PHIX™ CARTRIDGE SYSTEM

TECHNICAL **MANUAL**

Solutions. ENGINEERED HERE.

greenturtle®

Table of Contents

List of Appendices

1. Overview

Traditional wastewater neutralization relies on old, ineffective and often toxic and hazardous technologies to treat acidic wastewater. PHIX™ technology represents the next generation in point-source/in-line wastewater neutralization and can be used in various applications requiring pH adjustment in the treatment process, to ensure effluents meet by-law regulations.

PHIX™ Neutralization Systems are patented and patent pending point-source wastewater neutralization technologies that treat acidic wastewater safely and effectively in process and/or prior to discharge into a water body or municipal sewer system. The advanced systems are adaptable, use simple designs and straightforward techniques to adjust pH efficiently to within discharge limits or specific required levels, preventing sewer surcharges or fines.

1.1. PHIX™ Media

PHIX Media is a proprietary mix of solid alkali non-resin materials. It is consumed throughout the neutralization process and is added to the process as required. It permits better control over effluent pH and eliminates the need for special storage or handling required by traditional hazardous neutralizing chemicals. PHIX Media has several formulations. To ensure the correct Media formulation is used, Green Turtle works with its clients to analyze the specific wastewater inputs and requirements for each application.

For acid neutralization applications, PHIX Media replaces the regular use of marble or lime beads. PHIX Media is a cost-effective treatment that ensures continuous wastewater neutralization and by-law regulations compliance.

PHIX Media vs. Traditional Acid Neutralization Chemicals

	PHIX MEDIA	LIME	CAUSTIC SODA
Safety	Contact with skin rarely causes irritation.	Hazardous to handle.	Extremely hazardous to handle.
Environmental Effects	Harmless with no by-products.	Highly caustic and can cause immediate damage to the environment.	Highly corrosive causing severe physical injury to plant and animal life coming in contact with it.
Ease of Handling	No special handling or equipment required.	Expensive solids and handling equipment is required.	Requires elaborate safety equipment and rigorous, time-consuming safety procedures.
Equipment Costs	No initial capital cost.	Initial capital cost required. Expensive and regular maintenance required due to the abrasiveness of lime.	Expensive capital and maintenance costs. Regular maintenance, heated system and safety equipment required.
Application	Flow through system.	Conventional batch treatment system.	Conventional batch treatment system.

For more information on PHIX Media, please contact a Green Turtle Representative at 1-877-428-8187 (USA) | 1-877-966-9444 (Canada) or phixinfo@greenturtletech.com

1.2. PHIX™ Cartridge System Overview

The PHIX Cartridge System treats acidic wastewater and removes solids. Installed directly under the sink, it is ideal for commercial, industrial and institutional applications, neutralizing acidic wastewater to within by-law regulations, prior to discharge into municipal sewer systems. The PHIX Cartridge System is compatible with every size sink, easy to install and/or retrofit in most commercial, institutional and industrial applications.

The PHIX Cartridge System features an engineered flow-through design to maximize efficiency and minimize maintenance. By using the all natural and safe PHIX Media, the System permits better control over effluent pH. The Media eliminates the need for special storage or handling required by conventional neutralizing chemicals, and ensures optimal neutralization treatment within the space-saving unit.

The PHIX Cartridge System reduces the cost of all new construction projects by eliminating the need for glass, glass lined or PVDF piping. For retrofit projects, the PHIX Cartridge System fits directly underneath the sink removing the need for a collection tank to treat and store acidic wastewater prior to discharge into the sewer system.

1.3. Applications

The PHIX Cartridge System may be used in numerous pH adjustment applications including:

- Laboratory sinks
- School laboratory benches
- Hospital laboratories
- Maintenance sinks
- Industry rinse sinks

1.4. Design and Operation

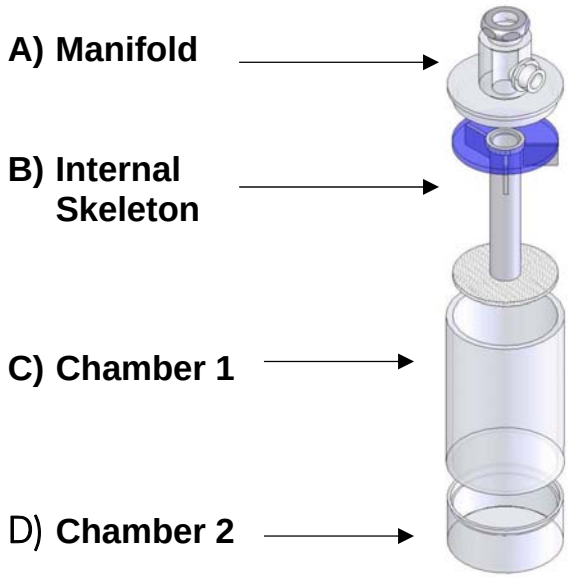
Engineering is the key difference between traditional neutralization systems and the PHIX Cartridge System. The system is constructed from 100 percent durable Polypropylene (poly) and has a high resistance to numerous chemicals (listed in Appendix 2). Each PHIX Cartridge System includes everything for field set-up and servicing - a bucket, siphon pump and hose, supporting bracket and one prescribed package of PHIX Media

Please note: If the chemical used in your application is not listed in Appendix 2, please contact a Green Turtle Representative at 1-877-428-8187 (USA) | 1-877-966-9444 (Canada) or phixinfo@greenturtletech.com.

The PHIX Cartridge System design has four main components (see Figure 1.1.) and is sized for standard sink drain times in North America. It is designed for wastewater neutralization with PHIX Media, solids removal, and easy maintenance.

The PHIX Cartridge System attaches easily to the underside of a sink using the specially designed Manifold. Wastewater from the sink flows down through the Internal Skeleton into Chamber 2 (Solids Collection Chamber). Solids settle to the bottom of Chamber 2 and the wastewater then flows up through the perforated plate and into Chamber 1 (Treatment Chamber) containing PHIX Media. Neutralization of the acidic wastewater occurs upon contact with PHIX Media in Chamber 1. The treated wastewater then exits the unit through the Manifold and into the drain pipe.

Figure 1.1 PHIX Cartridge System



The PHIX Cartridge System uses all four main components to adjust pH. Note: any modifications to the unit will alter the ability of the System to effectively neutralize wastewater.

1.5. Design Considerations

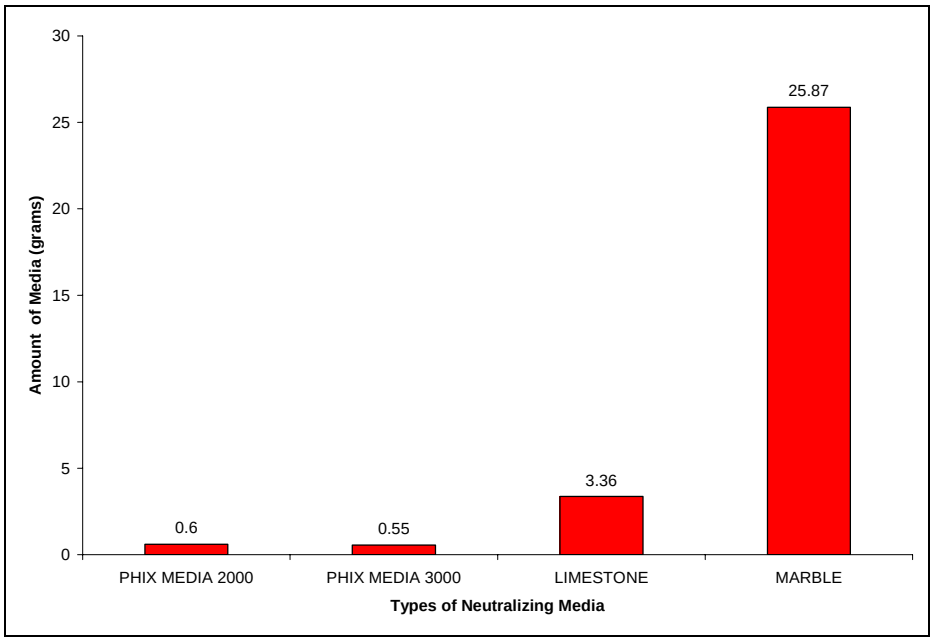
1. The PHIX Cartridge System removes solids and treats acidic wastewater only.
2. The PHIX Cartridge System is primarily designed for under the sink installations.
3. The PHIX Cartridge System cannot intercept fats, oils or grease from the wastewater.

For more information, please visit www.greenturtletech.com/phix or contact a Green Turtle Representative at 1-877-428-8187 (USA) | 1-877-966-9444 (Canada) or phixinfo@greenturtletech.com.

1.6. Performance Testing

Performance testing evaluated the treatment efficiency of PHIX Media in the PHIX Cartridge System. A standard neutralizing capacity test was used to compare the ability of specific neutralizing chemicals to adjust the pH of a sample to within acceptable by-law levels. Green Turtle engineers ran standard concentration of hydrochloric acid (HCl) samples through a series of titration until the required by-law pH levels were attained. Once the testing stage was complete, usage rates were used to calculate the total amount of chemicals required to neutralize the samples. The graph below illustrates the results of neutralizing capacity test of the PHIX Cartridge System and the effectiveness of PHIX Media.

PHIX Media required to neutralize 1 g (0.03 oz) of HCl



PHIX Media is five times more efficient than limestone and 43 times more efficient than marble chips.

2. Principles of Operation

Introduction

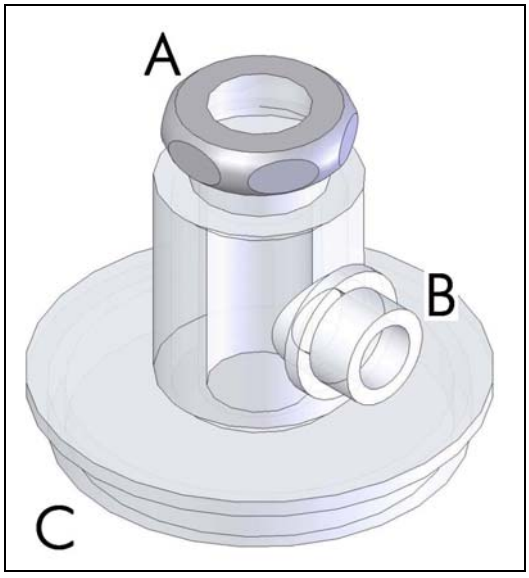
The PHIX Cartridge System has four main components: Manifold, Internal Skeleton, Chamber 1 and Chamber 2.

Manifold

The Manifold houses the unit's three main connections:

A) Threads to the sink drain (see Figure 2.1.);
B) Connection to the drain pipe with a 1 ½" adapter, provided by the contractor/plumber (see Figure 2.1.);
C) Threads into Chamber 1 of the PHIX Cartridge (see Figure 2.1.).

Figure 2.1 Manifold



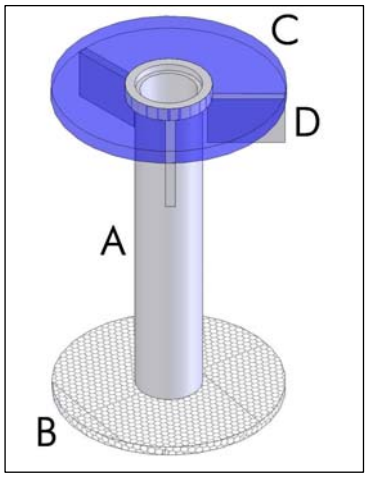
Internal Skeleton and Chamber 1 (Treatment Chamber)

The Internal Skeleton directs the flow of the wastewater through the System. PHIX Media is contained in Chamber 1. The two components operate as follows:

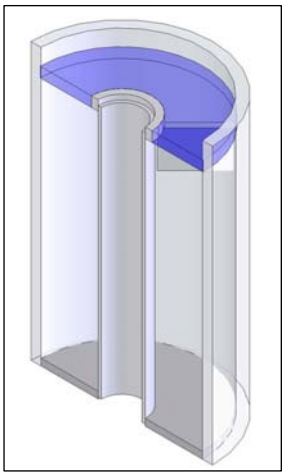
1. The Internal Skeleton inserts into Chamber 1 and channels wastewater from the sink strainer through the center pipe (A) directly into Chamber 2 for solids removal (see Figure 2.2).
2. Wastewater flows up from Chamber 2 through the perforated plate (B) where it comes into contact with PHIX Media housed in Chamber 1 (see Figure 2.2). The perforated plate ensures the PHIX Media remains in Chamber 1 and solids are retained in Chamber 2.
3. The neutralized wastewater flows through the woven filter (C). The woven filter retains the PHIX Media inside the PHIX Cartridge System. The internal structure brackets (D) support the woven filter (C) (see Figure 2.2).
4. The treated wastewater exits the unit through the Manifold and into the drain pipe.

Note: The design of Chamber 1 is based on the detention time required for the wastewater to neutralize upon contact with PHIX Media while ensuring the drain down time meets required plumbing code standards.

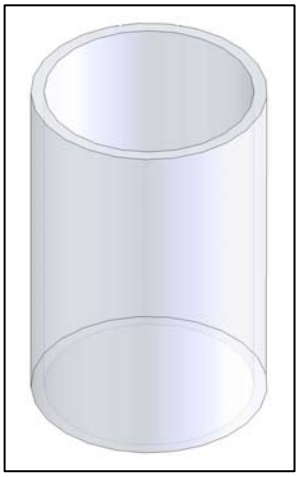
Figure 2.2 Internal Skeleton and Chamber 1



Internal Skeleton



Cross Section of Internal Skeleton inserted in Chamber 1

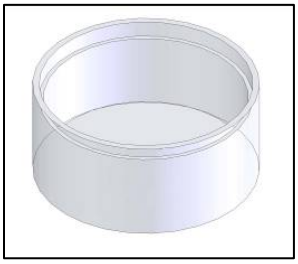


Chamber 1

Chamber 2 (Solids Collection Chamber)

Chamber 2 is threaded onto the bottom of Chamber 1 and can be removed at any time provided the wastewater is first removed from the System (see Section 6.1. for instructions). Chamber 2 captures solids larger than 1/8” (paper, food etc.) preventing items from disrupting the neutralization treatment process, or becoming lodged in the downstream piping.

Figure 2.3 Chamber 2



3. Sizing Guidelines

The PHIX Cartridge System is available in one standard design to neutralize acidic wastewater. Each unit is configured for standard North American sink drain down times.

4. Installation Procedures

Introduction

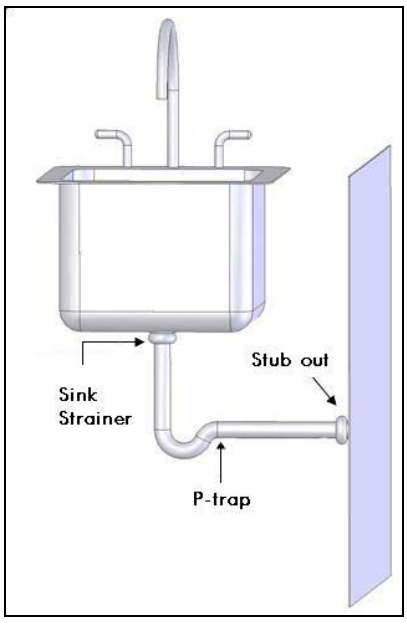
PHIX Cartridge Systems are shipped pre-assembled and include a bucket, siphon pump and hose, supporting bracket and one prescribed package of PHIX Media. The unit is installed easily under the sink, as per the installation instructions.

Installation Instructions:

1. Remove Drain

Remove the existing waste (drain) pipe between the sink strainer and the stub out at the wall or floor. If the piping is plastic with compression (threaded-type) fittings, unthread the pipe and save it for possible reuse. If the pipe is welded or metal, cut using a hacksaw and discard. Unscrew fittings by hand or with groove-joint pliers.

Figure 5.1 Standard Sink Connection



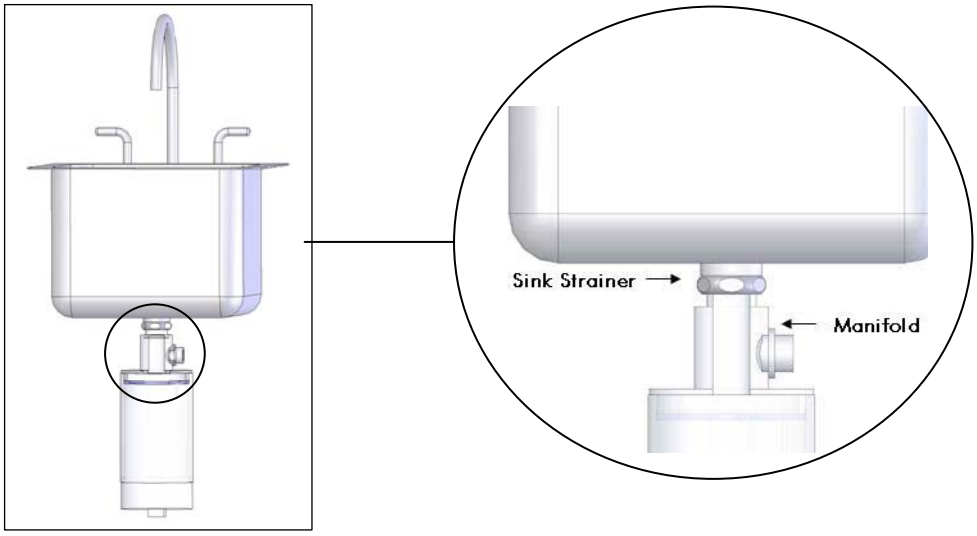
Installation Tip: Before removing the drain plug or disconnecting the trap, place a plastic bucket under the drain trap to catch any standing water.

2. Connect the PHIX Cartridge System

To connect the PHIX Cartridge System to the sink, thread the slip nut at the top of the PHIX Cartridge System onto the threads of the sink strainer (underneath the sink). Ensure

the washer, provided with the System, is installed between the top of the PHIX Cartridge System and the sink strainer before threading the two together.

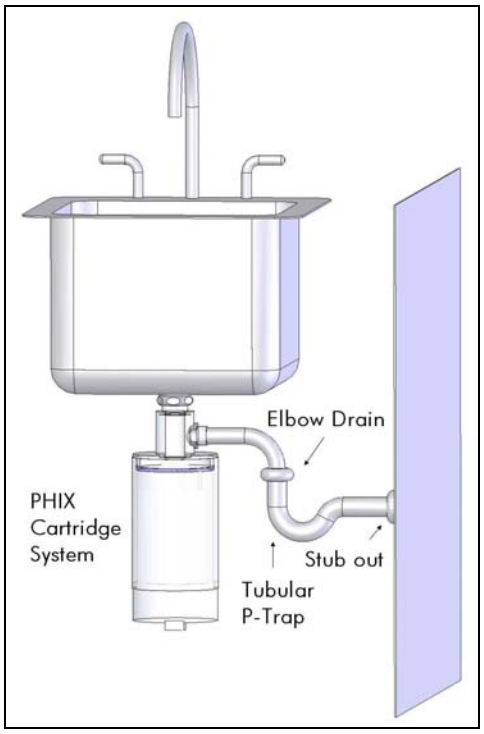
Figure 5.2 Connection between the PHIX Cartridge and Sink



3. Connect Plastic Waste Pipe

Install a 1½" adapter to the threaded connection on the outlet of the Manifold (must be provided by the plumber or contractor). Connect a two-piece tubular P-trap between the adapter, and to the stub out (drain fitting) in the wall. If required, cut the P-trap and rotate both the trap section of the P-trap and the PHIX Cartridge System to ensure that they are aligned. Complete the connection by tightening the waste pipe fittings and the PHIX Cartridge System. **All piping from the PHIX Cartridge System must meet the local plumbing codes.**

Figure 5.3 Configuration of the PHIX Cartridge and Piping Connections



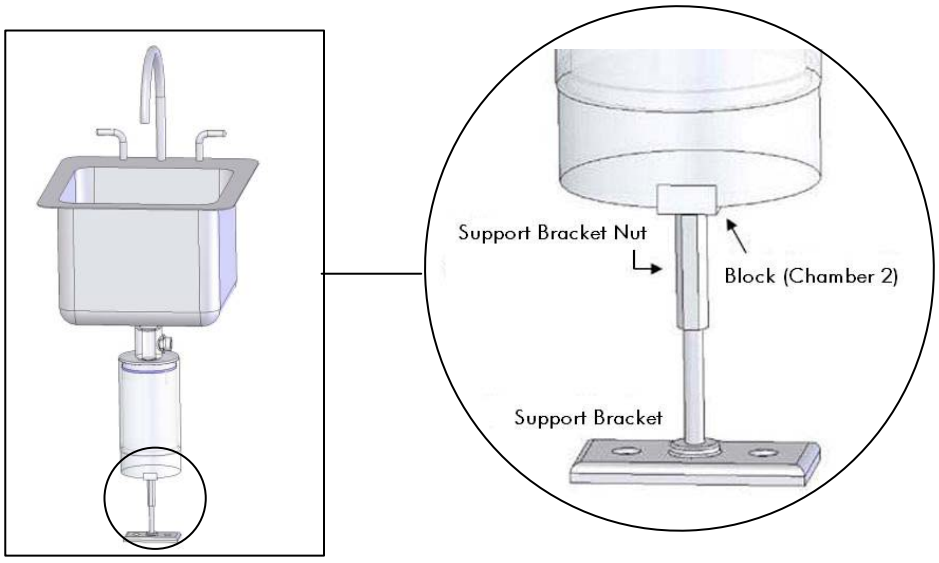
Please Note: If a dishwasher is present, connect the dishwasher hose between the PHIX Cartridge System drain fittings and the P-trap.

4. Install Support Bracket

The installation of the support bracket ensures that the suspended PHIX Cartridge System is properly supported. The bracket also prevents the unit from accidentally being moved.

1. Place the bracket on the ground or cabinet floor directly below the block located on the bottom of Chamber 2.
2. Thread the nut from the bracket up into the notch on the block (located at the bottom of Chamber 2). The nut should rest snugly inside the notch. If the bracket does not reach the block, a spacer is required.
3. Screw the flange of the bracket down into the ground or cabinet floor.

Figure 5.4. Expanded view of the support bracket



5. Initial Startup Procedure

Once the installation is complete, please perform a flow test to verify there are no leaks.

Flow test:

Run water from tap into sink, and visually inspect threaded connections.

1. If a leak is detected tighten threaded connections until the leak has stopped.
2. Once the test is complete, please see Section 6.3. for instructions on adding PHIX Media to the PHIX Cartridge System.
3. After the PHIX Media is added, the System is ready for operation.

5. Maintenance

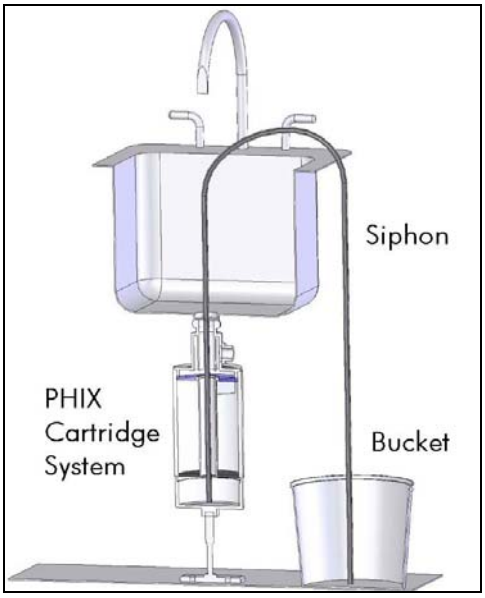
Maintenance of the PHIX Cartridge System is critical to ensure no disruptions in the efficiency of the neutralization treatment process. The PHIX Cartridge System must be maintained according to the following procedures to ensure continual effective treatment of acidic wastewater.

5.1. Solids Removal

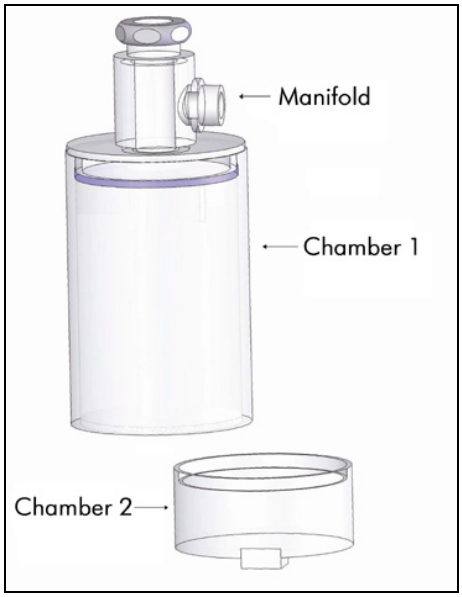
Chamber 2 captures any solids that may go down the sink; if the Chamber becomes full of waste and requires cleaning, please do the following:

1. Remove water from the unit by inserting the siphon tube (included with the System) down the center drain of the sink. When the tube touches the bottom of Chamber 2, pull back slightly so the tube is no longer touches the bottom (see Figure 6.1.).
2. Begin to siphon the water from the PHIX Cartridge System into a bucket by priming the tube with the siphon pump (included with the System).
3. Once all of the water is removed, thread the nut down from the support bracket to create adequate space to remove Chamber 2 from under the system.
4. Unthread Chamber 2 from Chamber 1 using an adjustable wrench on the block at the bottom of Chamber 2. Use a strap wrench on Chamber 1 (see Figure 6.1.).
5. Empty the waste collected in Chamber 2 into a trash bin. (Note: No special handling required.) Rinse Chamber 2 with water and wipe clean with a cloth.
6. Rethread Chamber 2 tightly onto Chamber 1.

Figure 6.1 Solids Removal



Siphoning of the water out of the PHIX Cartridge System



Unthread Chamber 2 to discard the waste

5.2. Maintenance Inspection (Chamber 2)

When the drain down time of the sink increases, the PHIX Cartridge System requires cleaning. To check the amount of waste in Chamber 2 use a flashlight and shine it behind the Chamber to perform a visual inspection. If half of Chamber 2 is full of waste, the unit requires cleaning.

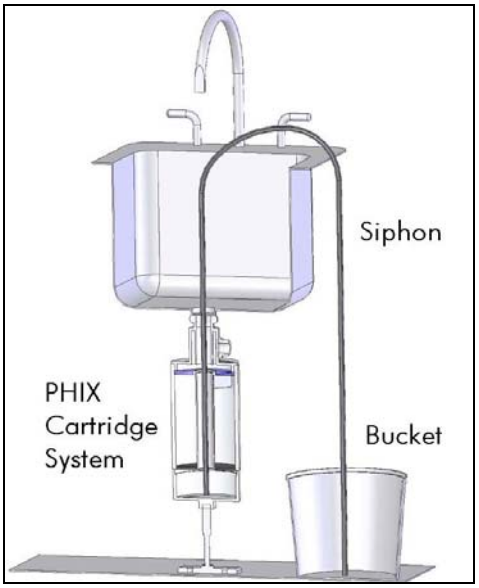
5.3. Media Replacement

PHIX Media in the PHIX Cartridge System must be replaced at regular intervals as prescribed by a Green Turtle Representative according to your site requirements. If the site has high acid levels or above average use, the replacement cycle may be more frequent. To confirm the Media maintenance schedule for your application, please contact a Green Turtle Representative at:
1-877-428-8187 (USA) | 1-877-966-9444 (Canada) or phixinfo@greenturtletech.com.

To add or replace PHIX Media:

1. Remove water from the unit by inserting the siphon tube (included with the System) down the center drain of the sink. When the tube touches the bottom of Chamber 2, pull back slightly so the tube is no longer touching the bottom.
2. Begin to siphon the water from the PHIX Cartridge System into a bucket by priming the tube with the siphon pump (included with the System – see Figure 6.2.).
3. Once all of the water is removed, thread the nut down from the support bracket, so there is adequate space to remove Chamber 1 and Chamber 2 from the manifold. (Note: do not remove Chamber 2 from Chamber 1)
4. To remove Chamber 1 and Chamber 2 from the Manifold, use a strap wrench on Chamber 1 while holding the Manifold tightly. Then unthread the joint between Chamber 1 and the Manifold.
5. Remove the woven filter located on the top of Chamber 1.
6. Rinse the filter with water - the filter can be re-used or replaced when required.
7. Dispose any remaining PHIX Media found in Chamber 1 into a trash bin. (Note: No special handling of used PHIX Media is required)
8. If there is any waste in Chamber 2, do not remove Chamber 2 from Chamber 1, simply remove the Internal Skeleton from Chamber 1.
9. Dispose the collected waste into a trash bin. Rinse Chamber 1 and 2 with water and wipe clean with a cloth.
10. To clean the Internal Skeleton, rinse the perforated plate and the center pipe with water and wipe clean with a cloth, then insert the Internal Skeleton back into Chamber 1.
11. Pour one package of PHIX Media into Chamber 1, between the center pipe and the sidewall (see Figure 6.2.). Place the woven filter on the top of the Internal Skeleton and reattach Chamber 1 and Chamber 2 to the Manifold, using the appropriate tools to ensure a tight seal.
12. The System is replenished with Media and is now ready to resume operation.

Figure 6.2. PHIX Media Replacement



Siphoning of the water out of the PHIX Cartridge System

Replace PHIX Media

6. Replacement Parts

PHIX Cartridge System replacement parts are available and can be order by calling a Green Turtle Representative at 1-877-428-8187 (USA) or 1-877-966-9444 (Canada).

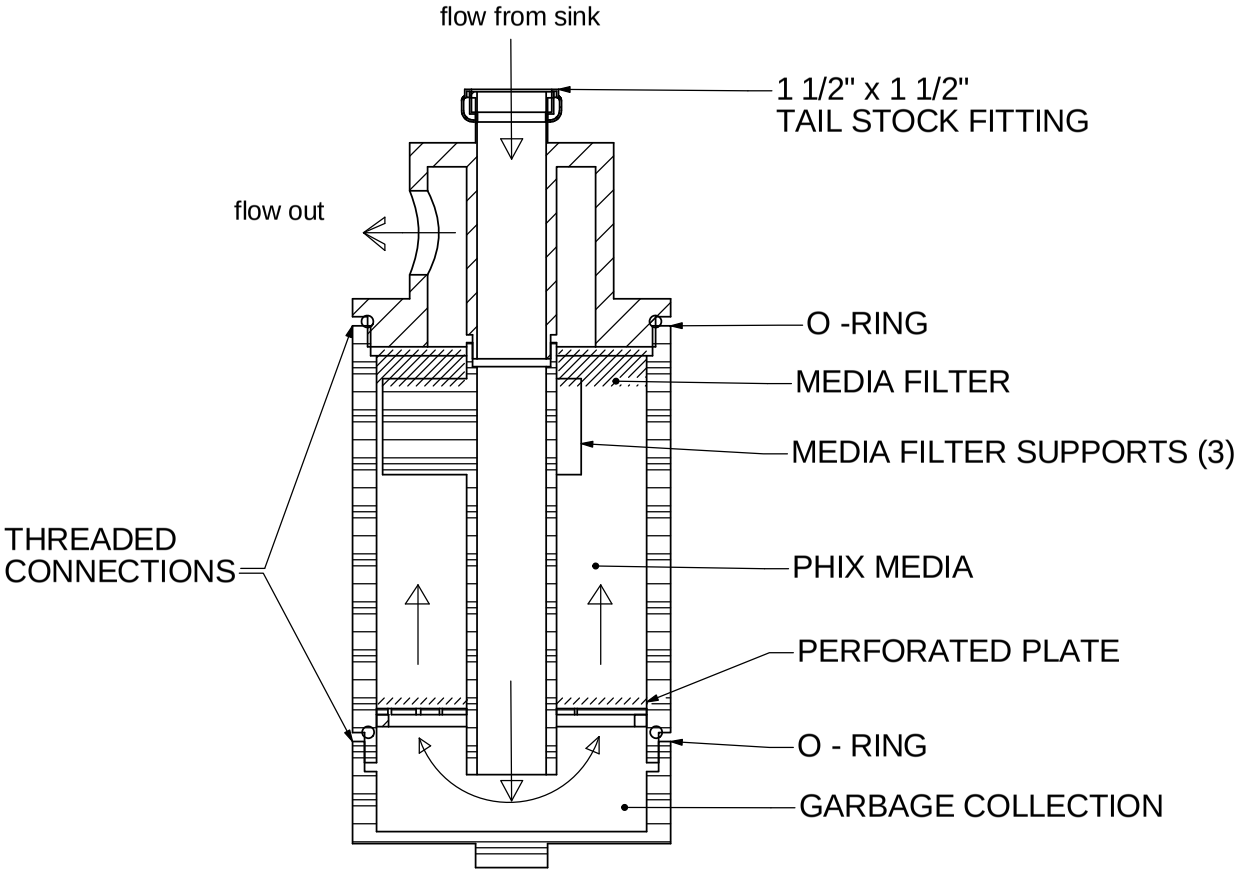
Product Code	Product Description
PHC TOP	Top Manifold
PHC C1	Chamber 1
PHC C2	Chamber 2
PHC SUPPORT	Internal Skeleton
PHC FILTER	Woven Filter
PHC ORING	Replacement O-Ring
PHC M-3000	Single order of PHIX Media 3000
PHC M10-3000	10 packages of PHIX Media 3000
PHC Pump	Siphon Pump
PHC Tube	Siphon Tube

7. Availability and Distribution

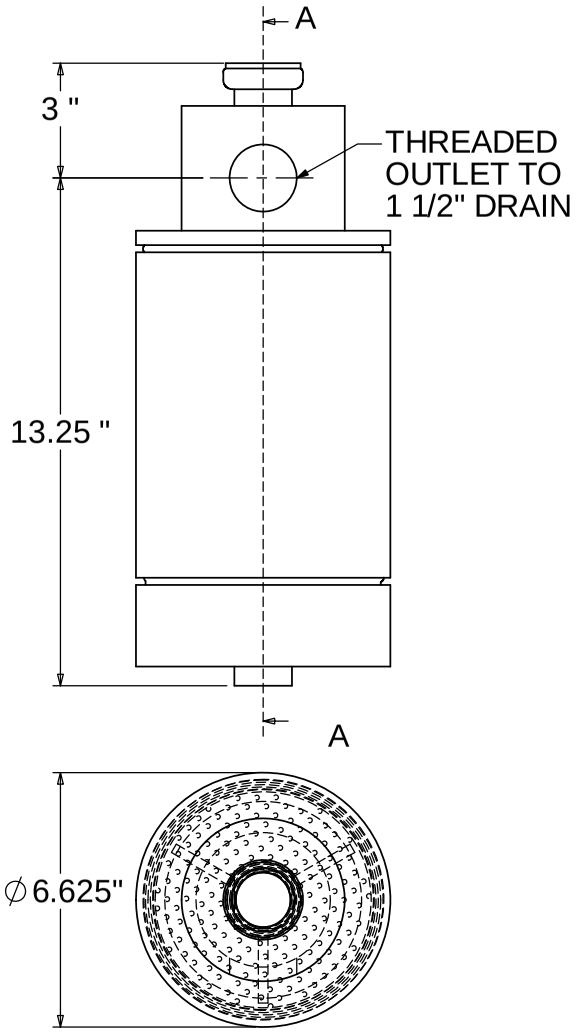
The PHIX Cartridge System is available throughout North America exclusively from Green Turtle. For more information, please contact a Green Turtle Representative at 1-877-428-8187 (USA) |
1-877-966-9444 (Canada) or phixinfo@greenturtletech.com.

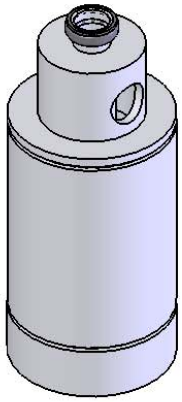
APPENDIX 1

PHIX™ CARTRIDGE SYSTEM TECHNICAL DRAWING AND OPTIONS



SECTION A-A
SCALE 1 : 4





3 - D VIEW

PATENT PENDING

MANUFACTURING TOLERANCE = ± 0.125"

TITLE:	PHIX CARTRIDGE SYSTEM ACID NEUTRALIZATION
PROJECT:	WO:
✓	OPTIONS:

REV	DATE	DRAWN
1	NOVEMBER 15, 2007	L. SIMKINS
2	MARCH 20, 2014	S. MANGAT
3		
4		
5		
6		
7		
8		
9		
10		

DRAWN BY: LISA SIMKINS

DRAWN DATE: 22/3/5

PHIX™

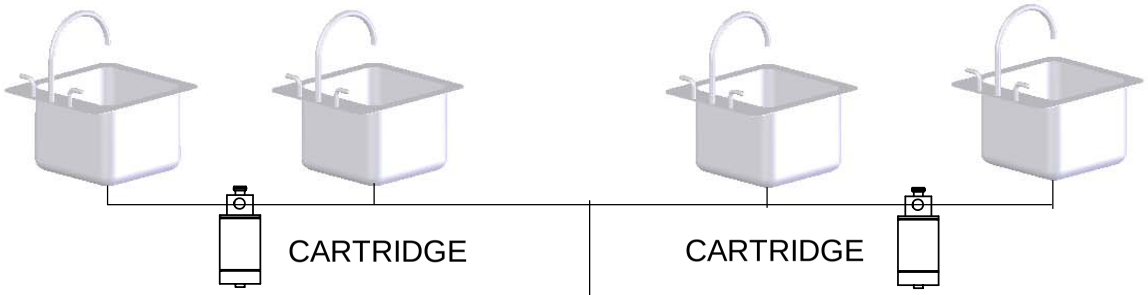
MANUFACTURER: GREEN TURTLE
877-428-8187 US 877-966-9444 CAN
GREENTURTLETECH.COM/PHIX

SIZE	DWG. NO.	REV.
A	PHIX CARTRIDGE SYSTEM	2

SCALE: NTS | DO NOT SCALE DRAWING | SHEET 1 OF 1

LIGHT APPLICATION

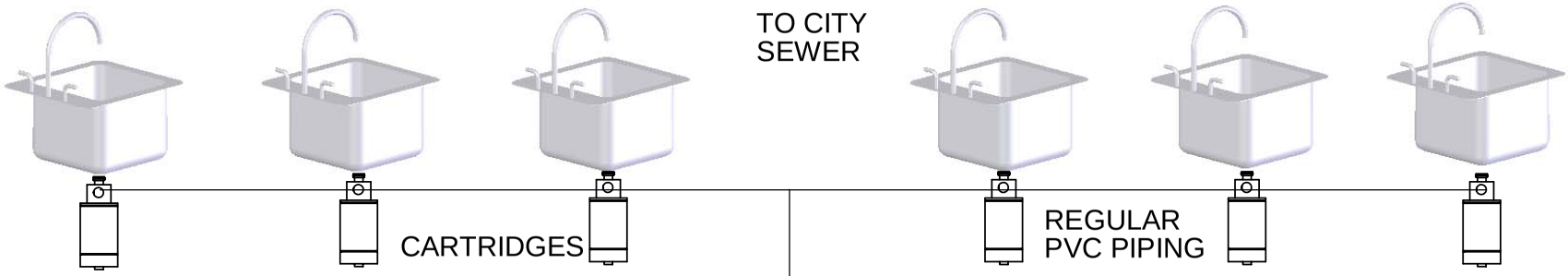
A



MEDIUM-HEAVY APPLICATION
(ie. HOSPITAL, LABORATORY, HIGH SCHOOL
PHARMACEUTICAL, UNIVERSITY LAB)

TO CITY
SEWER

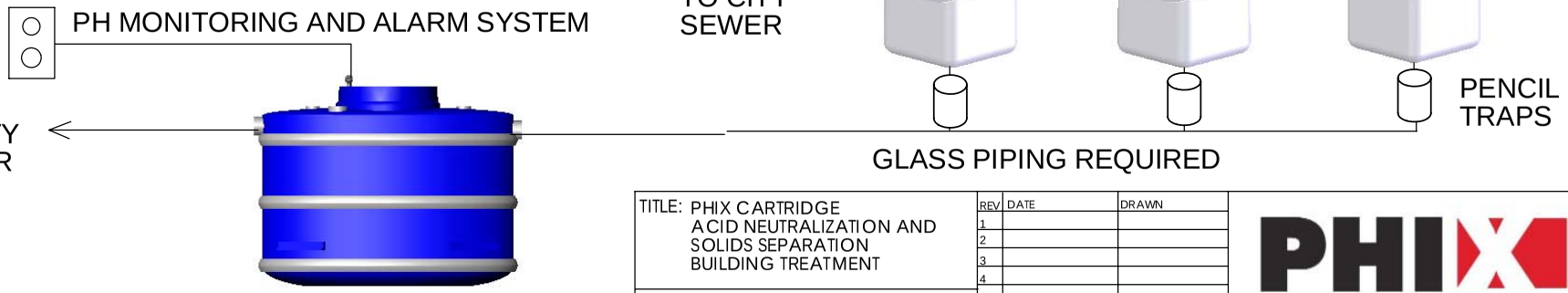
B



MEDIUM-HEAVY APPLICATION
(ie. END OF LINE BASIC AND ACID TREATMENT)

TO CITY
SEWER

C



TITLE: PHIX CARTRIDGE ACID NEUTRALIZATION AND SOLIDS SEPARATION BUILDING TREATMENT	REV	DATE	DRAWN
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	10		
PROJECT: WO:	DRAWN BY: LISA SIMKINS		
✓ OPTIONS:	DRAWN DATE: 3/24/5		

PHIX™

MANUFACTURER: GREEN TURTLE

SIZE	DWG. NO.	REV.
A	PHIX CARTRIDGE CONFIGS	A
SCALE:1:7	DO NOT SCALE DRAWING	SHEET 1 OF 1

APPENDIX 2

PHIX™ CARTRIDGE SYSTEM
CHEMICAL RESISTANCE CHART

Chemical Effect

A. Excellent
B. Minor effect-Good
C. Moderate effect- Fair
D. Severe effect - Not Recommended

Footnotes

1. Satisfactory to 72°F (22°C)
2. Satisfactory to 72°F (22°C)
3. Satisfactory to 120°F (48°C)

	Polypropylene
Acetaidehyde[5]	B
Acetamide	--
Acetate Solv.[2]	D
Acetic Acid	A
Acetic Acid 20%	A
Acetic Acid 80%	B
Acetic Acid, Glacia[1]	B
Acetic Anhydride	A
Acetone [6]	B
Acetyl Chloride	--
Acetylene[2]	A
Acrylonitrile	B
Alohois Amyl	B
Alum Potassium Sulfate (Alum), 10%	--
Alum Potassium Sulfate (Alum), 100%	A
Aluminum Chloride	A
Aluminum Chloride 20%	A
Aluminum Flouride	A
Aluminum Hydroxide[6]	A
Aluminum Sulfate	A
Amines	--
Ammonia 10%	A
Ammonia, Anhydrous	A
Ammonia, Bifluoride	A
Ammonia, Carbonate	A
Ammonia, Casenite	--
Ammonia, Chloride	A
Ammonia, Hydroxide	A
Ammonia, Liquids	A
Ammonia, Nitrate	A
Ammonia, Nitrate	A
Ammonia, Oxalate	--
Ammonia, Persulfate	A
Ammonia, Phrosphate, Dibasic	A
Ammonia, Phrosphate, Monobasic	A
Ammonia, Phrosphate, Tribasic	A
Ammonia, Sulfate	A
Ammonia, Thio-sulfate	--
Amyl Alcohol	A
Amyl Chloride	D
Amyl-Acetate	D
Aniline	B
Aniline	
Anise	--
Anti-Freeze	A
Antimony Trichloride	A
Aqua Regia (80%, HCI, 20%, HNO)	C
Arochlor 1248	--
Aromatic Hydrocarbons	--
Arsenic Acid	A

	Polypropylene
Asphalt	A
Barium Carbonate	A
Barium Chloride	A
Barium Cyanide	--
Barium Hydroxide	A
Barium Nitrate	--
Barium Sulfate	A
Barium Sulfide	A
Bay	--
Beef Sugar Liquids	A
Beer[2]	D
Benzaldehyde[3]	D
Benzene[2]	D
Benzoic Acid	D
Benzol	A
Benzyl	A
Bone	--
Borax (Sodium Borate)	A
Boric Acid	A
Brewery Slop	--
Bromine[2] (wet)	D
Butadiene	--
Butane [2 1]	D
Butanol	--
Butter	--
Buttermilk	--
Butyl	B
Butyl Acetate[1]	D
Butylene	--
Butyric Acid1	A
Calcium Bisulfate	--
Calcium Bisulfide	A
Calcium Bisulfite	A
Calcium Carbonate	A
Calcium Chlorate	--
Calcium Chloride	A
Calcium Hydroxide	A
Calcium Hypochlorite	A
Calcium Sulfate	A
Calgon	A
Cane Juice[2]	D
Carbolic Acid (See Phenol)	--
Carbon Bisulfide[2]	D
Carbon Dioxide (wet)	--
Carbon Disulfide[2]	D
Carbon Monoxide	A
Carbon Tetrachloride[2 1]	D
Carbonated Water	A
Carbonic Acid	A
Castor	--

Chemical Effect

A. Excellent
B. Minor effect-Good
C. Moderate effect- Fair
D. Severe effect - Not Recommended

Footnotes

1. Satisfactory to 72°F (22°C)
2. Satisfactory to 72°F (22°C)
3. Satisfactory to 120°F (48°C)

	Polypropylene
Catsup	A
Chloracetic Acid[2]	D
Chloric Acid	--
Chlorinated Glue	--
Chlorine (dry)	--
Chlorine Water	D
Chlorine, Anhydrous Liquid	D
Chlorobenzene (Mono)	D
Chloroform	D
Chlorosulfonic Acid[1]	D
Chlorox (Bleach)	D
Chocolate Syrup	A
Chromic Acid 10%	A
Chromic Acid 30%	A
Chromic Acid 5%	A
Chromic Acid 50%	B
Cider	--
Cinnamon	A
Citric	A
Citric Acid	B
Citric Oils	A
Clove	B
Coconut	A
Cod Liver	A
Coffee	A
Copper Chloride	A
Copper Cyanide	A
Copper Floborate	--
Copper Nitrate	A
Copper Sulfate	A
Copper Sulfate (5% Solution)	A
Corn	A
Cotton Seed	A
Cream	A
Cresols[2]	C
Cresote[2]	D
Cresylic Acid	--
Cyanic Acid	--
Cyclohexane	D
Cycolic Acid	A
Detergents	A
Diacetone[2]	D
Dichlorethane	--
Diesel Fuel	D
Diesel Fuel (2D, 3D, 4D, 5D)	A
Diethylamine	C
Diethylene Gycol	--
Diphenyl Oxide	--
Dyes	--
Epsom Salts (Magnesium Sulfate)	A
Ethane	--

	Polypropylene
Ethanolamine	--
Ether [3]	--
Ethyl	A
Ethyl Acetate[2]	C
Ethyl Chloride	D
Ethyl Sulfate	--
Ethylene Chloride[2]	D
Ethylene Dichloride	A
Ethylene Glycol[4]	A
Ethylene Oxide	--
Fatty Acids	A
Ferric Chloride	A
Ferric Nitrate	A
Ferric Sulfate	A
Ferrous Chloride	A
Ferrous Sulfate	A
Fluoboric Acid	A
Fluorine	--
Fluosilicic Acid	A
Formaldehyde	A
Formaldehyde 40%	A
Formic Acid[6]	A
Freon 11[1]	--
Freon 113	--
Freon 12 (wet)[2]	A
Freon 22	--
Freon T.F.[4]	D
Fruit Juice	A
Fuel (1, 2, 3, 5A, 5B, 6)	
Fuel Oils	B
Furan Resin	--
Furfural1	D
Gallic Acid	--
Gasoline [1 4]	C
Gelatin	A
Ginger	--
Glucose	A
Glue P.V.A.[1]	--
Glycerine	A
Gold Monocyanide	--
Grape Juice	--
Grease [4]	--
Heptane[1]	D
Hexane[1]	C
Hexyl	A
Honey	A
Hydraulic (See Hydraulic)	--
Hydraulic Oils (petroleum)[1]	D
Hydraulic Oils (Synthetic)[1]	D
Hydrazine	--
Hydrobromic Acid (20%)[4]	A

Chemical Effect

A. Excellent
B. Minor effect-Good
C. Moderate effect- Fair
D. Severe effect - Not Recommended

Footnotes

1. Satisfactory to 72°F (22°C)
2. Satisfactory to 72°F (22°C)
3. Satisfactory to 120°F (48°C)

	Polypropylene
Hydrobromic Acid (37%)[4]	A
Hydrobromic Acid (Dry gas)	--
Hydrobromic Acid 100%	--
Hydrobromic Acid 20%	A
Hydrobromic Acid [4]	B
Hydrocyanic Acid	A
Hydrocyanic Acid (Gas 10%)	--
Hydrofluoric Acid (20%)[1]	A
Hydrofluoric Acid (75%)[1 2]	B
Hydrofluoric Acid 100%	--
Hydrofluosilicic Acid	--
Hydrofluosilicic Acid (20%)	A
Hydrogen Gas	--
Hydrogen Peroxide	A
Hydrogen Peroxide 10%	--
Hydrogen Peroxide 30%	A
Hydrogen Sulfide (dry)	--
Hydrogen Sulfide, Aqueous Solution	A
Hydroxyacetic Acid (70%)	--
Ink	--
Iodine	D
Iodine (In Alcohol)	B
Iodoform	--
Isobutyl	A
Isopropyl	A
Isopropyl Acetate	--
Isopropyl Ether[2]	D
Isotane[2]	D
Jet Fuel (JP#, JP4, JP5)	D
Kerosene[2]	D
Ketones	D
Lacquer Thinners	B
Lacquers	A
Lactic Acid	A
Lard	A
Latex	--
Lead Acetate	A
Lead Sulfamate	A
Lemon	D
Ligroin[3]	D
Lime	--
Linseed	A
Lubricants	A
Magnesium Carbonate	A
Magnesium Chloride	A
Magnesium Hydroxide	A
Magnesium Nitrate	A
Magnesium Oxide	--
Magnesium Sulfate	A
Maleic Acid	C

	Polypropylene
Maleic Anhydride	--
Malic Acid	--
Mash	--
Mayonnaise	A
Mehtyl Bromide	--
Melamine	--
Mercuric Chloride (Dilute Solution)	A
Mercuric Cyanide	A
Mercury	A
Methanol (See Alcohol Methyl)	--
Methyl Acetate	--
Methyl Acetone	--
Methyl Acrylate	--
Methyl Alcohol 10%	--
Methyl Butyl Ketone	--
Methyl Cellosive	A
Methyl Chloride	D
Methyl Dichloride	--
Methyl Ethyl Ketone	A
Methyl Isobutyl Ketone [2]	C
Methyl Methacrylate	--
Methyl[6]	A
Methylamine	--
Methylene Chloride	D
Methyul Isopropyl Ketone	--
Milk	A
Mineral	B
Molasses	A
Mustard	A
Naptha	A
Napthalene	B
Nickel Chloride	A
Nickel Sulfate	A
Nitric Acid (10% Solution)	A
Nitric Acid (20% Solution)	A
Nitric Acid (50% Solution)	D
Nitric Acid (Concentrated Solution)	D
Nitrobenzene[2]	C
Octyl	--
Oleic Acid	C
Oleum	D
Oleum 25%	--
Olive	A
Orange	A
Oxalic Acid (cold)	A
Palm	--
Paraffin	A
Peanut[3]	D
Pentane	--
Peppermint[2]	D

Chemical Effect

A. Excellent
B. Minor effect-Good
C. Moderate effect- Fair
D. Severe effect - Not Recommended

Footnotes

1. Satisfactory to 72°F (22°C)
2. Satisfactory to 72°F (22°C)
3. Satisfactory to 120°F (48°C)

	Polypropylene
Perchloroethylene[2]	D
Petrolatum	--
Phenol (Carbolic Acid)	B
Phenol 10%	--
Phosphoric Acid (40%-100% Solution)	A
Phosphoric Acid (Crude)	--
Phosphoric Acid (to 40% Solution)	A
Phosphoric Anhydride (Dry or Moist)	--
Potassium Bicarbonate	A
Potassium Bromide	A
Potassium Carbonate	A
Potassium Chlorate	A
Potassium Chloride	A
Potassium Chromate	--
Potassium Cyanide Solutions	A
Potassium Dichromate	A
Potassium Ferrocyanide	--
Potassium Hydroxide (50%)	A
Potassium Nitrate	A
Potassium Permanganate	B
Potassium Sulfate	A
Potassium Sulfide	--
Propane (Liquified) [1 2]	D
Propyl	A
Propylene Glycol	--
Pyridine	B
Pyrogallic Acid	--
Rape Seed	--
Rosin	A
Rosins	A
Rum	A
Rust Inhibitors	A
Salad Dressing	A
Sea Water	A
Sesame Seed	--
Shellac (Bleached)	A
Shellac (Orange)	A
Silicone	A
Silicone	A
Silver Bromide	--
Silver Nitrate	A
Soap Solutions[1]	A
Soda Ash (See Sodium Carbonate)	--
Sodium Acetate	A
Sodium Aluminate	--
Sodium Bicarbonate	A
Sodium Bisulfate	A
Sodium Bisulfite	A
Sodium Borate	--
Sodium Carbonate	A

	Polypropylene
Sodium Chlorate	A
Sodium Chloride	A
Sodium Chromate	A
Sodium Cyanide	A
Sodium Fluoride	--
Sodium Hydrosulfite	--
Sodium Hydroxide (20%)	A
Sodium Hydroxide (50% Solution)	A
Sodium Hydroxide (80% Solution)	A
Sodium Hypochlorite	A
Sodium Hypochlorite[3] (to 20%)	D
Sodium Hyposulfate	--
Sodium Metaphosphate[2]	D
Sodium Metasilicate	--
Sodium Nitrate	A
Sodium Perborate	A
Sodium Peroxide	--
Sodium Polyphosphate	--
Sodium Silicate	A
Sodium Sulfate	A
Sodium Sulfide	A
Sodium Sulfite	--
Sodium Tetraborate	--
Sodium Thiosulphate ("Hypo")	A
Sorghum	--
Soy Sauce	--
Soybean	A
Sperm	--
Stannic Chloride	A
Stannic Fluoborate	--
Stannous Chloride	--
Starch	--
Stearic Acid[2]	D
Stoddard Solvent	D
Styrene	--
Sugar (Liquids)	A
Sulfate Liquors	A
Sulfur Chloride	D
Sulfur Dioxide (dry)	--
Sulfur Dioxide[2]	D
Sulfur Trioxide (dry)	--
Sulfuric Acid (10%-75%)[2]	A
Sulfuric Acid (to 10%)	A
Sulfuric Acid 75%-100%	B
Sulfurous Acid	A
Sulfuryl Chloride	--
Syrup	A
Tallow	--
Tannic Acid	A
Tanning	--

Chemical Effect

A. Excellent
B. Minor effect-Good
C. Moderate effect- Fair
D. Severe effect - Not Recommended

Footnotes

1. Satisfactory to 72°F (22°C)
2. Satisfactory to 72°F (22°C)
3. Satisfactory to 120°F (48°C)

	Polypropylene
Tanning Liquors	A
Tartaric Acid	A
Tetrachlorethane	A
Tetrahydrofuran	C
Toluene, Toluol[3]	D
Tomato Juice	A
Trichlorethane	--
Trichlorethylene[2]	D
Trichloropropane	--
Tricresylphosphate	--
Triethylamine	--
Turbine	--
Turpentine[3]	B
Urine	A
Varnish (Use Viton for Aromatic)	A
Vegetable Juice	--
Vinegar	A
Water, Acid, Mine	A
Water, Distilled, Lab Grade 7	A
Water, Fresh	A
Water, Salt	A
Weed Killers	--
Whey	--
Whiskey and Wines	A
White Liquor (Pulp Mill)	A
White Water (Paper Mill)	A
Xylene[2]	D
Zinc Chloride	A
Zinc Hydrosulphite	--
Zinc Sulfate	A

Information compiled by Green Turtle Technologies Ltd.

APPENDIX 3

PHIX™ MEDIA MSDS

MATERIAL SAFETY DATA SHEET

SECTION 1 - PRODUCT IDENTIFICATION

PRODUCT NAME:	PHIX MEDIA 3000	PIN/UN:	Not Available
PRODUCT USE:	Wastewater Treatment	WHMIS CLASS:	Does Not Meet Criteria

SECTION 2 - HAZARDOUS INGREDIENTS

COMPONENTS	% (Wt/Wt)	CAS NO.	LD_{50}/species	LS_{50}/species

SECTION 3 - PHYSICAL DATA

PHYSICAL STATE: White Powder	ODOUR AND APPEARANCE: White to light brown odourless slurry		ODOUR THRESHOLD: Not applicable	
VAPOUR PRESSURE: Not applicable	VAPOUR DENSITY: Not applicable	EVAPORATION RATE: Not available	BOILING POINT: 3600EC	MELTING POINT: approx. 2800EC
pH: 10.3 (sat. aqueous solution)	SPECIFIC GRAVITY: Approx. 3.6 g/cc	COEFF. WATER/OIL DIST.: Not available		

SECTION 4 - FIRE AND EXPLOSION DATA

CONDITIONS OF FLAMMABILITY: Not Flammable		
EXTINGUISHING AGENTS: As for surrounding fire		
FLASHPOINT AND METHOD: Not applicable	UPPER FLAMMABLE LIMIT: Not applicable	LOWER FLAMMABLE LIMIT: Not applicable
AUTOIGNITION TEMPERATURE: Not applicable	HAZARDOUS COMBUSTION PRODUCTS: Not applicable	
SENSITIVITY TO MECHANICAL IMPACT: No special sensitivity	SENSITIVITY TO STATIC DISCHARGE: No special sensitivity	

SECTION 5 - REACTIVITY DATA

CONDITIONS OF INSTABILITY:	Stable under normal conditions
INCOMPATIBLE SUBSTANCES:	Interhalogens (eg. Bromine pentafluoride), phosphorus pentachloride and strong acids
REACTIVITY:	May react exothermically with acids or water
HAZARDOUS DECOMPOSITION PRODUCTS:	None reported

SECTION 6 - TOXICOLOGICAL PROPERTIES - HEALTH EFFECTS

INHALATION:	May cause irritation of the upper respiratory passages.
INGESTION:	No significant effects are expected to occur.
EYES/SKIN:	May cause irritation of eyes and nasal passages.

EFFECTS OF ACUTE EXPOSURE:
See inhalation effects above.

EFFECTS OF CHRONIC EXPOSURE:
None reported.

EXPOSURE LIMITS:

* Threshold limit value - Time weighted average (limit recommended by the American Conference of Government Industrial Hygienists
** Occupational Exposure Limit (regulated limit in Alberta)

SENSITIZER: No	CARCINOGEN: Not available	TERATOGEN: Not available
REPRODUCTIVE TOXIN: Not available	MUTAGEN: Not available	SYNERGISTIC PRODUCTS: None known

MATERIAL SAFETY DATA SHEET - PHIX MEDIA - Page 2

SECTION 7 - FIRST AID MEASURES

INHALATION: If symptoms of exposure are experienced (see Toxicological Properties - Health Effects), remove victim to fresh air.

INGESTION: Rinse mouth with and/or drink water.

EYES: If irritation occurs, immediately flush eyes with water for at least 10 minutes. Obtain medical attention.

SKIN: Not expected to cause a problem. However, if irritation occurs, flush affected area with water. If irritation persists, obtain medical advice.

SECTION 8 - PREVENTIVE MEASURES

PERSONAL PROTECTIVE EQUIPMENT:

RESPIRATORY PROTECTION:

If adequate engineering controls are not available, wear respirator approved by NIOSH/MSHA for dusts/mists, as applicable.

EYE/SKIN PROTECTION:

Wear safety goggles in high dust concentrations. Wear dust impervious gloves during manual handling of product. Wear long sleeves, buttoned collar and long pants extended over shoes, or coveralls.

ENGINEERING CONTROLS:

Local exhaust ventilation with or without process enclosure is important where large quantities are handled, as in bagging operations.

SPILL OR LEAK:

Pick-up spills. Place material into a dry container and cover. Hold in sealed container for disposal.

WASTE DISPOSAL:

Dispose in accordance with all applicable Federal, Provincial/State, and local Environment Regulations.

OLING PROCEDURES:

Avoid inhalation of dust. Clean area frequently to avoid build-up of dust. After handling product, always wash hands and face thoroughly with soap and water before eating or drinking.

STORAGE: Store in a dry area in sealed containers. Keep away from incompatible materials such as interhalogens and strong acids. Protect from damage.

SPECIAL SHIPPING INFO:

Not regulated.

SECTION 9 - PREPARATION INFORMATION

PREPARED BY:	PHONE NUMBER:	DATE:
Green Turtle Technologies	(416) 966-9400	April 10, 2007

APPENDIX 4

STANDARD SPECIFICATION SHEET

PHIX™ CARTRIDGE SYSTEM SPECIFICATION SHEET

Total number of Sinks _____
Maximum Gravity Flow Rate _____ gpm (US)
Capacity for PHIX Media _____ kg/lbs
Height available under sink _____ mm/inches

The PHIX Cartridge System is designed to remove solids and to treat acidic wastewater in point-source applications under a sink. The PHIX Cartridge System connects directly to the drain of a sink and provides effective treatment and detention time to limit effluent discharges of low pH into the sewer system.

PHIX Media must be used with the PHIX Cartridge System to ensure treatment specifications and compliance. PHIX Media is non-toxic, non-hazardous, and safe to handle and store without special storage devices or regulations.

The PHIX Cartridge System is constructed from 100 percent durable Polypropylene (poly), and is resistant to numerous chemicals. Green Turtle provides each PHIX Cartridge System with a bucket, siphon pump and hose, supporting bracket and one prescribed package of PHIX Media.

Each PHIX Cartridge System is designed for under sink installation and must be installed as per the manufacturer's installation procedures (see Section 5.).

Indicate required options and submit with project specifications		
Inlet and Outlet Pipe Diameter (inches)		
pH Monitoring System – Probe and Transmitter	Yes	No
pH Monitoring System – Probe and Transmitter and data logger	Yes	No

For more information, please contact a Green Turtle Representative at
1-877-428-8187 (USA) | 1-877-966-9444 (Canada) or phixinfo@greenturtletech.com.

GUARANTEED AGAINST DEFECT AND BREAKAGE FOR 10 YEARS.

CONTACT US:

US 877 428 8187
CA 877 966 9444

GREENTURTLETECH.com