectants can react with natural organic matter commonly found in water, forming cancer-causing by-products, (trihalomethanes) such as chloroform.^{4,20} Chemicals used in water treatment also include aluminum sulfate, copper salts, lime, phosphate and silicate all undesirable in aquarium water.^{2,3,14} Well water and municipal tap water can also contain heavy metals such as copper, zinc, and lead.¹⁴

Harmful substances can also enter tap water supplies unintentionally, as a result of human activities and natural processes. Tap water may contain nitrite and nitrate due to agricultural runoff. Insecticides, herbicides and fertilizers enter groundwater during snow melts and heavy rains.²³ Old and leaking underground fuel tanks present a significant contamination problem throughout the world.⁷ (Although harmless to fish, concentrations of natural minerals such as calcium and magnesium carbonate can make water so hard and alkaline that adjusting and stabilizing the pH is nearly impossible). The **TAP WATER FILTER™** removes all minerals and chemicals from tap water, creating perfect deionized water.

The Hydromineral Balance

Tropical rivers, lakes and streams contain varying amounts of dissolved ions: calcium, sodium, magnesium, potassium, chloride and sulfate. These ions originate from weathering rocks, sediments and rain water. Fish require these "hydrominerals" for their metabolic processes, including the excretion of ammonia and the regulation of blood pH. The mineral content in tap water is quite different from that found in the native habitats of tropical fish. Additionally, in order to reach peak health and colouration, most aquatic plants require soft, acidic water-conditions similar to those of their natural habitats. The **TAP WATER FILTER™** removes all minerals and pollutants from tap water so the correct hydromineral balance can be created. **API® ELECTRO-RIGHT™** solution will add just the right amount of ions to deionized water to create an appropriate hydromineral balance;

pH ADJUSTER can adjust the pH from 5.5 to any desired level up to 8.0.

How the TAP WATER FILTER™ Works

The **TAP WATER FILTER™** has a single cartridge that removes all organic and inorganic contaminants, including heavy metal, from tap water. Water first passes through the prefilter pad to remove larger particles of sediment. Next, chlorine and chloramines, as well as organic chemicals, are removed from the water in the "dechlorinating and organic removal chamber." Then, all inorganic ions (calcium, sulfate, silicate, carbonates, magnesium sodium, ammonia, nitrite, nitrate, phosphate, lead, copper, zinc) are removed in the deionization chamber. The **TAP WATER FILTER™** is the only single-cartridge tap water filtration system that makes perfect, organic-free deionized water.

What is Deionized Water?

Water contains a variety of dissolved ions, such as calcium, sodium, chloride, iron and magnesium. Some ions are positively charged (cations) others have a negative charge (anions). The TAP WATER FILTER™ contains ion-exchange resins that remove all ions from tap water, thus making deionized water.

Each **TAP WATER FILTER™** comes complete with a tap water faucet unit, one universal faucet adapter, one 118 ml bottle of **pH ADJUSTER**, one 118 ml- **API® ELECTRO-RIGHT**, 4' pieces of kink-free tubing. The universal faucet adapter comes with an assortment of threaded adapters and washers to fit most taps, as well as a connection whereby the hobbyist, with a push of the finger, can use either the tap or the **TAP WATER FILTER™**. The **Replacement Filter Cartridge** is a ready-to-use replacement cartridge that quickly and easily connects to the **TAP WATER FILTER™** to provide a continuous supply of perfect deionized aquarium water.

Other Tap Water Filtration Methods: Reverse Osmosis

RO systems require three separate components to be truly effective filtration devices: a sediment removal

cartridge, an activated carbon cartridge and the RO membrane. Sediments such as sand, clay, oil and ferric iron must be completely removed, or else the membrane, flow restrictors and check valves will become fouled.^{8,21} However, the 5-micron sediment cartridges that are typically supplied with RO units may not be adequate to thoroughly remove these substances. Also, an activated carbon cartridge is required to remove chlorine, chloramine and organic compounds, but in less expensive RO systems activated carbon filtration is not included, thus sacrificing total contaminant removal. RO membranes are subject to hard water damage if tap water is high in minerals. In fact, tap water containing high levels of calcium carbonate, phosphates and sulfates can cause RO systems to fail in less than two weeks, as evidenced by a two-fold increase of minerals and heavy metals in filtered water.⁸ Fouling can also decrease the amount of water produced each day by 20% or more, and so RO membranes may have to be frequently replaced to maintain water output and quality. Less expensive RO systems are sealed and must be discarded when the membrane fails. RO filters produce water at a very slow rate. Filters are sold as “38-76L per day systems,” whereas the **TAP WATER FILTER™** makes 38L per hour. These RO ratings are based on tap water temperatures of 77°F/25°C,⁶ even though RO filters must be connected to cold water lines with average temperatures of 55°F/12.7°C. Cold water temperatures reduce the amount of water made each day. And because of the design limitations of reverse osmosis systems, they are often inefficient. Every gallon of filtered water produced requires 11 to 38L of water that is washed down the drain and wasted.

Home Water Softeners

Home water softeners will remove calcium and magnesium, but will raise the sodium or potassium content of water. These devices do not remove anions such as nitrate and phosphates.

Countertop and Faucet Filters

Many of the countertop and faucet-mounted filters that claim to remove “everything” are simply activated carbon filters. These filters improve the taste of water by removing sediments, some organic compounds, and chlorine. They do not deionize tap water.

Hobbyist Resin Columns

Separate cationic and anionic resin columns have been used to filter tap water for aquarium use. Although these filters are rechargeable, the aquarist must obtain, measure, use and dispose of two hazardous chemicals, hydrochloric acid and sodium hydroxide, in order to regenerate the resin columns. No activated carbon or particle filtration is provided with these filtration systems. Resin columns do not remove chlorine, chloramine or organic pollutants.

Electric Distillation

Electric distillation systems will provide purified water only in small quantities and at a very high energy cost.¹⁵ Certain organic chemicals are not fully removed by household distillation units.¹²

Bottled Spring Water

In an attempt to obtain better water, aquarists have tried using bottled spring water. But even spring water can have high levels of dissolved minerals and may have been subjected to the same treatment processes as municipal waters.^{1,10,22} Carrying jugs of water home from the supermarket is expensive, tedious and time-consuming, and it rarely solves water quality problems.

DIRECTIONS FOR USE:

1. Place the **TAP WATER FILTER™** on a level surface, such as the kitchen counter.
2. Connect the faucet adapter onto the faucet. The filtered water can be collected in any clear plastic container.
3. Slowly increase the water flow through the **TAP WATER FILTER™** to 1 cupful (8 fl. oz./240 ml) in 25-30 seconds. This flow rate is equal to about 10 U.S. gallons (38L) per hour. The **TAP WATER FILTER™** has been designed to work efficiently at this rate.
4. When the filter cartridge is completely blue-violet, filtering capacity has been exhausted; the cartridge must then be replaced. DO NOT use the filter once the entire cartridge turns blue-violet. It will no longer produce deionized water, and may begin to pass minerals back into the water.
5. The filter cartridge contains a mixture of gold and green-resins. Under certain filtering conditions, the gold resins sometimes separate from the green resins in the cartridge, forming a gold band or bands. Such separation does not affect the filtration capability of the **TAP WATER FILTER™**. However, THESE GOLD RESINS ARE NOT THE

COLOUR INDICATOR RESINS; THEIR COLOUR DOES NOT CHANGE and thus should not be used to decide when cartridge replacement is necessary. Cartridge replacement should be based on the colour change of the GREEN resin material, which will turn to dark blue violet when the cartridge’s filtering capacity is exhausted.

6. The **TAP WATER FILTER™** can be connected to a reverse osmosis filter system in order to completely purify RO water. Connect the RO outlet hose to the inlet hose on the **TAP WATER FILTER™** to accomplish this.

TAP WATER FILTER™ Sizes Available:

APIUK175	TAP WATER FILTER™, one unit per box
API175A	Refill Cartridge, one cartridge in box
API175H	pH ADJUSTER, 473ml bottle
API175J	ELECTRO-RIGHT, 473ml bottle

References

1. Anonymous. Bottle Water: eauverdose? Economist 328 (9):55.
2. ANSI/AWWA B202-93; AWWA Standard for Quicklime and Hydrated Lime.
3. ANSI/AWWA B404-92; AWWA Standard for Sodium Silicate.
4. ANSI/AWWA C651-92; AWWA Standard for Disinfecting Water Mains.
5. Carney, M. European drinking water standards. J. AWWA (1991) 83:48-55.
6. Cartwright, P.S. A membrane system design primer. Water Conditioning & Purification (1992) 7:28-34.
7. Christiansen, S. Toxic wastes in groundwater. Water Conditioning & Purification 5:32-34.
8. Dhwan, G.K. Solutions to membrane fouling. Water Conditioning & Purification (1989) 8:32-54.
9. Entz, R. How new drinking water regulations will affect utilities. Water Engineering & Management. (1992) 139:10-13.
10. Geyer, A. Water on schedule...and on tap. Business Mexico (1993) 3:16-19.
11. Haarmeyer, D. Privatizing infrastructure: options for municipal systems. J. AWWA (1994) 86:43-55.
12. Ingram, C. Drinking distilled water: a balanced view. Water Conditioning & Purification (1992) 8:36-42.
13. Kinnersley, D. Environmental debate: water quality. Environmental Management & Health (1992) 3:72-92.
14. Kyrris, K. Lead and copper rules complicate matter for water systems. Water Engineering & Management (1993) 140:28-30.
15. Letorney, A.J. Distilled water...and minerals. Water Conditioning and Purification (1992) 5:44-47.
16. Luciano, L. What to do if you are afraid to sip your water. Money (1993) 22:18.
17. Mason, J. Europe’s water bill. International Management (1993) 48:16-18.
18. Ositko, G. Nitrate dilemma...affecting the water supply of humans and animals. Water Conditioning & Purification (1990) 2:84-90.
19. Palmer, D.G. Calcium enrichment of distilled water. Water Conditioning & Purification (1991) 6:70-73.
20. Richardson, S.D. Scoping the chemicals in your drinking water. Today’s Chemist at Work (1994) 3:29-32.
21. Saunders, K. Point-of-use reverse osmosis systems: maintenance and troubleshooting. Water Conditioning & Purification (1991) 7:54-58.
22. Squires, S. (Water) bottle concerns about safety spur sales of H₂O. The WashingtonPost Dec.1993, 14:6.
23. Stamer, J.K. and R.B. Zelt. Organonitrogen herbicides in the lower Kansas River basin. J. AWWA (1994) 85:93-104.
24. Tyson, R. 120 million get unsafe drinking water. USA Today, September 1993, 27:1A.

Water chemistry products

PROPER pH®

- Sets and holds the pH of aquarium water
- neutralises chlorine in tap water
- Detoxifies heavy metals and adds needed electrolytes
- Contains Aloe Vera to help heal skin wounds and torn fins
- For use when:
 - Setting up a new aquarium
 - Adjusting pH in an established aquarium
 - Performing water changes
- Use **PROPER pH® 6.5, 7.0, and 7.5** for freshwater unplanted aquariums
- Use **PROPER pH® 8.2** for saltwater, reef, brackish and African cichli aquariums



What is pH?

The pH level refers to the acidity in water, using a scale of 0 to 14. A pH of 0 is most acidic, while a pH of 14 is most alkaline. Water with a pH of 7.0 is neither acidic nor alkaline, and is considered "neutral." Most freshwater fish live in a pH range of 6.0 to 8.0, depending on their natural habitat. Marine fish and most African cichlids come from environments with pH levels of 8.0 or higher.

Appropriate testing and adjusting of aquarium pH is crucial for the maintenance of fish health—for good colour, wholesome appetite, successful breeding, and disease resistance. **PROPER pH®** adjusts aquarium water to a selected pH and buffers it to remain stable at that pH. In addition, chlorine in tap water is neutralized by **PROPER pH® 6.5, 7.0, and 7.5**, and heavy metals are detoxified. **PROPER pH®** also provides essential electrolytes for your fish, and supplies Aloe Vera to the aquarium environment. Aloe Vera is a proven stress reducer and healing agent of damaged fish tissue.

Aquarium Fish and pH®

To keep tropical fish and goldfish healthy and colourful, it is necessary to maintain a stable pH in the correct

range. In general, egg-laying fish such as discus, tetras, angelfish and rasboras prefer a pH of 6.5, while live-bearing species like goldfish, mollies, swordtails, and guppies thrive at pH 7.5. When keeping a mixed community of freshwater fish, a neutral pH of 7.0 is considered ideal. Marine fish and African cichlids prefer aquarium pH levels of 8.2. Excessively acidic or alkaline pH levels in the aquarium, as well as pH fluctuations, can cause stress to aquarium inhabitants. A stressful environment lowers resistance to disease, causes poor fish colour and poor appetite. **PROPER pH®** can provide the correct pH conditions for a variety of aquarium needs. This product is completely safe and nontoxic when used as directed; continued use of **PROPER pH®** will help maintain a stable aquarium environment. **PROPER pH®** is formulated for these four pH levels:

6.5-for acidic aquariums containing soft water fish like discus, angelfish and tetras.

7.0-for community aquariums.

7.5-for alkaline aquariums containing goldfish, guppies and barbs.

8.2-for African cichlid, saltwater and reef aquariums

PROPER pH® and Aquarium Plants

All true buffers below a pH of 7.8 are phosphate-based. Any aquarium pH product below 7.8 that is not phosphate-based is simply a pH adjuster, and will not stabilize the pH of your aquarium. While phosphate is normally considered an algae-promoting nutrient, the phosphate level in **PROPER pH®** will not promote algae growth. However, the phosphate buffers in **PROPER pH®** will bind to essential trace elements, such as iron. Without essential trace elements, algae and aquatic plants grow very poorly. Therefore, do not use **PROPER pH® 6.5, 7.0 or 7.5** in planted aquariums. **PROPER pH® 8.2** contains no phosphate, and is completely safe for marine aquarium use.

Factors Affecting pH®

Tap water with high levels of calcium and magnesium is called hard water. These minerals are responsible for the GH, or General Hardness, of water, and can cause an unsightly white crust to accumulate on aquarium hoods, lights and filters. In addition to its high

mineral content, hard water typically has a high pH level. If aquarium water is extremely hard (above 200 ppm), it will strongly resist adjustments using **PROPER pH®**. When **PROPER pH®** is added to such water, a haze may form in the aquarium due to the precipitation of some of the minerals. The haze is nontoxic and will be filtered out by most aquarium filters. However, this problem can be avoided by softening the water with **API® WATER SOFTENER PILLOW**. GH should be reduced to 100 ppm to prevent mineral haze. **API® GH & KH TEST KIT** is recommended for testing water hardness.

Tap Water Treatment

Some water treatments used by municipal water companies can produce either very acidic or very alkaline tap water. The pH level can vary on a daily or seasonal basis. Therefore, it is necessary to test municipal tap water pH levels before adding the tap water to your aquarium. Once water is tested, the pH can be adjusted.

Testing pH Levels

pH levels can fluctuate both in the aquarium and in the tap water used to fill the aquarium. Thus, the pH level of an aquarium and its tap water source must be tested frequently. **API® pH TEST KIT** and **HIGH RANGE pH TEST KIT** are recommended to monitor pH levels.

Natural Gases

Tap water from municipal sources and wells will contain carbon dioxide gas. Carbon dioxide (CO₂) can temporarily lower the pH of tap water. For example, tap water might show a pH of 7.0 initially, but after aeration or addition of the water to an aquarium, pH may increase to 8.0. This is because dissolved carbon dioxide is acidic and has caused the initial 7.0 reading. When the water is aerated by an air pump or filter, CO₂ diffuses out of the water and the pH rises to its true level of 8.0.

Fully Stocked Aquariums

Heavily stocked aquariums, particularly those which have a low KH (Carbonate Hardness), can experience declining pH due to the

accumulation of natural organic acids and activity of the biological filter.

Controlling pH in the Aquarium

Adjusting pH in aquariums can be difficult and frustrating with conventional pH-adjusting products. The most common problem the hobbyist faces is rebound —when pH is adjusted to the desired level but then drifts back to its original level within 24 hours. Elevated levels of KH or Carbonate Hardness (the measure of bicarbonate and carbonate ions in water) are responsible for pH rebound. **PROPER pH®** products are pH buffers formulated to counteract this problem. As **PROPER pH®** dissolves, its pre-set pH level of 6.5, 7.0, 7.5 or 8.2 will gradually raise or lower the aquarium pH to the prescribed level, and will stabilize that level through buffering action. Whenever water KH is high (above 100 ppm), it may be necessary to add several doses of **PROPER pH®** to achieve pH stabilization. **API® KH (Carbonate Hardness) TEST KIT** is recommended for measuring the KH of aquarium water.

The Special Needs of African Cichlid and Marine Aquariums

African cichlids and marine aquariums require the use of cichlid or marine salts. These salts create the appropriate mineral content in aquarium water for marine fish and African cichlids. **PROPER pH® 8.2** is made specifically for use in water containing these salts and minerals, and should never be applied without first adding appropriate salts to the aquarium. If this product is used in water containing a low salt and mineral concentration, an unnaturally high pH can result. **PROPER pH® 8.2** successfully sets and stabilizes the pH of reef, saltwater fish and African cichlid aquariums. While this product increases the carbonate hardness of aquarium water, it contributes no algae-promoting phosphate. It actually increases calcium utilization in reef tank hard corals. And, like its companion products, **PROPER pH® 6.5, 7.0, and 7.5, PROPER pH® 8.2** provides Aloe Vera to improve fish health.

DIRECTIONS FOR USE:

PROPER pH® 6.5, 7.0, and 7.5

1. Packets: Add the contents of one **PROPER pH®** packet for every 10 U.S. gallons (38 L) of aquarium water. Jar: Using the enclosed measuring spoon, add one scoop of **PROPER pH®** for every 10 U.S. gallons (38 L) of aquarium water.
2. Repeat treatment when pH testing indicates a change of more than 0.2 pH.
3. A partial water change (10–25%) is recommended before applying a

third treatment. In very hard water, it may be necessary to first soften aquarium water to 100 ppm GH.

4. When using **PROPER pH®** with water clarifiers, a temporary cloud may form. This cloud is nontoxic, and will quickly be removed by most aquarium filters.
5. Before adjusting pH, it is necessary to test for ammonia. The toxicity of ammonia is greatly increased as pH becomes more alkaline; if ammonia is present and the pH is increased, rapid fish loss may occur. **API® AMMONIA TEST KIT** is recommended for accurate ammonia testing. If ammonia is present, steps should be taken to remove it. **API® AMMO-LOCK®** is recommended in detoxifying ammonia in aquarium water. **NITRA-ZORB™, AMMO-CARB®** or **AMMO-CHIPS®** by **API®** are products designed to remove ammonia in freshwater aquariums.
6. Do not use **PROPER pH® 6.5, 7.0** or **7.5** in planted aquariums.

DIRECTIONS FOR USE

PROPER pH® 8.2

1. Packets: Add the contents of one **PROPER pH®** packet for every 20 U.S. gallons (76 L) of aquarium water. Jar: Using the enclosed measuring spoon, add one scoop of **PROPER pH® 8.2** for every 10 U.S. gallons (38L) of aquarium water.
2. Repeat treatment when pH testing indicates a change of more than 0.2 pH.

Using **PROPER pH® 8.2** to reach a pH level above 8.2

Some African cichlids come from lakes that have a pH level above the standard 8.2 level. To raise pH higher than 8.2, additional **PROPER pH® 8.2** can be added. Use **API® HIGH RANGE pH TEST KIT** to judge the actual amount needed. Begin adding one scoop of **PROPER pH® 8.2** for every 10 U.S. gallons (38 L) of aquarium water until the elevated pH level is reached. Take a pH reading between additions to determine if additional doses are required.

PROPER pH Sizes Available:

API35C	PROPER pH 6.5 240 g Treats 757 L
API36	PROPER pH 7.0, 2 x 12 g packets Treats 40 L
API36C	PROPER pH 7.0, 250 g Treats 757 L
API37	PROPER pH 7.5, 2 x 12 g packets Treats 40 L
API37C	PROPER pH 7.5, 260 g Treats 757 L
API39	PROPER pH 8.2, 2 x 14 g packets Treats 75 L
API39C	PROPER pH 8.2, 160 g Treats 757 L

pH UP® and pH DOWN®



pH UP® is designed to raise the pH in aquariums where the pH has been shown through testing to be lower than desired. **pH**

UP® is a dilute base, and may not adjust the pH to the desired level after only one or two doses. Continue to apply once daily until the desired change has been effected. In extremely soft water (KH less than 5 degrees), frequent additions of **pH UP®** may be required to maintain the desired level, and the aquarium may even experience dangerous pH “crashes” when organic acids build up in the aquarium. If this is the case, use one of the **PROPER pH®** products to adjust the aquarium water to the desired pH and buffer it against changes.

DIRECTIONS FOR USE

1. Use **API® pH TEST KIT** to determine the pH of aquarium water.
2. To raise pH, add four drops of **pH UP®** for each U.S. gallon (3.78 L) of aquarium water, or 1/2 tsp (2.5 ml) of pH UP for every 10 U.S. gallons.
3. Take another pH reading before making the next addition of **pH UP®**.
4. If pH adjustments are still desired, repeat dose. Changing the pH more than 0.2 in any 24-hour period should only be made with extreme care. Some fish may be sensitive to pH adjustments greater than 0.2 in any 24-hour period.

pH DOWN® is designed to lower the pH in aquariums where the pH has been shown through testing to be higher than desired. Additions of **pH DOWN®** neutralize bases in aquarium water, providing a gradually lower pH. **pH DOWN®** is a dilute acid, and may not adjust the pH to the desired level after only one or two doses.

Continue to apply once daily until the desired change has been effected. A pH that cannot be lowered with continued additions of **pH DOWN®** may be the result of a high carbonate hardness (KH), which can be tested with the **KH (CARBONATE HARDNESS) TEST KIT**. Shells, coral, or limestone in the aquarium can contribute to this, or it may be a natural condition of the source water. KH can be lowered by diluting the source water with deionized, distilled or reverse osmosis water, all of which have a KH of zero or near zero. Deionized water is easily made in the home using **API® TAP WATER FILTER™**.

DIRECTIONS FOR USE:

1. Use **API® pH TEST KIT** to determine the pH of aquarium water.
2. To lower pH, add two drops of pH Down for each U.S. gallon (3.78L) of aquarium water, or 1/2 tsp. (2.5ml) for every 20 U.S. gallons.
3. Take another pH reading before making the next addition of pH Down.
4. If pH adjustments are still desired, repeat dose. Changing the pH more than 0.2 in any 24-hour period should only be made with extreme care. Some fish may be sensitive to pH adjustments greater than 0.2 in any 24-hour period.

pH UP® and DOWN® Sizes Available:

API30C	pH Down 118ml
API31C	pH Up 118ml

AMMO-LOCK®

- Locks up ammonia in a non toxic form
- Removes chlorine & chloramine
- Works instantly
- Proven safe and effective
- For fresh and saltwater aquariums



Dangers of Tap Water

Treated municipal water may contain chlorine, chloramine, ammonia, or a combination of these disinfectants. Concentrations of these chemicals can vary daily, depending on treatment requirements. While the addition of these chemicals is intended to assure safe drinking water for humans, all three of them are toxic to aquatic life.

Effect of AMMO-LOCK on Chlorine and Chloramine

In addition to its ammonia-detoxifying effects, AMMO-LOCK® instantly eliminates chlorine and chloramine as well. The chlorine-neutralizing compound in AMMO-LOCK® converts chlorine to a harmless salt. Chloramine, a combination of chlorine and ammonia, is removed in a two-step process. First, AMMO-LOCK® eliminates the chlorine and then AMMO-LOCK® immediately detoxifies the residual ammonia.

Chlorine and Chloramine in the Aquarium or Pond

When chlorinated water is added to

an aquarium or pond containing fish, the chlorine will dissipate after a few days. However, during those few days, if the water goes untreated, chlorine will damage the gill tissue of fish. Damaged gill tissue negatively affects respiration, impairing the uptake of oxygen and the release of ammonia and carbon dioxide from the fish's blood. This can lead to suffocation and death. Though many municipal water treatment facilities use chlorine as a disinfectant, research has shown that chlorine reacts with organic matter to form a cancer-causing by-product known as trihalomethane (THM). To eliminate the development of THM, many treatment plants have switched from using chlorine to using chloramine. Chloramine is an inorganic compound, which is formed when chlorine and ammonia are added to water. Unlike chlorine, chloramine is very stable and will not dissipate after a few days. In fact, chloramine can take weeks to dissipate. Chloramine is highly toxic to fish and other aquatic life. It passes through the gills and enters the bloodstream, binding to iron in blood cells, thus preventing the blood cells from carrying oxygen. Fish exposed to chloramine become lethargic, sitting on the bottom or near the surface of the aquarium or pond. As with chlorine, exposure to chloramine may lead to suffocation and death.

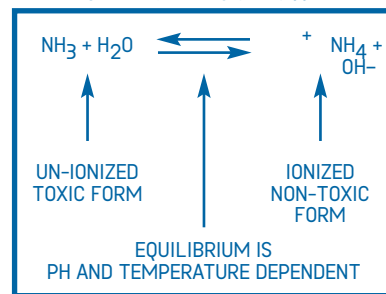
Ammonia in the Aquarium or Pond

Ammonia can enter an aquarium or pond from many sources. Tap water, waste products from fish, decomposing plants, algae and uneaten fish food can all increase the level of toxic ammonia in the water. Regardless of the source, high levels of ammonia in an aquarium or pond are toxic to living organisms.

The lethal effects of exposure to ammonia are: severe gill damage leading to suffocation, kidney and liver damage due to impaired osmoregulation, and the inability to excrete ammonia from the body, resulting in metabolic and physiological imbalance. Even at low ammonia levels, problems are documented as reduced growth rate, fin and tail rot, increased stress and interference with respiration due to damaged gill tissue. While ammonia toxicity varies widely among species, ammonia levels as low 0.04 ppm have been shown to promote gill disease in certain fish. Long-term exposure to low ammonia levels will generally result in die-off of a few fish at first, and the mortality rate will increase steadily with time. An associated consequence for fish

Testing for Ammonia

DIAGRAM 1. AMMONIA IN WATER



from chronic exposure to ammonia is a weakened immune system leading to infestations from bacteria and parasites. Normally, ammonia is removed by biological filtration, that is, by the action of nitrifying bacteria that convert ammonia into nitrite, and then into relatively harmless nitrate. In new aquariums and ponds, the nitrifying bacteria are not yet established, so ammonia may build up to highly toxic levels. Even in established aquariums and ponds, a sudden ammonia surge can result from overfeeding, overstocking, recent spawning, unnoticed fish death, overdose of antibiotics, filter malfunction or decomposing plants and algae.

Ammonia: Toxic vs. Nontoxic

Ammonia in water exists in two forms: un-ionized or free ammonia (NH_3), and ionized ammonium (NH_4^+). (See Diagram 1.) Ammonia (NH_3) is the toxic compound that destroys fish tissue, and ammonium (NH_4^+) is considered non-toxic. The exact proportion of ammonia to ammonium depends on the pH and temperature of the water. Ammonium (NH_4^+) undergoes a transformation into toxic ammonia (NH_3) at higher pH and higher temperature. So, as the pH and temperature of the water increases, the toxic effects of ammonia also increase. Toxic ammonia levels as low as 0.01 ppm may cause reductions in growth and damage to gill, liver and kidney tissue in fish. Therefore, the only safe total ammonia level is zero.

All test kits measure the sum of both forms of ammonia: toxic ammonia (NH_3) and ammonium (NH_4^+). So, if a product converts the toxic ammonia to nontoxic ammonium, the test kit would read both the toxic and nontoxic forms; therefore, the reading before and after a water treatment would be the same. Thus, the only way to determine the ability of a product to neutralize the effects of ammonia is through cell tissue culture studies.

Independent Tests Prove Protective Effect of AMMO-LOCK®

A study was conducted at the University of Georgia, School of Veterinary Medicine, to determine the ammonia-neutralizing capabilities of water conditioners. The study focused on water conditioners marketed for their ammonia-detoxifying benefits. To establish the testing criteria, the ammonia concentration that would destroy fish cell tissue cultures was first determined. Then, fish cell tissue cultures were exposed to both the toxic concentration of ammonia and the recommended dosage of water conditioner. The ability of the water conditioner to protect the fish cells was ranked on a scale of 1 to 4. A rank of 1 indicates complete protection and a rank of 4 indicates complete destruction of the fish cell culture. Among the water conditioners tested, Ammo-Lock achieved a rank of 1, indicating the highest degree of protection. (See Photographs 1 - 2 and Table 1.)

TABLE 1.
CELL TISSUE ANALYSIS OF PROTECTION FROM TOXIC AMMONIA

Product	Ammonia-Neutralizing Rank
Ammo-Lock	1
Competitor W	3
Competitor X	2
Competitor Y	2
Competitor Z	3
Control (No Product)	4

Protecting Fish from Ammonia



PHOTOGRAPH 1.

Fish cell culture exposed to 5.0 ppm of ammonia. Cell damage is clearly visible.



PHOTOGRAPH 2.

Fish cell culture exposed to 5.0 ppm of ammonia, and dosed with AMMO-LOCK. AMMO-LOCK neutralises the ammonia, protecting fish cells.

It is important to remember that chronic exposure to even relatively low levels of ammonia causes stress, physiological imbalance and increased susceptibility to disease.

When ammonia is detected, its source should be determined. If ammonia is constantly present, even in small amounts, it implies that the biological filter is not large enough, or is not working properly, and should be serviced. Whatever the source of the ammonia, **AMMO-LOCK®** will protect fish from its toxic effects by instantly neutralizing it. (See Diagram 2. on page 72.)

AMMO-LOCK®: Triple Effect

AMMO-LOCK® has a unique triple effect: it instantly removes chlorine, breaks down chloramine and detoxifies ammonia. A single dose of **AMMO-LOCK®** will remove 7.0 ppm of chlorine and 5.0 ppm of chloramine, and will detoxify 3.0 ppm of ammonia. Even though **AMMO-LOCK®** detoxifies ammonia, it is still available to nitrifying bacteria. The addition of **AMMO-LOCK®** to a new aquarium does not slow down the development of the biological filter.

AMMO-LOCK® is effective in both freshwater and saltwater aquariums, as well as in water gardens and koi ponds. It is safe for all aquatic life, including fresh and saltwater fish, sensitive invertebrates, such as shrimps, mollusks and corals, and live plants.

DIAGRAM 2. AMMO-LOCK Detoxifies Ammonia

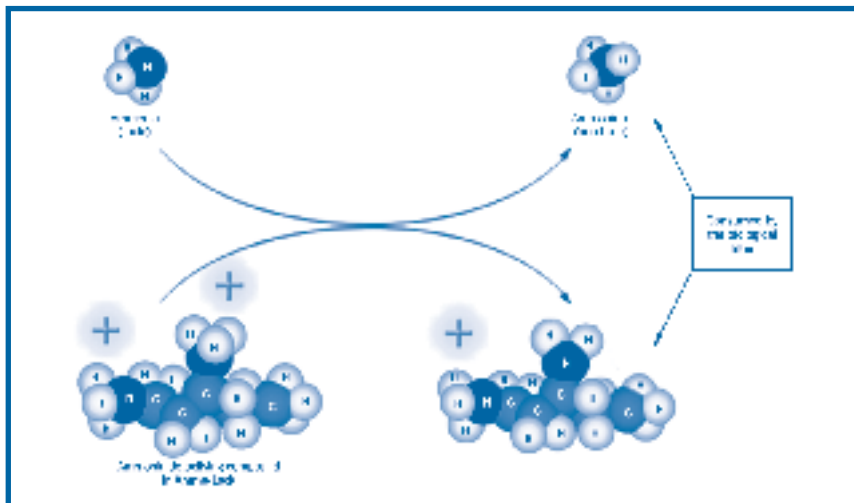
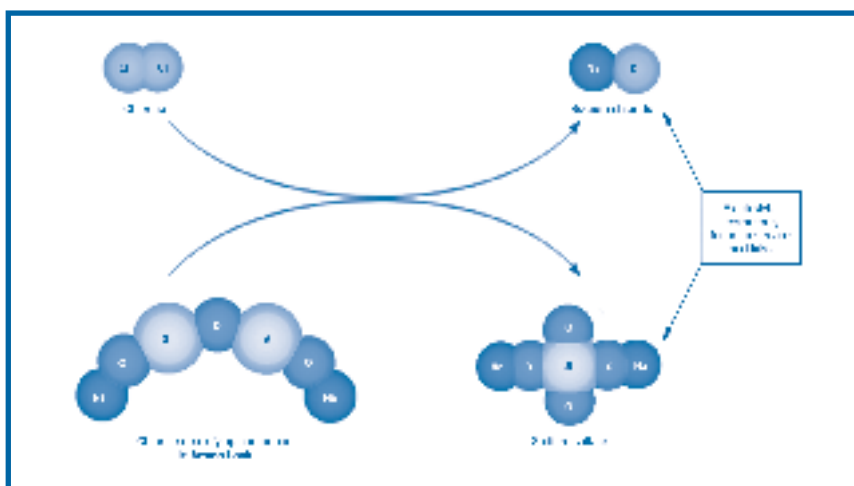


DIAGRAM 3. AMMO-LOCK DETOXIFIES CHLORINE



Directions For Use

- For fresh and saltwater aquariums of 10 U.S. gallons (38 L) or more: Add 1 tea-spoonful (5 ml) of **AMMO-LOCK®** for each 10 U.S. gallons (38 L) of water. For desktop or mini-aquariums up to 5 U.S. gallons (19 L): Add 1/2 teaspoonful (2.4 ml) of **AMMO-LOCK®** to the aquarium water. For fishbowls up to 1 U.S. gallon (3.8 L): Add 1/4 teaspoonful (1.2 ml) of **AMMO-LOCK®** to water.
- Continue to add ammo-lock every 2 days until ammonia is not detected. A teaspoonful of **AMMO LOCK®** will detoxify 3.0 ppm ammonia, 7.0 ppm chlorine, or 5.0 ppm of chloramine in 10 U.S. gallons (38 L) of water.
- Positive ammonia test results after 7 days indicate possible overfeeding, overstocking, or inadequate biological filtration. Perform a partial water change and reduce feeding.
- AMMO-LOCK®** can be used with all medications.

AMMO-LOCK® Sizes Available:

API45A	30 ml Treats 227 L
API45C	118 ml Treats 893 L
API45D	237 ml Treats 1794 L
API45E	473 ml Treats 3581 L

Additional Literature

Boyd, Claude E. 1990. Water quality in ponds for aquaculture. Alabama Agricultural Experiment Station. Auburn University Birmingham Publishing, Birmingham, Alabama.

Connell, Des W. and Darryl W. Hawker. 1992. Pollution in tropical aquatic systems. CRC Press, Inc. Boca Raton, Florida.

Meade, J.W. 1985. Allowable ammonia for fish culture. Progressive Fish Culturist 47(3):135-145.

Painter, H.A. 1970. A review of literature on inorganic nitrogen metabolism in micro-organisms. Water Research 4:450-493.

Puckhaber, Birgit and Gerd-Uwe Meylahn. 1998. Intensive fish production in closed recirculation systems: a future farming strategy for intensive aquaculture. Recirculation Today 1(2):9-12.

Rand, Gary M. and Sam R. Petrocelli. 1985. Fundamentals of aquatic toxicology: Methods and applications. Hemisphere Publishing Corporation. Washington District of Columbia.

Wedemeyer, Gary A. 1996. Physiology of fish in intensive culture systems. Chapman and Hall. New York, New York.

WATER SOFTENER PILLOW



- Softens water by removing calcium, magnesium and heavy metals
- Eliminates white, crusty deposits
- Completely rechargeable
- For freshwater aquariums

Providing an aquarium with softer water improves fish health and can prevent unsightly mineral deposits on aquarium surfaces. Many fish (such as neons, angelfish and South American cichlids) prefer softer water. Additionally, buffers such as **API® PROPER pH® 6.5, 7.0 and 7.5** will work better and last longer when used in soft water.

The **WATER SOFTENER PILLOW** contains ion-exchange resins which remove calcium, magnesium, and heavy metal ions from water in fresh-water aquariums. These water-softening resins are contained in a "pillow" which is placed in the filter, where aquarium water can pass through it. The resins work by exchanging sodium ions (located on the resin beads) for minerals and heavy metals that cause hard water. Thus, the **WATER SOFTENER PILLOW** does not add "salt" to the aquarium, only harmless sodium ions.

The **WATER SOFTENER PILLOW** can be recharged for repeated use. When resin beads are full of minerals, recharging is accomplished by placing the pillow in a salt solution. Sodium ions in the recharging solution displace the "water hardness" minerals on the resin beads; the **WATER SOFTENER PILLOW** is now ready to remove more minerals. Note: Heavy metals like copper and iron permanently bind to the resin beads in the **WATER SOFTENER PILLOW**. High levels of organics can

also clog the resins, reducing efficiency. This process can gradually reduce the product's efficiency. Under ideal conditions (low metallic ions and low levels of dissolved organics) the **WATER SOFTENER PILLOW** may be recharged an indefinite number of times. If the **WATER SOFTENER PILLOW** ceases to function properly due to bound resins, it should be replaced; normally this occurs after six to eight recharges.

DIRECTIONS FOR USE

1. Remove and flatten pillow to evenly distribute the resins within.
2. Place the pillow in the aquarium filter so that circulating water passes through it.
3. Activity of the pillow lasts for 48 hours before recharging is necessary.
4. Hardness removal for each 48 hours of use:

Aquarium Size	PPM Removal
95 L	220 ppm
205 L	110 ppm
415 L	55 ppm

5. To test general hardness, use **API® GH & KH TEST KIT**. (See page 23)

Directions for Recharging and Storage

1. Remove pillow from filter and rinse with tap water. Never let the pillow dry out.
2. Make a recharging solution by dissolving 3 tablespoonfuls (60 g) of **API® AQUARIUM SALT** in 7oz. (210 ml) of water. Place pillow in solution for 2 hours for full recharging. Discard recharging solution after 4 recharges.

WATER SOFTENER PILLOW

Sizes Available:

API49A	Large - for aquariums up to 95 L
API49B	Extra large - for aquariums up to 208 L

TAP WATER CONDITIONER



- Super-strength formula instantly removes chlorine
- Breaks the chloramine bond
- Detoxifies heavy metal in tap water
- For freshwater aquariums

Toxic heavy metals such as copper, lead and zinc can be found in most tap water supplies, sometimes entering tap water from lead and copper pipes, or from solder used to

join the pipes. Additionally, many tap water supplies contain chlorine or chloramine to make water safe for human consumption. Chlorine destroys gill tissue in fish and can cause suffocation. Chloramine (an inorganic complex formed when ammonia combines with chlorine in water) passes through the gills and enters the bloodstream, binding to iron in blood cells and preventing them from carrying oxygen. As with chlorine, the presence of chloramines can suffocate fish. Chlorine, chloramines and heavy metals are all toxic to aquatic life; therefore, tap water which contains these substances should be treated before adding to an aquarium. **TAP WATER CONDITIONER** instantly makes tap water safe by detoxifying heavy metals, neutralising chlorine, and breaking the chloramine bond. Ammonia released from the breakdown of chloramines can be detoxified by **API® AMMO-LOCK®. TAP WATER CONDITIONER** along with **AMMO-LOCK®** provides the most complete way to condition tap water by removing toxic compounds.

Directions for Use:

1. **To remove chlorine and detoxify heavy metals:** Add one drop to each gallon (38 L) of tap water being treated, or 1/4 teaspoonful (1.25 ml) to each 20 gallons (75.7L).
2. **To detoxify chloramines (break the chloramine bond):** Add 3 drops to each gallon (38 L) of tap water being treated, or 3/4 teaspoonful (3.75 mL) to each 20 gallons (76 L). To remove the ammonia released from chloramines or produced by fish waste use **AMMO-LOCK®**.

TAP WATER CONDITIONER

Sizes Available:

API52E	30 ml Treats 2,268 L
API52B	118 ml Treats 9,072 L
API52C	473 ml Treats 28,607 L

STRESS ZYME®



- Concentrated live bacteria help establish the biological filter in new aquariums
- Maintains an active biological filter in established aquariums
- Works to eliminate toxic ammonia and nitrite
- Helps keep aquariums clean by reducing sludge build-up
- For freshwater and saltwater aquariums

Why use STRESS ZYME® in a new aquarium?

All aquariums must have an active biological filter to remove harmful substances from the water. Biological filters are comprised of many types of bacteria that work together to maintain healthy conditions in aquariums. Nitrifying bacteria, for example, remove harmful ammonia and nitrite.

When fish are added to a new aquarium, they immediately begin to release toxic ammonia. Because new aquariums have no active biological filters, ammonia concentrations can quickly rise. High ammonia levels place stress on fish and lower their immunity, resulting in disease and fish death. In fact, the natural, gradual development of an active biological filter in a new aquarium is actually inhibited by high concentrations of ammonia and other organic compounds from fish waste and uneaten fish foods. **STRESS ZYME®** significantly shortens the development time of the biological filter in new aquariums, thus reducing serious early stress in a new aquatic environment.

Why use STRESS ZYME® in an established aquarium?

Established aquariums get dirty. That is, they collect organic matter (such as uneaten fish food and solid fish waste) in the gravel bed and filtration system. Ideally, such organic matter is consumed by bacteria in the biological filter as quickly as it is generated, and a healthy environment is maintained. Most often, this organic sludge tends to accumulate, however, inhibiting the activity of the biological filter by consuming oxygen and clogging the gravel bed. Because the biological filter cannot function without oxygen, ammonia and nitrite concentrations reach harmful levels under these conditions, meanwhile disease-causing organisms thrive. These disease-causing organisms often grow to very high numbers in the aquarium when such conditions exist, and ultimately lead to fish loss. The bacteria in **STRESS ZYME®** keep the aquarium clean by reducing sludge build-up, thus boosting the biological filter's activity.

What is STRESS ZYME®?

STRESS ZYME® is a highly concentrated solution of beneficial bacterial strains that have been specifically selected for the development of biological filters. These bacteria will be active in both fresh and saltwater aquariums.

How STRESS ZYME® works

Each teaspoonful of **STRESS ZYME®** contains a minimum of 345 million live bacteria. These bacteria are active and ready to enhance the growth of the biological filter and to digest compounds that will inhibit its development. **STRESS ZYME®** is stabilized to provide a five-year shelf life, as shown by the expiration date on the label. Some bacterial aquarium products have limited shelf life, yet manufacturers often give no expiration dates. Certain of these liquid bacterial products are subject to rapid degradation, evidenced by their characteristic "rotten egg" (hydrogen sulfide) odor. Formation of toxic hydrogen sulfide indicates complete product breakdown; consequently, such products should not be added to an aquarium.

STRESS ZYME® has a sweet odor due to its unique concentrated bacterial formulation. When used as directed, **STRESS ZYME®** assures a well-functioning biological filter, improved water quality, and healthy fish. This product contains bacteria which are natural and beneficial for aquatic settings; thus **STRESS ZYME®** is harmless to humans and pets, and completely safe for all fresh and saltwater fish, invertebrates and plants. Unlike most other liquid bacterial products, **STRESS ZYME®** does not require refrigeration.

Directions for Use:

New Fresh and Saltwater Aquariums

1. Add 2 teaspoonfuls (10 ml) of **STRESS ZYME®** for each 10 U.S. gallons (38 L) of aquarium water on the 1st day of aquarium set-up, and on the 7th and 14th days thereafter.
2. Then, once a week add 1 teaspoonful (5 ml) for each 10 U.S. gallons (38 L) of aquarium water.

Established Fresh and Saltwater Aquariums

1. To maintain good water quality and healthy biological filtration, once a week add 1 teaspoonful (5ml) of **STRESS ZYME®** for each 10 U.S. gallons (38 L) of aquarium water. Important Note: SHAKE WELL BEFORE USING. To obtain maximum activity, keep from freezing and do not store above 49°C (120°F).

STRESS ZYME® Sizes Available:

API56A	30 ml Treats 2,268 L
API56C	118 ml Treats 907 L
API56D	237 ml Treats 1,814 L
API56E	473 ml Treats 3,628 L
API56F	3.8 L Treats 29,030 L

STRESS COAT®



- Replaces the natural slime coating fish can lose in times of stress
- Contains Aloe Vera—nature's "liquid bandage" to promote the healing of skin wounds
- Removes chlorine from tap water
- Removes ammonia from tap water
- neutralises chloramine
- Detoxifies heavy metals
- Benefits both freshwater and saltwater fish

Every time a fish is netted or handled, its protective slime coating is disturbed. Such damage can cause fish to lose essential electrolytes (chloride and potassium) through the outer skin layers, further stressing the fish. Suppression of the immune system and increased susceptibility to disease can result. **STRESS COAT®'s** special patented formula was designed to replace damaged slime coats, to replenish essential electrolytes and to treat fish with the tissue-healing properties of Aloe Vera, nature's own liquid bandage. This unique formula not only eases stress, but heals damaged tissue.

How STRESS COAT® heals wounds

STRESS COAT contains a special nontoxic polymer that is attracted to the skin of fish, forming a synthetic slime coat envelope. **STRESS COAT®'s** formula also includes electrolytes such as sodium, magnesium and chloride, which helps reduce electrolyte loss through the skin, gills and damaged tissue. But it is the Aloe Vera in **STRESS COAT®** that makes this product unique. Independent studies have proven that **STRESS COAT®** with Aloe Vera effectively heals damaged tissue and aids in tissue regeneration. (See the results of a independent laboratory study performed by the University of Georgia, pg. 11.)

Added benefits of STRESS COAT®

Treated municipal water may contain chlorine or chloramine. Both are disinfectants, and both are toxic to aquatic life. Chlorine destroys gill tissue, causing suffocation. Chloramine passes through the gills and enters the bloodstream, binding to iron in blood cells and preventing them from carrying oxygen. As with chlorine, the presence of chloramine suffocates fish. **STRESS COAT®** removes chlorine and chloramines, breaking the chloramine bond in tap water to be used in the aquarium. Heavy metals such as copper, lead and zinc also can be found

in most tap water supplies and even wells, sometimes entering tap water from ground water, as well as from lead and copper pipes or from solder used to join the pipes. These heavy metals are highly toxic to all aquarium inhabitants and should be removed from tap water before use in an aquarium. **STRESS COAT®** effectively detoxifies heavy metals found in tap water, making it safe for aquarium use.

Recommendations

STRESS COAT®'s excellent reputation as a healing treatment is global and longstanding. It is recommended for use whenever actual tissue damage has occurred in aquarium fish as a result of disease or injury. Both freshwater and saltwater fish benefit from the use of **STRESS COAT®**. Professional ornamental fish farmers employ **STRESS COAT®** as an effective stress reducer. Fish breeders rely on **STRESS COAT®** as a means to reduce stress in their facilities, as well as during fish transport, by adding the product to bags of fish for shipment. This product is recommended as a beneficial water conditioner when setting up a new aquarium, when making a water change or handling fish, and when adding new fish to a tank. **STRESS COAT®** can be used in conjunction with **API® AMMO-LOCK®** to condition aquarium water and neutralize toxic ammonia in tap water.

Directions For Use:

1. To Replace Fish Slime Coating and Promote Healing of Skin Wounds and Torn Fins: add two teaspoonfuls (10 ml) of **STRESS COAT®** for each 10 U.S. gallons (38 L) of aquarium water.
2. To Remove Chlorine and neutralize Chloramines: add one teaspoonful (5 ml) of **STRESS COAT®** for each 10 U.S. gallons (38 L) of tap water.

Using **API® AMMO-LOCK®** will instantly lock up the ammonia from chloramine, as well as ammonia produced by decomposing fish waste, overfeeding, etc.

Note: **STRESS COAT®** is not a medication, nor is it intended to be a substitute for any medication.

STRESS COAT® Sizes Available:

API85G	30 ml Treats 227 L
API85B	118 ml Treats 907 L
API85A	237 ml Treats 1,814 L
API85C	473 ml Treats 3,628 L
API85F	473 ml with pump Treats 3,628 L

Independent Laboratory Study Proves the Effectiveness of STRESS COAT®

In 1983, an independent study performed by the University of Georgia's School of Veterinary Medicine,

set out to test **STRESS COAT®** for its effectiveness in tissue healing. The experimental protocol was designed by Dr. John Gratzek, Chairman of the Medical Microbiology Department at the University of Georgia.

About the Study

Twelve 10-gallon aquariums were set up with established biological sponge filters. Water temperature was held at 75°F/23.6°C with aquarium heaters, and the pH of the water was buffered at 7.5. Fifteen common goldfish (*Carassius auratus*) were put in each aquarium. Fish were fed daily with a commercial pellet food. Ammonia, nitrite, and pH were monitored daily. In order to create uniform tissue damage on all 180 fish, a special surgical wounding instrument was created. The tool was made from a steel cylinder, 3.93 mm in diameter. Twelve razor points spaced 1 mm apart were machined into the tip. The fish were anesthetized before surgery with the wounding tool. A few scales were first removed, then the instrument was used to make a single uniform wound. Over the next 40 days, 9 of the 12 aquariums were treated with **STRESS COAT®**. Three aquariums were left untreated as experimental controls. After 40 days, the fish were examined by seven experts. This group was comprised of six veterinarians on the University of Georgia faculty, four of whom possessed the added qualification of Ph.D. in biology, and one pet shop owner. All of the examiners worked independently and were not aware of which fish received the **STRESS COAT** treatment. They were asked to evaluate the wounds using the following scale:

- 1 = no discernable wound, discoloration or redness
- 2 = just discernable wound, discoloration or redness
- 3 = wound readily discernable, less than grade 4.
- 4 = redness, open wound very apparent, scale disrupting, fungus, frayed edges on wound.

Analysis of the rating data showed a significant difference between the treated fish and the untreated controls. Examiners found that **STRESS COAT®** helped heal the wounds and reduce their size, compared to the wounds left untreated.

Interpreting the Results

The ability of Aloe Vera to promote cell regeneration in human tissue cell cultures has been well-established by scientific studies.^{1,2,3,4,8,9,10} Aloe Vera

extract is high in mucopolysaccharides, an essential component of many tissues that is believed to help in the healing process. The glycoproteins Alocin A and Alocin B are also present and have been identified as probable "tissue healers." This study showed that **STRESS COAT®** with Aloe Vera actually does promote the healing and regeneration of damaged fin tissue.

The product was patented in 1985 and has developed a reputation as a superior stress-reducer for fish. Fish farmers apply **STRESS COAT®** directly to fish during harvesting operations; many professionals will not ship exotic fish without **STRESS COAT®** in the shipping bags. One university professor reported that the use of **STRESS COAT®** significantly improved marine fish survival during collecting trips. These observations confirm the University of Georgia test results, as summarized by Dr. John Gratzek: "**STRESS COAT®** in no way harms aquarium fish, alters pH, or affects the biological filter. No ammonia or nitrite was detected in aquariums. The results indicated that the Aloe Vera in the **STRESS COAT** formula significantly reduced the wound size compared to untreated tissue."¹¹

Since 1985, **STRESS COAT®** has been North America's top selling water conditioner. Each year, **STRESS COAT®** is used to treat over one billion gallons of aquarium water.

ACCU-CLEAR®

- Clears cloudy aquarium water fast, usually within four hours
- Eliminates milky haze caused by gravel in new aquariums
- Removes suspended dirt and haze that may appear after cleaning the aquarium and gravel bed
- Unique, colourless, inorganic polymer
- For freshwater aquariums

ACCU-CLEAR® is a fast-acting water clarifier designed to eliminate murky, cloudy water in freshwater aquariums caused by particulate materials. Such tiny particles are too small for regular aquarium filters to remove. **ACCU-CLEAR®** causes these particles to clump together, forming large particles that are easily removed by the aquarium filter. This enhances the filter's water-clearing efficiency. Whenever organic matter is removed by the filter, however, the oxygen level in aquarium water may drop to harmful levels.



This is because organic material consumes oxygen while decomposing. Thus, adequate aeration should be provided in the aquarium when using **ACCU-CLEAR®**.

Causes of cloudy aquarium water

Newly established aquariums often develop cloudy water within one week after the addition of fish. Such cloudiness can also occur in established aquariums. Water changes, filter changes, and gravel cleaning can also stir up dirt and debris, resulting in unsightly, persistent clouds in aquarium water.

Tips for Crystal Clear Water

Many aquarium clouds are directly related to the accumulation of organic matter, such as uneaten fish food and fish waste. The following schedule for monthly maintenance should be performed to keep the aquarium clean and healthy:

- Partial water changes of 15-35% are recommended
- Aquarium filter cartridges should be changed or cleaned frequently
- Aquarium gravel should be vacuumed to remove accumulating dirt or "sludge"
- Activated carbon and filter floss should be replaced
- **STRESS ZYME®** should be added on a regular basis.

Directions for Use:

1. Add 2 drops of **ACCU-CLEAR®** for each U.S. gallon (3.8 L) of aquarium water. For larger aquariums, add 1 teaspoonful (5 ml) for each 50 U.S. gallons (190 L) of aquarium water.
2. Water will clear within several hours. If a second dose is necessary, wait 24 hours before applying.
3. **ACCU-CLEAR®** can be used once every week to keep filters performing at maximum efficiency.
4. This product is completely safe for all freshwater fish, invertebrates and plants when used as directed. Overdosing with **ACCU-CLEAR®** will slow down water clarification, however.

ACCU-CLEAR® Sizes Available:

API111A	37ml treats 1,399L
API111B	118ml Treats 4,536L

Fish feeders

THE 7-DAY PYRAMID FISH FEEDER™

- Provides a superior nutritional source for aquarium fish when away from home
- Slowly releases food pellets, allowing fish to feed at will
- Patented inner chamber supplies a nutritious mid-week treat
- One pyramid will feed the fish in an appropriately stocked 10 U.S. gallon (38 L) tank for 5 to 10 days.



THE 7-DAY PYRAMID FISH FEEDER™ successfully supplies the dietary needs of aquarium fish when the hobbyist isn't available to manually feed fish for approximately 7 days. Within a few hours of being placed in the aquarium, fish will sense food within the pyramid, and will begin to consume nourishing food pellets from the surface of **THE 7-DAY PYRAMID FISH FEEDER™**. These pellets contain a formulation of energy-rich foods, along with essential vitamins and minerals, which are continually provided during the feeding cycle of the pyramid. Fish feed at will; the more they eat, the more food pellets are exposed. Approximately mid-way in the pyramid's 7-day feeding cycle, a centrally located chamber within the pyramid will be exposed, supplying a nutritious treat to add variety to the fish's diet.

Vacation Checklist

- ✓ **Make sure the aquarium water contains no measurable ammonia or nitrite.**
- ✓ **Test the pH level and adjust if necessary.**
- ✓ **Clean the filter.**
- ✓ **Make sure the aquarium has adequate aeration.**

Directions for Use:

1. Simply place **THE 7-DAY PYRAMID FISH FEEDER™** in the aquarium to begin the feeding cycle. One pyramid will normally feed the fish in an appropriately stocked 10 U.S. gallon (38 L) aquarium for 5 to 10 days. However, the dissolving time may increase in very hard water.

THE 7-DAY PYRAMID FISH FEEDER™ Sizes Available:

APIUK71A one pyramid feeding block

THE 3-DAY PYRAMID FISH FEEDER™

- Patented feeding block contains pellets of nutritious fish food
- Each pellet is a uniformly balanced meal
- Feeds fish for a whole weekend
- One pyramid will feed the fish in an appropriately stocked 10 U.S. gallon (38 L) tank for 2 to 4 days



THE 3-DAY PYRAMID FISH FEEDER™ supplies superior nutrition for freshwater aquarium fish when the hobbyist isn't available to manually feed fish for approximately 3 days. After being placed in the aquarium, **THE 3-DAY PYRAMID FISH FEEDER™** will give off a fine stream of bubbles; fish begin to sense the presence of food within the pyramid, and are attracted to it. Within a few hours, fish are feeding on the nourishing food pellets from the surface of the pyramid. These pellets contain a formulation of energy-rich foods, along with essential vitamins and minerals, which are continually provided during the feeding cycle of the pyramid. Fish feed at will; the more they eat, the more food pellets are exposed.

Directions For Use:

1. Simply place **THE 3-DAY PYRAMID FISH FEEDER™** in the aquarium to begin the feeding cycle. One pyramid will feed the fish in an appropriately stocked 10 U.S. gallon (37.8 L) aquaium for 2 to 4 days.

THE 3-DAY PYRAMID FISH FEEDER™ Sizes Available:

APIUK78 four pyramid feeding blocks

Filtration products

ACTIVATED CARBON & FILTRATION PRODUCTS

- Provides excellent filtration for crystal-clear aquarium water
- Removes toxic organic substances, odors and colours from water, promoting the health of aquarium inhabitants
- Not treated with phosphate or nitrate

What is activated carbon?

Many natural substances are used as base material to make activated carbon, such as wood, coal and coconut shell. Lignite, a form of coal, is used to produce an activated carbon that is suitable for removing aquarium pollutants. The base material is subjected to a heating process called carbonization, which produces a carbon mass full of tiny pores. A second heat-steam process is then employed which "activates" the carbon mass. Activation creates a vast internal pore network as well as a particular surface chemistry in each carbon particle, both of which impart unique filtering characteristics. Ash, an inorganic material left behind after the activation process, is also produced.

Why Use Activated Carbon for an Aquarium?

Activated carbon filtration is one of the most effective, economical and easiest methods of removing organic pollutants from an aquarium. "Organic-laden" aquariums often experience a higher rate of disease and reduced fish growth, while invertebrates close or cease reproduction. Reduction of organic compounds ultimately leads to improved water quality and healthier aquarium specimens.

How Does activated carbon Work?

Activated carbon removes organic compounds from an aquarium primarily by adsorption, a process by which pollutants are transferred from the water to the carbon and held there by electrostatic forces. Aquarium filtration systems employ this property of activated carbon by filtering a small portion of the total aquarium volume on a continuous basis, so that pollution

can be removed faster than it can accumulate. If the filter is too small or the flow rate is too slow, pollutants will build up; thus, manufacturers make different size filtration systems so that they can be appropriately matched to the volume of any aquarium. When activated carbon in the filter becomes exhausted, the adsorption rate goes down; fresh activated carbon must be supplied to the filter to continue the purification process. Activated carbon cannot be reactivated by boiling in water, heating in an oven, or by any other method aquarists could apply at home. Reactivation requires high heat in a controlled environment to restore adsorption sites. Ideally, aquarium water should be pre-filtered before contact with activated carbon. Prefilters reduce the amount of particulate matter that can clog carbon particles. The size of the activated particles is important in some filtration systems. Smaller carbon pieces pack together and can reduce flow rates through canister filters. If flow rates are not too restrictive, however, these conditions will increase contact time for adsorption. Please note that the quality of an inferior activated carbon cannot be improved by crushing it. Crushing into smaller pieces will not create more surface area, it will simply expose more of the existing surface area so that the rate of adsorption may increase, but not the amount of pollution removed. Most aquarium medications are readily adsorbed by activated carbon; therefore carbon products must be removed while treating with antibacterial and antiparasitic drugs. Fresh activated carbon will effectively remove medication from aquarium water when a treatment is completed. And while activated carbon has the potential to adsorb certain dissolved metals considered to be desirable trace elements in the marine aquarium, it must be noted that activated carbon has a much higher affinity for organic compounds than for metals. These metals are continuously removed by other ongoing processes, as well as by the marine organisms themselves. Given that there are many additives available that can replenish essential elements, it would seem the benefits of activated carbon filtration for marine aquariums far outweigh concerns over trace element removal.

How much activated carbon should I use?

Follow product recommendations when they are provided. Carbon is used by volume not weight. In general, "more is better" when using activated carbon—a greater quantity of carbon will work faster and longer than a lesser amount.

How do different filtration products compare?

There are many activated carbon products on the market today, but they are not equal in performance. Quality activated carbon, like that manufactured by **API**®, has not been subjected to chemical activation or washing with phosphoric acid, zinc or hydroxides. It also has a macroporous structure, that is, large pores in each particle.

ACTIVATED FILTER CARBON

A high quality activated carbon with excellent pore distribution, **ACTIVATED FILTER CARBON** offers complete filtration for maintaining healthy fresh and saltwater aquariums. This product effectively removes organic pollutants, odors and colours, and is perfect for the needs of aquarium hobbyists who want healthy, active fish and crystal-clear water.



Directions For Use:

1. Remove Activated Filter Carbon pouch from plastic bag (do not open the Activated Filter Carbon pouch). It is important to rinse the pouch thoroughly in tap water to remove any dust. (Rinse water does not need to run completely clear).
2. Place filter pouch directly in **RENA FILSTAR** filtration basket.
3. Replace pouch every 1 to 3 months, depending on stocking density and water quality.

ACTIVATED FILTER CARBON Sizes Available:

ADC840606	285g Pouch
ADC290603	Refill (Internal filter)

AMMO-CHIPS®

AMMO-CHIPS® is made of the highest grade zeolite, a natural ammonia-removing mineral. Ammonia is produced in aquariums from decaying fish waste and uneaten fish food; increased ammonia levels create toxic conditions for fish. **AMMO-CHIPS®** contains only 100% zeolite, and is highly effective for ammonia removal in freshwater aquariums and ponds.



Directions For Use:

1. Before using, rinse thoroughly under running water to remove fine particles caused by shipping vibration.
2. Use 1/4 cup (4 tablespoonfuls) of AMMO-CHIPS for each 10 U.S. gallons (38 L) of aquarium water. Place **AMMO-CHIPS®** in one of the following locations:
 - a. In an external power filter (follow the directions of the filter manufacturer).
 - b. In a canister or corner filter (layer **AMMO-CHIPS®** between two layers of filter fiber or use filter media bag).
3. For goldfish bowls, use 2 tablespoon-fuls of rinsed AMMO CHIPS for each goldfish bowl.
4. Recharging **AMMO-CHIPS®**:
AMMO-CHIPS® can be recharged by soaking them in a solution made with **API® AQUARIUM SALT**. Add 1 lb. (453 g) of salt to 3 gallons (11 L) of water to make a recharging solution. Ammo-Chips can normally be recharged about four to eight times.

AMMO-CHIPS® Sizes Available:

API79A 340g

BIO-CHEM STARS®

- Grows massive colonies of nitrifying bacteria
- Provides more growing area than plastic balls, blocks or undergravel filters
- Fits in any power filter, canister filter or wet/dry trickle filter
- Floats for better oxygen supply to growing bacteria
- Unique black porous polymer has large pores for rapid transfer of water and oxygen
- For fresh and saltwater aquariums



BIO-CHEM STARS® are a biological filtration medium that provides the optimal home for colonies of nitrifying bacteria in the aquarium. Made of porous polymer, this product provides excellent growing conditions for nitrifying bacteria. Other biological filtration media provide only limited surface growing area and little, if any, internal pore structure to support a healthy biological filter. One **BIO-CHEM STAR®** has 33 times more growing area for bacteria than the leading plastic ball. **BIO-CHEM STARS** are so effective that they can be used instead of rotating filters, undergravel filters and many other biological media, providing a more efficient surface area for bacterial growth.

How BIO-CHEM STARS Work

The stars are formed through a patented process that creates a 50-70 micron internal pore network. As bacteria multiply within this network, they colonize the internal pore structure. Because **BIO-CHEM STARS®** are completely porous, water and oxygen pass through, which keeps bacteria colonies healthy and active. **BIO-CHEM STARS®** float on the water surface in external power filters, permitting oxygen to saturate the stars, and creating a wet/dry filter effect.

Internal Surface Area Makes the Difference

Many products have internal surface area but cannot sustain live nitrifying bacterial colonies. Activated Carbon, for example, has a vast internal pore network. But these pores "dead-end" inside carbon particles, and are too small in diameter to permit bacterial growth. Thus, water and oxygen are unable to permeate, once bacterial growth has filled up the pores. In **BIO-CHEM STARS®**, the open pore structure assures no "dead-ends." All pores are interconnected so that water and oxygen can surround growing bacteria at all times.

The Benefits of Internal Colonization

The black coloration of **BIO-CHEM STARS®** prevents light from penetrating into the stars. Thus, bacterial colonies located therein are protected from growth-inhibiting exposure to light. As oxygen and nutrients diffuse into the star, metabolic by-products (carbon dioxide and nitrate) produced by colonizing bacteria diffuse out. In addition, living bacterial cells are continuously being pushed out of the pores to make way for new cells within. This self-purging action keeps the pores clean; stars remain active indefinitely, supporting a vigorous, healthy biological filter.

In contrast, the smooth surfaces of plastic balls promote "water shear," a high-velocity water current that washes over the surface of smooth materials. Water shear keeps bacteria from permanently attaching to the plastic balls and thus prevents bacterial colonization. Exposure to light also discourages the growth of nitrifying bacteria on such surfaces. Scientific studies prove that few colonies can grow normally under these conditions. Practical experience reflects this finding, since only large amounts of plastic materials can maintain an active biological filter.

Using BIO-CHEM STARS

Because **BIO-CHEM STARS®** do not break down or clog, they may be utilized indefinitely. **BIO-CHEM STARS®** will provide superior biological filtration even in bare-bottom aquariums. Use **BIO-CHEM STARS®** in an established aquarium to improve biological filtration or to start a new aquarium.

Directions For Use:

1. Use 4 **BIO-CHEM STARS®** for each 20 U.S. gallons (76 L) of aquarium water.
2. Rinse stars before use to remove fine dust from shipping.
3. For External Power Filters: **BIO-CHEM STARS®** can be used in any external power filter to create a wet/dry filtration system. Place stars anywhere in the power filter; the stars will float.
4. For Canister Filters: **BIO-CHEM STARS®** can be used as a biological filter medium in canister filters. Place stars anywhere in canister compartment.
5. For Wet/Dry Trickle Filtration Systems: **BIO-CHEM STARS®** can be used in new and established wet/dry systems. Simply layer, or mix the stars with the existing plastic medium.
6. If other filtration materials are used in addition to **BIO-CHEM STARS®**, it will be necessary to change or clean these materials monthly. Organic debris trapped in filter fiber or sponges can decrease the level of dissolved oxygen in the filter, thus affecting the biological filter's efficiency.
7. While anti-parasitic medications usually have no effect on nitrifying bacteria, antibacterial medications sometimes suppress the biological filter. **BIO-CHEM STARS®** can easily be removed from the filtration system and placed in a container of aerated water for the duration of the disease treatment. Because nitrifying bacteria live inside the stars, they are not disturbed by this practice.

BIO-CHEM STARS® Sizes Available:

ADC840604	Box of 20 stars
ADC170600	Box of 4 stars

BIO-CHEM ZORB®



- Superior filtration material.
- Effectively removes organic pollutants
- Removes medications
- For freshwater and saltwater aquariums, including reef tanks

BIO-CHEM ZORB® represents a break-through in water filtration technology, featuring the world's finest resin/carbon filtration media: two research-grade organic scavenger resins; two pharmaceutical-grade ion exchange resins; and high-porosity, activated carbon that will not leach phosphate. Working together, these components remove both synthetic and naturally occurring organic pollutants, as well as stress-causing metabolic by-products in freshwater and marine aquariums.

Organic Pollutants in the Aquarium

Fish, invertebrates, plants, algae and uneaten fish food release a variety of organic pollutants in the aquarium. (see **DIAGRAM 1**).^{4,10,12,14,15} Bacterial decomposition of dead plants, aquatic animals and aquarium foods also increase the level of organic pollutants in the aquarium. In nature, these pollutants are carried away by water currents and tides. Since aquarium water is only changed periodically, between water changes, pollution increases to harmful levels. Additionally, some tap water contains trace quantities of man-made organic pollutants, originating from industrial waste, agricultural fertilizers and insecticides. These contaminants are toxic to fish and invertebrates.^{6,8}

Effects of Accumulated Organic Pollutants

When organic pollutants accumulate in an aquarium, a stressful environment is created for all aquarium inhabitants. Naturally occurring bacteria in the aquarium will break down certain of these organic pollutants. In this process, however, the bacteria use oxygen, thus increasing the Biological Oxygen Demand (BOD).⁷ The oxygen available for fish, invertebrates and the biological filter is thereby reduced. Oxygen reduction can also be influenced by organics which can be measured by Chemical Oxygen Demand (COD). Poor water quality ultimately causes immune system

suppression of aquarium inhabitants and increases the likelihood of disease outbreak. Inhibited growth and reproduction of aquatic organisms is directly related to water quality.^{15,11,12} These and other negative effects caused by accumulated organic pollutants are summarized below:

1. Lowers resistance to disease
2. Inhibits growth and reproduction
3. Reduced oxygen level (high BOD)
4. Declining pH
5. Declining redox potential (high COD)
6. Discoloured aquarium water
7. Reduced light transmittance
8. Foul odors

Continuous filtration with **BIO-CHEM ZORB®** will restore a healthy aquatic environment. Each filtration media in **BIO-CHEM ZORB®** has been tested and proven to remove organic pollutants in fresh and saltwater.

How BIO-CHEM ZORB® Works in Freshwater

BIO-CHEM ZORB® cleans freshwater aquariums by ion exchange, adsorption and absorption processes. Organic pollutants are "sorbed" by both research-grade organic scavenger resins and high-porosity activated carbon. The pharmaceutical-grade ion exchange resins remove toxic heavy metals, antibacterial drugs, and aquarium medications such as malachite green, acriflavine, and formalin.

How BIO-CHEM ZORB® Works in Saltwater

In marine environments, **BIO-CHEM ZORB®** relies on the absorption/adsorption properties of research-grade organic scavenger resins, and high-porosity activated carbon. **BIO-CHEM ZORB®** is especially useful in removing organics or "yellow water," which results from the presence of organic pollutants that have not bio-degraded. These organic pollutants reduce the transmittance of the blue light energy (actinic type-420 nm) necessary for many saltwater invertebrates, especially corals. High redox potential will be easier to maintain due to reduction in COD.

Directions For Use

1. **BIO-CHEM ZORB®** may be used in any filtration system such as canister filters, power filters, and wet/dry trickle filtration systems. This product works most efficiently if a prefiltration material is used to capture debris.

2. Use **BIO-CHEM ZORB®** for fresh and saltwater aquariums according to the following recommendations:

Up to 208L	1 pouch
208L to 416L	2 pouches
416L to 567L	3 pouches
3. **BIO-CHEM ZORB®** will continuously remove pollutants for 3 to 6 months, depending on stocking density and aquarium maintenance practices.

BIO-CHEM ZORB® Sizes Available:

API108A	283g pouch in a jar, 250l
ADC840605	283g pouch

DIAGRAM 1.

Sources of Organic Pollutants in the Aquarium



References

1. Anderson, D. D. Immunology: Diseases of Fishes. T.F.H. Publications, New Jersey, 1974.
2. Austin B. and D. A. Austin. Bacterial Fish Pathogens: Disease In Farmed and Wild Fish. John Wiley & Sons, New York, 1987.
3. Brown, E. E. and J. B. Gratzek. Fish Farming Hand book. AVI Publishing Co., Inc., Connecticut, 1980.
4. Forsythe, J. W. and R. T. Hanlon. A Closed Marine Culture System for Rearing Octopus Joubini and Other Large-Egged Benthic Octopods. In Berg, C. J. Jr., (ed.) Culture of Marine Invertebrates. Hutchinson Ross Publishing Co., Pennsylvania, 1983.
5. de Guzman, E. and J. B. Gratzek. Fish Mortality Study in Retail Pet Shops. Paper presented to the Pet Joint Advisory Council, 1986.
6. Heath, A. C. Water Pollution and Fish Physiology, CRC Press, Inc. Florida, 1987.
7. Kennish, M. J. Ecology of Estuaries. Vol 1. CRC Press, Inc. Florida, 1986.
8. Lockwood, A. P. M. Effects of Pollutants on Aquatic Organisms. Cambridge University Press, New York, 1976.
9. Luning, K. Seaweeds: Their Environment, Biogeography and Ecophysiology. John Wiley & Sons, New York, 1990.
10. Manham, D. T. Nutritional implications of dissolved organic material for laboratory culture of pelagic larvae. Berg, C. J. Jr. (ed.) Culture of Marine Invertebrates. Hutchinson Ross Publishing Co., Pennsylvania, 1983.
11. McVey, J. P. Hand Book of Mariculture. Vol.1. Crustacean Aquaculture, CRC Press, Florida, 1986.
12. Shever, P. J. Some marine ecological phenomena: chemical basis and biochemical potential. Science (1990) 248:117-272.
13. Seki, H. Organic Materials In Aquatic Ecosystems. CRC Press, Florida 1982.
14. Sorenson, P. W., Stacey N. E. and K. J. Chamberlain. Differing behavior and endocrinological effects of two female sex pheromones on male goldfish. Hormones and Behavior. (1989) 23:317-332.
15. Sorenson, P. W., Hara, T. J., Stacey, N. E. and F. W. Goetz. Prostaglandins Function as Potent Olfactory Stimulants That Compromise the Pastovulatory Female Sex Pheromone In Goldfish. Bio. Reproduction (1988) 39:1039-1050.

prevents oxygen uptake.¹ High levels of ammonia quickly lead to fish death. Nitrites in the bloodstream combine with hemoglobin and prevent blood from carrying oxygen, resulting in stress and suffocation.² Even trace amounts of ammonia and nitrite cause detrimental metabolic changes in fish, and increase their susceptibility to disease.^{2,3} Normally, ammonia in aquarium water is consumed by an active biological filter, comprised primarily of nitrifying bacteria. Some species of nitrifying bacteria convert ammonia to nitrite, which is also toxic to fish. Other nitrifying bacterial species convert nitrite to harmless nitrate (see the Nitrogen Cycle diagram, pg. 30) Together, these bacteria create a biological filter which keeps the aquarium free of harmful ammonia and nitrite. However, newly established aquariums do not have enough nitrifying bacteria to keep these substances at safe levels; 4 to 6 weeks are required for bacteria to form an efficient biological filter. It is during those weeks that most freshwater aquarists experience fish loss due to high ammonia and nitrite levels. So-called "instant" biological filter products claim to add nitrifying bacteria that will prevent high ammonia or nitrite levels from occurring. Often these products do not work, and toxic concentrations of ammonia and nitrite result. Even in well-established aquariums, high ammonia or nitrite levels can occur. Each time a new fish is added to the aquarium, the biological filter must "grow" to accommodate the higher level of waste produced. While this growth is occurring, ammonia and nitrite can reach harmful levels. Fish breeders face an additional challenge. They must feed large amounts of food, several times a day, to condition adult fish and grow-out fry. This practice often leads to chronic low-level ammonia and nitrite concentrations which stress fish and increase the likelihood of disease outbreak.⁷ **NITRA-ZORB™** will successfully reduce ammonia and nitrite in each of these stress-producing instances to improve the quality of aquarium water.

"Discus require aquarium water of the highest quality for successful spawning, health, growth and colour development. Without water free pollutants, discus never reach their fullest potential and beauty. **NITRA-ZORB™** is the only filtration material I have used that removes ammonia, nitrite, and nitrate all at the same time and is completely safe in the discus aquarium. **NITRA-ZORB™** is perfect for keeping angelfish, tetras, rainbows and all softwater fish."

-Jack Wattley
World Famous Discus Breeder

Nitrates in the Aquarium

In the opinion of many tropical fish breeders, low nitrate levels are desirable. Elevated nitrate levels have been shown to dramatically impair growth in aquarium fish. Many tap water sources contain nitrate. So, water used for water changes may contribute to high nitrate levels. It is thus recommended that any tap water used in the aquarium be tested for nitrate. **NITRA-ZORB™** will effectively reduce nitrate in the aquarium, promoting a more natural aquatic environment.

Directions For Use:

1. Use one 3.7 oz. (105 g) pouch of **NITRA-ZORB™** in 20 U.S. gallons (76 L) of water to remove 5 ppm ammonia, 1 ppm nitrite and 20 ppm nitrate in 24 to 48 hours. Use one 7.4 oz. (210 g) pouch of **NITRA-ZORB** in 55 U.S. gallons (208 L) of water to remove 4 ppm ammonia, 0.7 ppm nitrite and 16 ppm nitrate in 24-48 hours.
2. Remove pouch from jar and rinse lightly with tap water.
3. Place pouch in any aquarium filter (such as external power and canister filters).
4. For Soft Water Aquariums
NITRA-ZORB™ is ideal for delicate species of fish and plants that thrive in softwater aquariums. This product will not alter pH, hardness or alkalinity levels, and will not remove trace elements such as iron fertilizers. Use as directed for maintenance of the highest water quality possible.

5. For New Aquariums
Use continuously as directed. Whenever ammonia and/or nitrite is detected by testing, this indicates that **NITRA-ZORB™** is exhausted and needs to be recharged. Follow recharging directions and recharge every 5 days for the first few weeks while the biological filter is developing.
6. For Established Aquariums
Once the biological filter is mature and active, there should be no detectable ammonia or nitrite in the aquarium. If testing shows the presence of ammonia or nitrite, continue using **NITRA-ZORB™** and recharge every 5 days. Look for possible causes, such as overfeeding, inadequate biological filtration, or unnoticed fish death.
7. For Nitrate Removal
NITRA-ZORB™ can be used continually to scavenge nitrates from freshwater aquariums. When aquariums contain a high level of nitrate, it will take several recharges to obtain the desired effect. Recharge **NITRA-ZORB™** every 5 days until nitrate is reduced to 20 ppm or less. Then recharge every two weeks for continued maintenance.
8. For Breeding Aquariums
Fish fry are particularly sensitive to any ammonia and nitrite levels in their environment. To enhance the growth and development of fry, clip a **NITRA-ZORB** pouch on the inside of a tank to remove toxins and recharge every 5 days.
9. Recharging and Storage
 - a. Dissolve 4 tablespoonfuls (80 g) of **API® AQUARIUM SALT** in 8 oz. (240 ml) of warm tap water. Warm water (120°F/48°C) is necessary to fully recharge **NITRA-ZORB™**.
 - b. Soak the pouch in the recharging solution for 2 hours and then rinse lightly in tap water. The pouch is now ready to re-use or be stored in an airtight bag or jar.
 - c. The **NITRA-ZORB™** resins will gradually become fouled with organic matter and metallic ions; thus, pouches should be replaced when the white resin beads turn dark brown or after four to eight recharges.

	Removes Dissolved Organics, Odors, Colours	Phosphate-Free Steam Activation	Removes Ammonia	For Freshwater Use Only	For Fresh & Saltwater
ACTIVATED FILTER CARBON	✓	✓			✓
AMMO-CHIPS		✓	✓	✓	

Important Note:

NITRA-ZORB™ will slowly remove many aquarium medications. Remove the pouch before adding medications.

NITRA-ZORB™ is not a substitute for normal aquarium maintenance, such as water changes and gravel bed vacuuming.

NITRA-ZORB™ Sizes Available:

API110B	105g - Treats up to 75l
API110A	210g - Treats up to 208l
ADC840610	210g

References

1. Smart, G. R. 1981. Aspects of water quality producing stress in intensive fish culture. Pickering, A. D. (Ed.), Stress and Fish. Academic Press, New York, NY 1981, pp. 281-287.
2. Bader, J. A. and J. M. Grizzle. Effects of ammonia on growth and survival of recently hatched channel catfish. Journal of Aquatic Animal Health (1992) 4: 17-23.
3. Barton, B. A. and G. K. Iwama. Physiological changes in fish from stress in aquaculture with emphasis on the response and effect of corticosteroids. Annual Review of Fish Diseases (1991) 1:3-26.
4. Conkling, D. Nitrate toxicity in Tanganyikan cichlids: preliminary study. Cichlid News (1992) 11:11-13.
5. Layton, J. R. 1992. Evaluating biological filtration materials: a scientific approach. Marine Fish Monthly 8 (1992) 6: 33-44.
6. Ositko, G. Nitrate dilemma: affecting the water supply on humans and animals. Water Conditioning and Purification (1990) 2: 84-90.
7. Schaperclaus, W. Fish Diseases. Fifth edition. Oxonian Press Pvt. Ltd., New Dehli, India, 1991. pp. 976-1008.
8. Spotte, S. Fish and Invertebrate Culture: Water Management in Closed Systems. Second edition. John Wiley & Sons, New York, NY 1979, pp. 115-117.
9. Stoskopf, M. K. Fish Medicine. W. B. Saunders, Philadelphia PA, 1992, pp. 184-186.
10. Untergasser, D. Discus Health: Selection, Care, Diet, Diseases & Treatments for Discus, Angelfish and Other Cichlids. T. F. H. Publications, Incorporated, Neptune NJ, 1991, pp. 18-19.

Water testing products

API® provides a complete range of water testing, essential for monitoring the health of aquariums

- Testing methods are fast, easy and accurate
- Test kits include:
 - large test solution bottles for multiple tests
 - glass test tubes with caps
 - accurate, easy-to-read colour charts for interpreting test results
- Child resistant caps

Every kit provides an informative booklet explaining how to test, why to test, what test results mean and, most importantly, how to correct any problems.

FRESHWATER pH TEST KIT

Overly alkaline or acidic water can have harmful effects on aquarium life, so pH control is important to maintaining a healthy aquarium. **API® pH TEST KIT** measures pH levels from 6.0 to 7.6 by adding a single indicator solution to a water sample and comparing the water colour to the chart provided.

- Performs 250 tests.
- For freshwater aquariums



API28 37ml bottle

FRESHWATER/SALTWATER HIGH RANGE pH TEST KIT

Testing of water within the high range of pH 7.4 to 8.8 can be accomplished by this kit. **API® HIGH RANGE pH TEST KIT** is ideal for measuring pH changes in marine aquariums, freshwater aquariums with African cichlids, and very alkaline tap water. The test is accomplished by adding a single indicator solution to a water sample and comparing the colour result to the appropriate chart provided, either for freshwater or saltwater aquariums.

- Performs 160 tests.
- For freshwater and saltwater aquariums



API27 37ml bottle

pH TEST KIT & ADJUSTER

Like the **API® pH TEST KIT**, this deluxe kit tests the pH of water within the range 6.0 to 7.6, but also includes both **pH UP®** and **pH DOWN®** for adjusting pH levels as needed.

- Performs 250 tests.
- For freshwater aquariums



API29A 37ml bottle

FRESHWATER/SALTWATER AMMONIA TEST KIT

Ammonia, the most common killer of tropical fish, is continually produced in an aquarium from decomposing organic matter and must be monitored to maintain a healthy aquarium. This kit measures ammonia levels from 0 to 8 ppm and is appropriate for use with all ammonia-detoxifying products such as **AMMO-LOCK®**. Most salicylate testing kits take up to 20 minutes to achieve results; however, **API® AMMONIA TEST KIT** employs a method that yields results in only 5 minutes. Each of two test solutions are added to a measured quantity of aquarium water; colour results are compared to one of two charts provided - one for freshwater aquariums and one for saltwater aquariums.

- Performs 130 tests.
- For freshwater and saltwater aquariums



APILR8600 37ml bottle

FRESHWATER/SALTWATER NITRITE TEST KIT

Nitrite can build up in aquarium water due to the action of nitrifying bacteria in the biological filter. As these bacteria break down ammonia, toxic nitrite is released and can cause stress, illness and death in aquarium fish. When the biological filter is established and working properly, other species of



nitrifying bacteria will use this nitrite as a food source and will convert it to nontoxic nitrate. In new aquariums, however, the biological filter is not fully developed, and water should be tested every other day to monitor nitrite levels. Even in established aquariums, conditions can change and elevated levels of nitrite can occur; thus, nitrite levels should be tested weekly. **API® NITRITE TEST KIT** measures nitrite levels from 0 to 5 ppm by adding a single test solution to a water sample and comparing the colour result with the appropriate chart, for either freshwater aquariums or saltwater aquariums.

- Performs 250 tests.
- For freshwater and saltwater aquariums

API26 37ml bottle

FRESHWATER/SALTWATER NITRATE TEST KIT

Nitrate is produced in an aquarium by the biological filter. Beneficial bacteria in the biological filter convert toxic ammonia, to nitrite, then into nitrate. A high nitrate level indicates the build-up of fish waste and organic compounds, resulting in poor water quality and contributing to the likelihood of fish disease. Most marine aquarists agree that a low nitrate level significantly improves the health of fish and invertebrates. **API® NITRATE TEST KIT** measures total nitrate levels in parts per million, 0 to 160 ppm. Nitrate testing often requires the use of two solutions and a powder, but the **API® NITRATE TEST KIT** is simple and quick. Just add each of two test solutions to a measured quantity of aquarium water, wait 5 minutes, then compare the colour result to the appropriate chart. Charts for both freshwater and saltwater aquariums are provided. The closest colour match indicates the parts per million of total nitrate in the water sample.

- Performs 90 tests.
- For freshwater and saltwater aquariums



APILR1800 37ml bottle

FRESHWATER GH & KH TEST KIT

This kit provides complete testing for water hardness—both general hardness (GH) and carbonate hardness (KH or alkalinity). Carbonate hardness is the measure of dissolved carbonate and bicarbonate in water. Concentrations of these ions depend on the water's source and treatment processes. General hardness is the measure of dissolved calcium and magnesium ion concentrations in water. Hard water has high levels of these minerals and soft water has low levels. Like KH, the GH of water depends on its source and the water treatment procedures to which it has been exposed. African cichlids and brackish water fish require hard water (GH and KH of 150 to 300 ppm) with a pH of 8.2, whereas Amazonian fish prefer water with a pH of 6.5 and water hardness of 50 to 70 ppm; the needs of the community aquarium fall between these extremes. Because tap water rarely provides the conditions necessary to satisfy the particular needs of tropical fish, testing a water source for hardness and making appropriate adjustments is essential for a healthy aquarium. The **API® GH & KH TEST KIT** determines results in parts per million, and a conversion chart to German degrees (°dKH) is provided. Both tests are performed by adding drops of indicator solution to a water sample until a colour end-point is achieved. Results are determined by the number of drops added; each drop is equal to 10 ppm KH or GH.

- For freshwater aquariums



API58 37ml bottle

FRESHWATER/ SALTWATER KH TEST KIT

This kit will test for carbonate hardness (also known as KH or alkalinity). KH is the measure of dissolved carbonate and bicarbonate ion concentrations in water. The level of KH depends on the source of the water and the treatment processes that it has undergone. Knowing the KH of a water source and making appropriate adjustments for low or high KH will provide aquarium fish with an environment more like their own in nature. Low KH can cause



rapid pH shifts; therefore, stress on fish can be prevented when low KH levels are detected and corrected. Measuring the KH of water can help to determine the proper dose of pH buffers to be used in an aquarium. Monitoring KH is particularly important in reef tanks where calcium uptake is vital for coral growth. The **API® KH TEST KIT** measures carbonate hardness in parts per million, and a conversion chart to German degrees (°dKH) is provided. The test is performed by adding drops of an indicator solution to a water sample until a yellow colour end-point is achieved. Results are determined by the number of drops added; each drop is equal to 10 ppm KH.

- For freshwater and saltwater aquariums

API59 1 x 37ml bottle

FRESHWATER MASTER TEST KIT

This kit tests tap water and aquarium water for five different parameters that affect the health of tropical fish: freshwater pH, high range pH, ammonia (Salicylate), nitrite and nitrate. Testing methods employed by this kit are the same as those for individual test kits discussed in this section. Four test tubes with caps, a moisture-resistant holding tray, a test tube rack, test solution, water-resistant colour charts and a complete instruction booklet are included.



APIUK34 5 x liquid tests

REPLACEMENT TEST TUBES



A replacement box of 24 test tubes and caps is available for use with all **API®** water testing kits where the original tube has been lost or misplaced.

API32 Replacement test tubes with caps bulk pack of 24

SALTWATER MASTER TEST KIT

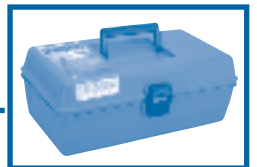
Providing for the needs of marine aquarists, this kit contains testing materials for four major parameters that affect the health of saltwater and reef aquariums: High Range pH (7.4 to 8.8), Ammonia (Salicylate), Nitrite and Nitrate. Four test tubes with caps, a moisture-resistant holding tray, a test tube rack, test solution, water-resistant colour charts and a complete instruction booklet are included.



APIUK401M 4 x liquid tests

FRESHWATER/ SALTWATER PROF. LIQUID TEST KIT

This kit was developed for the professional aquarist and for in-store testing of tap water and aquarium water. Comes complete with reagents to test for low range pH (6.0 to 7.6), high range pH (7.4 to 8.8), ammonia (salicylate), nitrite, nitrate, general hardness (GH) and carbonate hardness (KH). Included are six glass test tubes and caps, colour charts for each test, water analysis pad for recording test results and large format wall chart. The chart includes test instructions and charts for the essential water tests. This chart assists professional aquarists and store employees by instructing them on what products they could use to correct any conditions indicated by the test results. The **FRESHWATER/ SALTWATER PROFESSIONAL LIQUID TEST KIT** comes in a durable, waterproof, plastic box with an interior tray that can withstand the wet conditions associated with water testing.



API34P Includes tests for pH, High Range pH, Ammonia, Nitrite, Nitrate, GH and KH. Plus large, water resistant colour chart.

SALTWATER CALCIUM TEST KIT

Calcium is one of the most important elements for reef building invertebrates. Reef organisms use calcium to build a calcium carbonate skeleton. In an established reef aquarium, the calcium level should always be 400 to 500 mg/L (ppm). Over time, as the calcium is utilized, the calcium level will gradually drop. Regular testing is necessary to make sure the calcium level is adequate for corals to grow. Even reef invertebrates, such as crustaceans, mollusks and encrusting algae, require calcium to remain healthy and grow. To assure that an adequate calcium level is maintained, testing every two weeks is advised. **The API® CALCIUM TEST KIT** precisely measures calcium with a titration colour change method. The test is accomplished by adding drops to a water sample until a colour endpoint is achieved. Results are determined by the number of drops added. Each drop is equal to 20 mg/L (ppm).

- For saltwater aquariums



API69L 1 x 37ml bottle

FRESHWATER/ SALTWATER PHOSPHATE TEST KIT

Phosphate can occur in aquarium water as a metabolic byproduct of aquatic life, as an additive to tap water by some water treatment facilities, or as a result of natural organic materials put into the aquarium. Excessive phosphate is known to promote unsightly algae growth. In saltwater aquariums, phosphate precipitates dissolved calcium and magnesium ions, rendering them unavailable for the growth of corals and other invertebrates. Monitoring phosphate in aquarium water allows the aquarist to detect elevated levels, and to take prompt steps to reduce them. This test kit determines phosphate levels up to 10.0 mg/L (ppm) by adding two test solutions to a measured quantity of aquarium water; colour results are compared to a colour chart that is provided.

- Performs 150 tests.
- For freshwater and saltwater aquariums



API63L 2 x 37ml bottle

FRESHWATER/ SALTWATER COPPER TEST KIT

Copper is used to treat many parasitic infections in freshwater and saltwater aquariums. Specific copper levels are recommended for many remedies, thus continual testing and monitoring are required in order to achieve parasite control. This kit measures the levels of both free and chelated copper. Chelated copper compounds are very stable and will remain in solution for long periods of time. Free copper levels decline rapidly in saltwater aquariums and more slowly in freshwater aquariums, due to the formation of insoluble copper salts. **API® COPPER TEST KIT** determines TOTAL copper levels from 0 to 4 mg/L (ppm) by adding a single test solution to a water sample and then comparing the colour result with the chart provided.

- Performs 90 tests.
- For freshwater and saltwater aquariums



API65L 2 x 37ml bottle

Aquarium plant products

Live aquatic plants have had the reputation of being difficult to grow—sometimes because aquarists used house plants instead of true aquatic plants, and sometimes because improper fertilization and poor growing conditions kept plants from flourishing. Actually, only a few simple steps are needed to convert an aquarium into a lush aquatic garden. Today, true aquatic plants are readily available, and **API®** has developed an easy-to-use system for establishing and maintaining a beautiful planted aquarium. The following suggestions will insure success with aquatic plants.

Planted Aquariums and Water Hardness

Most aquatic plants require water with a low to moderate hardness level. The General Hardness (GH) should be between 2–7°dGH. Carbonate Hardness (KH) should be between 2–6°dKH. Tap water is often high in GH and KH, and may contain excess nutrients such as phosphate and nitrate. If your tap water is too hard or contains excess nutrients, use **API® TAP WATER FILTER™**. The **TAP WATER FILTER™** removes all hardness, minerals and nutrients from tap water. You can then make partial water changes on existing aquariums to reduce hardness and nutrients. When starting a new aquarium with the **TAP WATER FILTER™**, use **API® ELECTRO-RIGHT™** and **pH ADJUSTER** to add back just the right amount of hardness to the water.

Benefits of a Planted Aquarium

Taking the time to properly set up an aquarium with aquatic plants is well worth the effort. Very little maintenance is required, and a planted aquarium provides fish with conditions found only in nature. Follow the steps above and use the following products, and you will enjoy a lush, beautiful aquatic garden.

FIRST LAYER® PURE LATERITE

Using the right type of gravel in a planted aquarium is important for success. Aquatic plants grow best in small-sized gravel, two to four inches deep. Do not use pebble gravel or gravel containing crushed coral. In the tropics, aquatic plants grow in laterite—a natural mineral found in stream beds there. **FIRST LAYER® PURE LATERITE** is an excellent planting medium developed

by **API®** for rooted aquatic plants. This product can be used when preparing a new aquarium or can be added to an established aquarium.

Directions for use:

New Aquariums

1. Rinse **FIRST LAYER® PURE LATERITE** before use.
2. Distribute **FIRST LAYER® PURE LATERITE** evenly on the bottom of the aquarium, using 1 oz. (28 g) of the product for every U.S. gallon (38 L) of aquarium water. For example, use 20 oz. (567 g) in a 20 U.S. gallon aquarium (75 L).
3. Now, add approximately one inch (2.5 cm) of gravel on top of the **FIRST LAYER® PURE LATERITE**.
4. Mix the gravel evenly throughout **FIRST LAYER® PURE LATERITE**.
5. Add the remaining gravel to the aquarium on top of the **FIRST LAYER® PURE LATERITE**.
6. Gently fill the aquarium with water, being careful not to disturb the gravel.

Established Aquariums

1. Rinse **FIRST LAYER® PURE LATERITE** before use.
2. Add 1 oz. (28 g) of **FIRST LAYER® PURE LATERITE** for each U.S. gallon (38 L) of aquarium water. Distribute the product evenly, throughout the aquarium gravel.

FIRST LAYER® PURE LATERITE Sizes Available:

API578C	567g
API578E	1.56kg

LEAF ZONE®

Aquatic plants require sufficient amounts of iron and potassium to produce lush green leaves. A lack of iron results in decaying leaves and poor growth; potassium is required by aquarium plants for photosynthesis and maintaining cell pressure. **LEAF ZONE®** is a liquid plant food containing a special formula of chelated iron and potassium. Readily absorbed through plant leaves, **LEAF ZONE®** is an excellent source of these essential nutrients. Regular use of **LEAF ZONE®** keeps aquarium plants lush and colourful by adding the critical elements necessary to maintain vigorous growth.

Directions For use:

1. Add one teaspoonful (5 ml) of **LEAF ZONE®** for every 10 U.S. gallons (38 L) of aquarium water.
2. Use one dose of **LEAF ZONE®** every week.

LEAF ZONE® Sizes Available:

API576B	118ml Treats up to 903l
API576G	237ml Treats up to 1814l
API576J	473ml Treats up to 3628l

ROOT TABS

Aquarium plants require certain essential nutrients for vibrant growth. **ROOT TABS** are formulated to supply key nutrients, including iron and potassium, to help new aquatic plants get off to a vigorous start and keep established plants flourishing.



Directions For Use:

Add 1 tablet for each 30 square inches (194sq.cm) of gravel surface. Push midway into gravel bed. A standard 10 gallon (38l) aquarium requires 6 tablets. Add new tablets monthly for optimum plant growth.

API577C	Pack of 10 tablets
API577D	Pack of 40 tablets



9 Boeing Way, International Trading Estate
Brent Road, Southall, Middlesex UB2 5LB
Tel: 0208 843 1766 Fax: 0208 843 0679