Operations Manual

Model WM-SM

RGF® ENVIRONMENTAL GROUP, INC.

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Documentation:
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Contents

Section 1: Overview 7

Introduction 7
How to Use This Manual 7
How This Manual Is Organized 8
Sources of Help 9

Shipment Inspection 11

Shipment Inspection 11
Pre-Installation Checklist 11

Safety 13

Labeling Conventions In This Manual 13
General Safety Issues 14

Section 1: The WM-SM System 15

The Vision 2000 concept 15
The Ultrasorb System 16
Unit Familiarization / Flow Diagram 16

Section 2: Installation 19

Installation Requirements 19
Installation Procedure 19
Equipment Placement 20
Main Drain Return Line 20
Main Electrical Connection 20
Series I Tank 21
Series II Equipment Skid 25
Series III Storage Tank 28

Section 3: System Startup and Operation 29

System Startup 29
Series I Tank 29
Series II Equipment Skid 30
Series III Storage Tank 31
Start-Up 32
System Operation 33
Series I Tank 33
Series II Equipment Skid 33
Series III Storage Tank 34
Operational Notes 35

Section 4: Preventative Maintenance Schedule 37

Overview....37
Required Tools and supplies....37
Maintenance Schedule....38
- Series I Tank....38
- Series II Equipment Skid....38
- Polishing Filters....39
- UV/O^3 Catalytic Chambers....39

Weekly Maintenance....40
- Trenches, Sumps, Pits, and Clarifiers....40
- Series I Tank....40
- Y-Strainer....41
- Polishing Filters....41
- Storage Tanks....42

Monthly Maintenance....42
- UV/O^3 Catalytic Chambers....42

As Required Maintenance....43
- Series I Tank....43

Winterizing the System....43

Section 5: General Theory 45

Overview....45
Series I Tank....45
Series II Equipment Skid....47
- Process System....47
- Supply Header....47
- Continuous Flow Control System (CFC System)....47
- CFC Pump....47
- Catalytic Oxidation Process (CO^3P System)....47
- UV/O3 Catalytic Chamber....48

Section 6: Controlling Water Quality 49

Overview....49
pH / Alkalinity....50
- pH....50
- Total Alkalinity....50

Oxidizers....51
- Hydrogen Peroxide....51
- Ozone....51
- UltraViolet Light....51

Cleaning Agents....51
- Enviro-Control....52
- Water Conditioner-1 (WC-1)....52

Dissolved and Suspended Solids....52
- Total Dissolved Solids (T.D.S.)....52
- Total Suspended Solids (T.S.S.)....53

Section 7: Engineering Drawings 55

Outline....55
System Layout....57
Series I Tank....58
Series II Equipment Skid....59

Series III Storage Tank 61
Piping & Instrumentation Diagram 63
Electrical Diagram 65
ELECTRICAL DISTRIBUTION 67

Section 8: Troubleshooting 69

Flow 69
Electrical 71
Chemistry 72

Section 9: Replacement Parts 73

General Ordering Information 73
Replacement Parts List 73
Filters And Parts 73
Chemicals 73
Pumps And Parts 73
Valves And Unions 74
Misc. Parts 74

Section 10: Sub-Component Manuals 75

GFI Reset 77
Process Pump 78
CFC System Pump82

Section 11: System Warranties 93

Product Registration and Return Forms 103

Glossary of Terms 112

Section 1: Overview

Introduction

About *RGF*

Congratulations on the purchase of your new *RGF* Ultrasorb® water treatment system. For over 20 years *RGF* Environmental Group Inc. has been the industry leader in industrial wash water treatment systems with thousands of installations worldwide.

Founded in 1985, *RGF* pioneered the development of heavy equipment zero discharge wash water recycling systems. Since then, *RGF* has continuously expanded to encompass the entire scope of water treatment concerns of industry. Today *RGF* offers a variety of products and services that is among the widest available in the pollution control equipment industry.

How to Use This Manual

As with any piece of new equipment, the first thing you should do is obtain a complete understanding of the operation and maintenance of the system before you begin. The best way to do this is to read the manual and associated documentation sent with the unit well before it is scheduled to be installed. *RGF* has invested a great deal of effort to make our manuals as informative and user friendly as possible to make the task of learning about your new system as enjoyable as possible.

How This Manual Is Organized

This manual is divided into the following major sections.

Shipment Inspection/ Receipt Checklist:

This section should be read immediately upon receipt of your system.

Safety:

A description of the labeling conventions employed in the manual to point out specific items relating to issues of personnel safety and proper operation of the system. General safety concerns and overall operational guidelines for the system.

Section 1: The Ultrasorb System

Unit familiarization, basic system information and system flow diagrams. Covers the overall concepts of the Vision 2000 Ultrasorb System.

Section 2: Installation

Provides important information to ensure proper equipment placement and connection.

Section 3: System Startup and Operation

Contains the steps required to properly start up your new system. The Operating Instructions outline the normal course of action for the routine operation of the system.

Section 4: Preventative Maintenance Schedule

Recommended periodicity's for maintenance routines are located in this section. Personnel who will be maintaining the unit should familiarize themselves fully with this section.

Section 5: General Theory

A description how the *RGF* Ultrasorb system actually separates, clarifies and treats the waste stream. In depth explanations of the processes and supporting information to help operators understand the physics and chemistry of the system.

Section 6: Controlling Water Quality

Without proper water chemistry control, even the most sophisticated systems will fail to perform to expectations. This section covers important topics which must be continually considered for proper system operation.

Section 7: Engineering Drawings

Reference drawings and schematics of the system.

Section 8: Troubleshooting

This section provides possible remedies for unusual operating conditions that occur from time to time.

Section 9: Replacement Parts List

A convenient source for locating part numbers and nomenclature of commonly replaced items on the system.

Section 10: Sub-Component Manuals

Additional literature provided on individual components of the system. This section is useful for more detailed knowledge of technical specifications regarding a specific sub-component.

Sources of Help

If you are unable to answer questions you have about your system from the information in this manual, *RGF* provides the following additional sources of help.

1) Your local ***RGF* licensed distributor**; He has a service support staff who are trained on all systems.

2) ***RGF* Web site Help Page,** provides answers to commonly asked questions and late breaking information concerning system operation and maintenance.

http://www.rgf.**com**

3) If you still have questions or have comments, the ***RGF* Service Department** can be contacted by **e-mail** at:

e-mail: requests@rgf.com

E-mail queries receive first priority through the service department. Please include as much information as possible so our service staff can quickly return an answer.

Shipment Inspection

Shipment Inspection

Immediately upon receipt of the **RGF® System**, you are responsible as the purchaser to take the shipping containers off the truck and inspect the equipment, storage tanks, and parts for damage.

IF ANY VISIBLE DAMAGE TO THE EQUIPMENT IS EVIDENT:

- Notify the driver for the courier company **immediately** and write on the Bill of Lading what is damaged or missing.

- Call ***RGF*** immediately at (**800)-842-7771,** (**561)-848-1826 (FL),** or **FAX** (**561**)**-848-9454** a copy of the Bill of Lading with damage or missing items to ***RGF***.

Pre-Installation Checklist

Remove the ***RGF*** **PACKING SLIP** and the **BILL OF LADING.** Verify the condition and presence of all the parts and components found on the pallets and skids. Remove the **LOOSE PARTS CHECKLIST** from inside of the **LOOSE PARTS BOX** and verify the condition and presence of all the parts and components within the box. If any of the items are missing, please contact your distributor immediately or ***RGF*** at (**800)-842-7771,** (**561**)**-848-1826 (FL),** or **FAX** (**561)-848-9454.**

Safety

Labeling Conventions In This Manual

Certain information contained in this manual is **VERY IMPORTANT**. In addition, there are varying degrees of importance of this special information.. Since most of the special information regards safety related issues, this section explains the conventions used throughout this manual. The following information explains the various conventions used to highlight important information

This statement directly regards an immediate **RISK TO LIFE**.

This designation, along with its associated graphical representation, denotes information that must be completely understood and heeded in order to prevent **Serious Personal Harm** or **Significant Environmental Consequences**.

This designation brings special attention to information that sensitizes the reader to the importance of following the instruction carefully. Typically used for information that reduces the risk of equipment damage or increases personal safety of the operator.

Note:

This designation clarifies or brings attention to particularly useful information that increases unit performance or reduces operating costs.

General Safety Issues

- All operating procedures, cautions, and warnings MUST be adhered to when operating the **RGF**® system and when using the recycled water processed through the system.

- All OSHA guidelines should be followed and material safety data sheets (MSDS) for all chemicals being used to treat the recycled water should be posted by the owner or operator of the system in a conspicuous place for all persons coming into contact with the system.

- Appropriate personal protective equipment MUST be used by all persons utilizing chemicals when maintaining and operating the system to avoid personal injury.

- Ensure all areas surrounding the system are adequately ventilated.

- Avoid adding excessive chemicals to the recycling system. (Refer to section 6.0, controlling water quality)

Additional safety precautions are listed throughout the manual.

Section 1: The WM-SM System

The Vision 2000 concept

The Vision 2000 line of Ultrasorb® systems was designed with modularity in mind, to suit each individual waste stream properly. ***RGF*** has available several standard models that may be integrated together as shown in Figure 1.1. However, depending on how your particular waste stream needs to be treated, depends on if your distributor or system integrator has added additional components to the standard system. If additional components have been added, it is important to become familiar with the components names and functions and where they will fit into the waste streams flow through the system.

Basic system layout

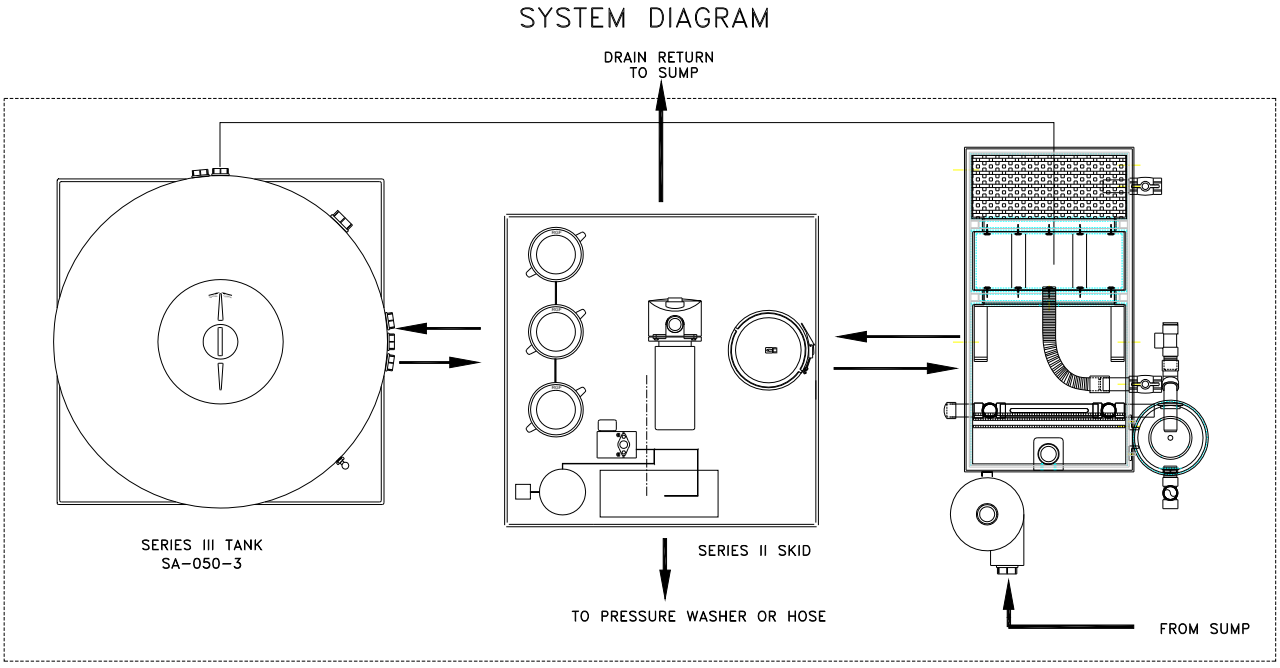
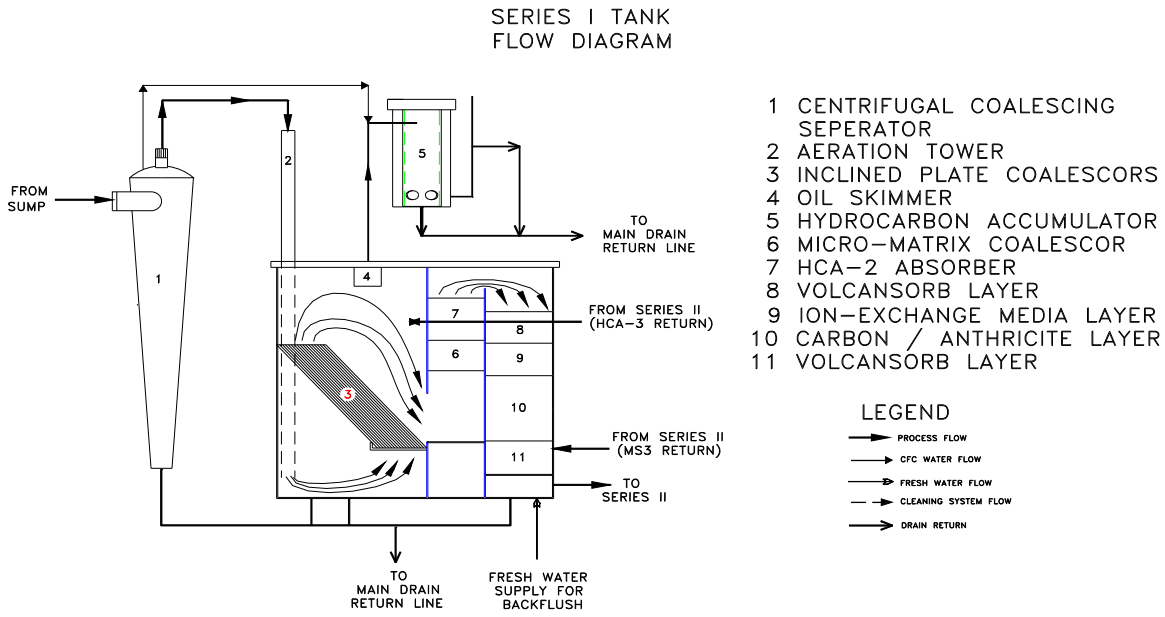


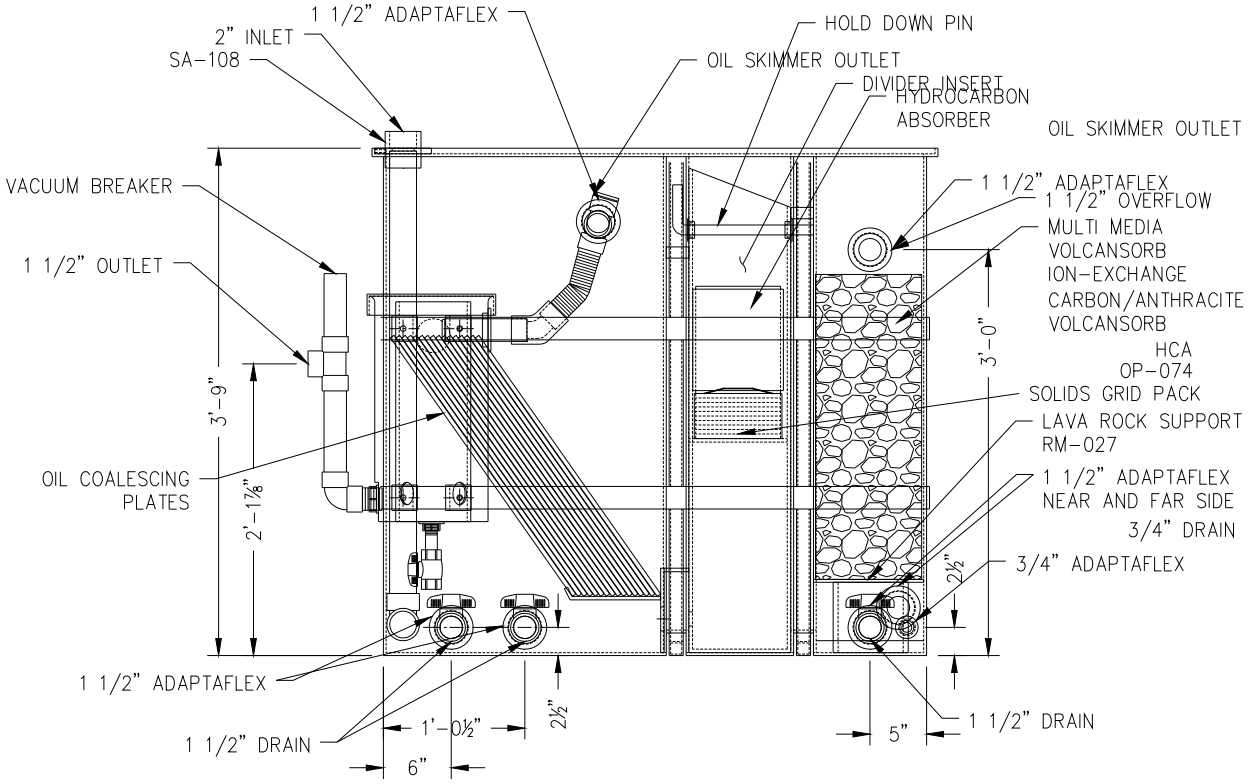
Figure 1.1

The Ultrasorb System

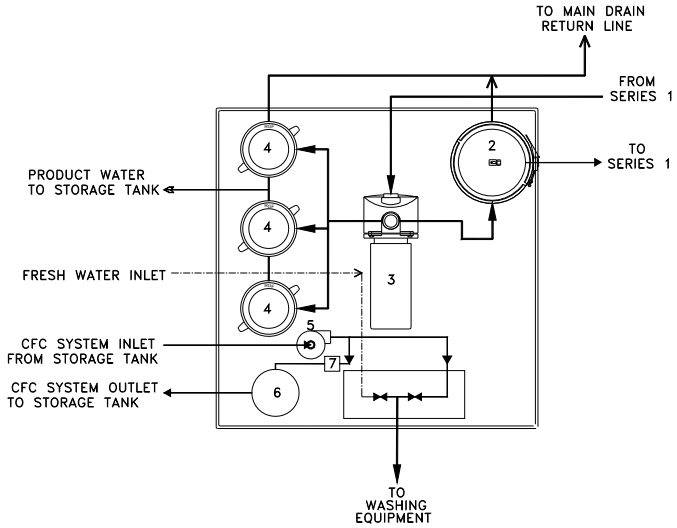
This manual contains information on: system installation, start-up, operation, and maintenance. As well as containing useful information on controlling water quality, training bulletins, and the theory behind how the Ultrasorb® System operates. In order to perform installation, start-up and maintenance procedures easily and correctly, it is important to become familiar with the system that you have. Section 1.0 is designed for just that purpose.

Unit Familiarization / Flow Diagram



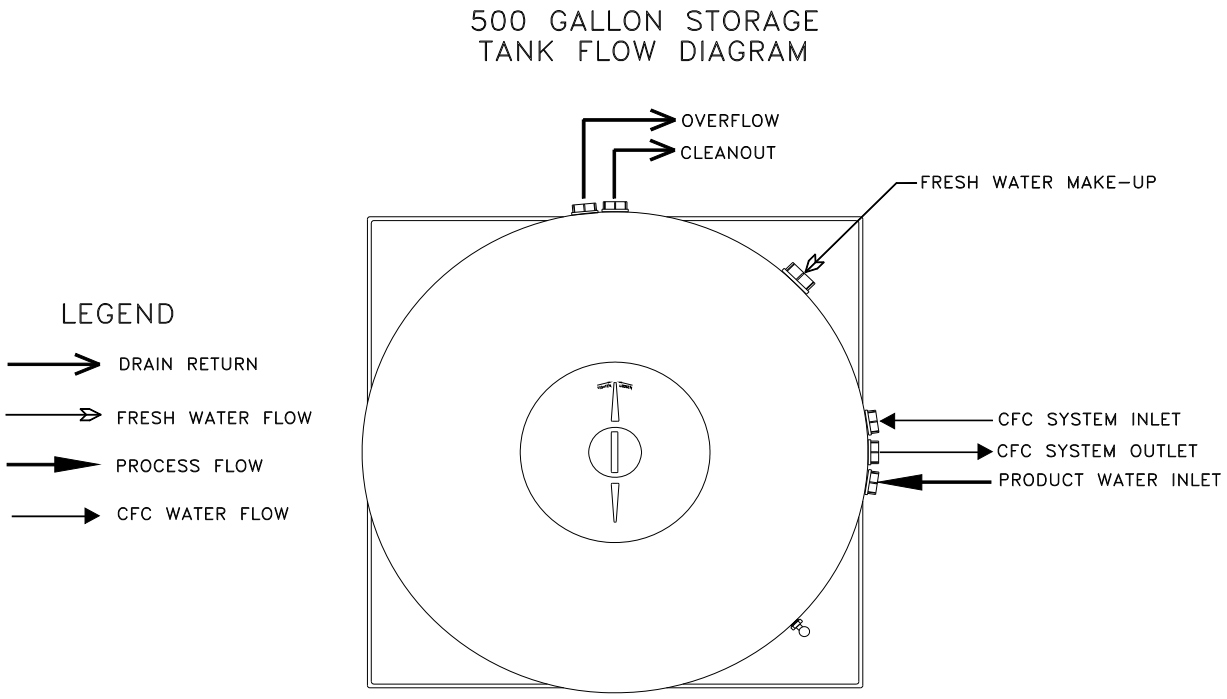


SERIES II
EQUIPTMENT SKID
FLOW DIAGRAM



1 CENTRIFUGAL COALESCING SEPERATOR
2 HCA-3 HYDROCARBON ABSORBER
3 PROCESS PUMP
4 POLISHING FILTERS (3)
5 CFC SYSTEM PUMP
6 UV/O3 CHAMBER
7 OZONE VENTURI

LEGEND
- PROCESS FLOW
- CFC WATER FLOW
- FRESH WATER FLOW
- CLEANING SYSTEM FLOW
- DRAIN RETURN


500 GALLON STORAGE
TANK FLOW DIAGRAM
OVERFLOW
CLEANOUT
FRESH WATER MAKE-UP
LEGEND
DRAIN RETURN
FRESH WATER FLOW
PROCESS FLOW
CFC WATER FLOW
CFC SYSTEM INLET
CFC SYSTEM OUTLET
PRODUCT WATER INLET

Section 2: Installation

Installation Requirements

The **ULTRASORB® System** must be installed in strict compliance with these procedures in order for the warranty to be activated. The purchaser is responsible for bringing the required utilities (i.e. water, electricity, and drainage) to the system and connecting them according to local codes. If the System must be modified by ***RGF*** or the distributor in order to meet the requirements of local codes, the purchaser will be required to pay the modification costs. When the purchaser has completed all of the above, a field representative will be furnished by the ***RGF*** Distributor. He will provide of installation check-out, testing, and training at no charge.

Please read the installation procedure completely and thoroughly before installing and operating the unit.

Installation Procedure

It is important to fully understand Section 1.0 to help to become familiar with all of the components and equipment names of your particular system for installation, start up, operating, and maintenance procedures

NOTE:

Make sure to use Teflon tape or Teflon paste on all threaded connections and PVC glue (medium blue PVC cement) all slip connections.

Equipment Placement

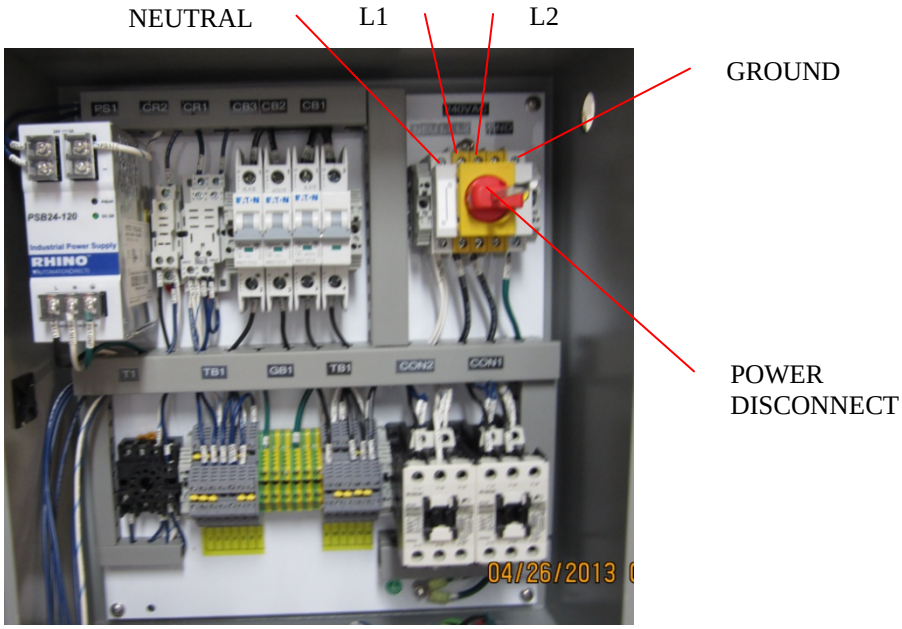
Place all of the equipment skids and tanks on the concrete pad location as desired. Allow a minimum of 2' clearance between components for access ways.

Main Drain Return Line

A. MAIN DRAIN RETURN LINE should be imbedded in the equipment pad prior to system installation. If there is not one available, one should be plumbed to accommodate drain return lines from the components of the system. This return line should be readily accessible from the rear of each component such that all of the drain lines from each component can be plumbed into a common manifold and fed into the Main Drain Return Line (refer to the "Suggested Layout.

Main Electrical Connection

A. MAIN ELECTRICAL JUNCTION for the particular system components should be planned into the equipment pad prior to system installation. Refer to Section 8.3 for exact power requirements. Most installations will require 220 VAC, 30 amps, 1 phase, 60 Hz with a neutral and a ground as a minimum.



Series I Tank

Inlet / Outlet Connections

A. For your convenience, all inlets and outlets, of the Series I Tank are factory installed. However, if shipping damage should occur and a fitting has come loose, remove the pipe and adapt-a-flex fitting and re-insert.

NOTE:

Apply a mixture of soap and water when inserting any piping into the adapt-a-flex tank bushings, this will assist in installing the piping (Fig. Tank-1)

Pipe Lubrication Application

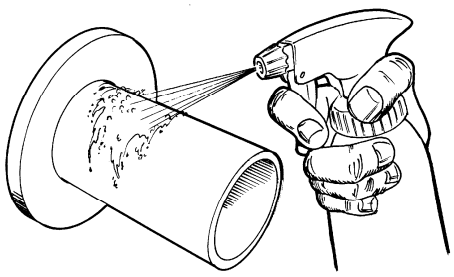


Figure TANK-1

B. Attach the **AERATION TOWER** to the **INLET FITTING** (this is the only 2" coupling).

C. Attach three 1-1/2" **BALL VALVES** with 1-1/2" pipe and connect to the **DRAIN CONNECTIONS** (labeled S1D-1, S1D-2, S1D-3 on the P&ID Diagrams). Plumb the tank drains to the main drain return line as shown in (Fig. TNK.2-TNK.4). Note: Piping and fittings for the main drain return line are not supplied. First, glue both 45° 1-1/2" fittings together as shown in (Fig TNK.2) on a flat surface. Before gluing the 45° fittings into the 1-1/2" tee, rotate 45° sub-assembly to the floor as shown in (Fig. TNK.3). Glue total assembly into place. Connect each drain valve assembly together and lead to the main drain return. This procedure holds the drain valves square with the tank and reduces stress to the pipe by keeping the pipe on the deck instead of evelated.

Tank Drain Hookups Top View

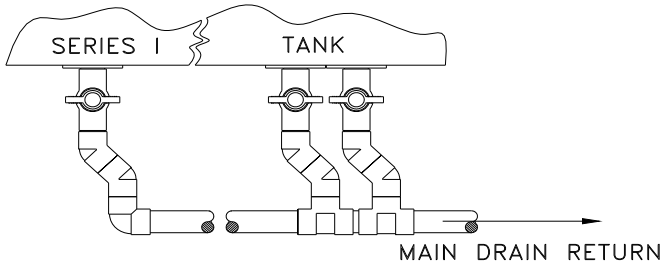


Figure TNK-2

Tank Drain Hookups Side View

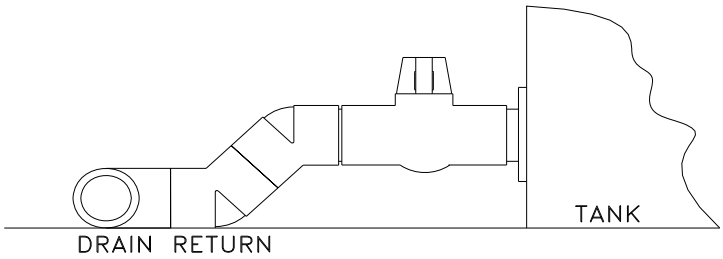


Figure TNK-3

Main Drain Connections

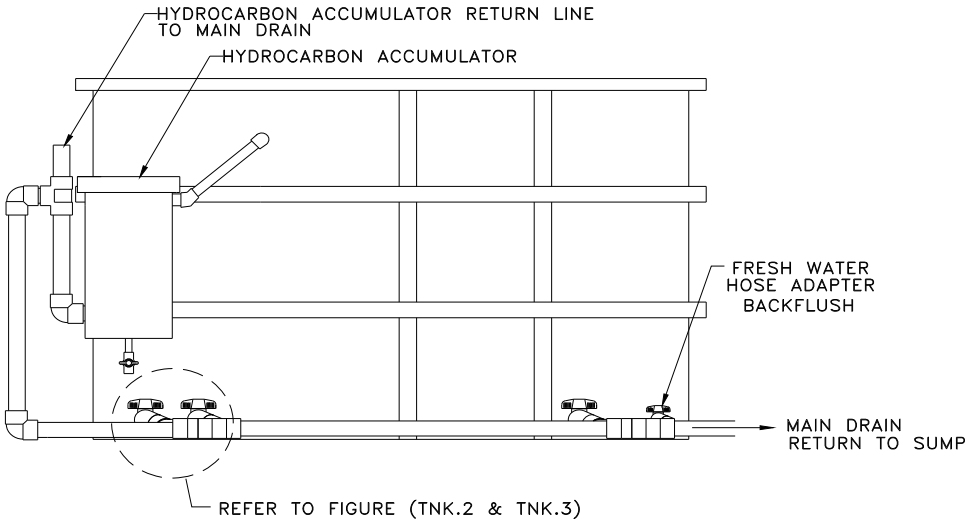


Figure TNK.4

D. Attach the 3/4"Slip Ball Valve with 3/4" pipe and **HOSE ADAPTER** to the **BACK FLUSH CONNECTION**. Plumb a fresh water source to the back flush Connection. Use a hose or plumb hard pipe to the ball valve.

E. Plumb the **TANK OVERFLOW** to the **MAIN DRAIN RETURN LINE**

Inlet Connection

A. Plumb a 1 1/2" pipe from the Coalescing Centrifugal Separator into the top of the 2" **AERATION TOWER**. This connection is designed such that the 1 1/2" pipe slips down inside the 2" Aeration Tower a minimum of 18" (Fig. TWR.1) and should not be glued or fastened to the tower (Fig TWR.1). There should be an air gap between the Inlet Pipe and Aeration Tower.

NOTE:

Do not glue or fasten the connection between the inlet pipe and aeration tower.

Aeration Tower Hookup

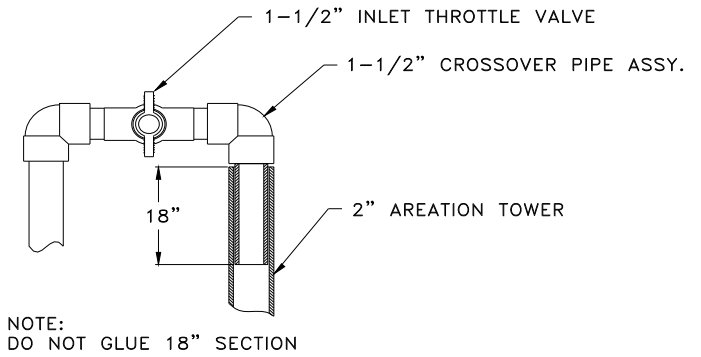


Figure TWR.1

Hydrocarbon Accumulator

A. Attach the supplied 7 gallon Hydrocarbon Accumulator Tank to the bolt studs on the side of the Series I frame. Use the supplied nuts and washers to secure the accumulator to the Series I.

B. The **OIL SKIMMER ASSEMBLY** is factory installed inside the first compartment (above the Inclined Plates) of the Series I as shown in Fig. HCA.1. Do **Not Glue** these fittings. Assemble the Inlet and Outlet **HYDROCARBON ACCUMULATOR ASSEMBLIES** as shown in Fig. HCA.1.

C. Plumb the **ACCUMULATOR OUTLET ASSEMBLY** to the **MAIN DRAIN RETURN LINE (**Fig TNK.4**)**. Ensure that the top of the Accumulator outlet piping is even with the bottom of the Accumulator inlet piping. Supplied pipe sections should allow for this.

D. Attach the 3/4" **ACCUMULATOR DRAIN** to the 3/4" fitting on the bottom of the Accumulator. Do not plumb this line to the main drain return line. This is used for accumulated oil removal.

Oil Skimmer / HCA Inlet Assy

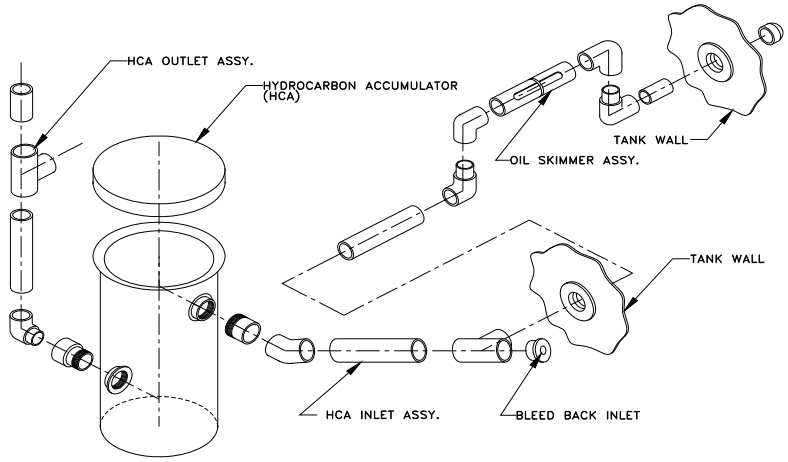


Figure HCA.1

Multi-Media Filter Bed

A. In the third compartment of the Series I Tank, ensure the **SUPPORT RINGS** under the Media Bed Deck (which may have shifted during shipping) are evenly spaced under the table to support the weight of the Multi-Media Filter Bed

B. On top of the **MEDIA BED PLATE**, place one of the supplied sheets of the **BLACK POLY MESH** (Each layer of media should be separated with a piece of black poly mesh). The mesh should lay so that approximately 4" of material lays up each wall, forming a pocket.

C. Place approximately half of the bag (approx. 4") of **VOLCANSORB (RED LAVA ROCK)** spread out evenly on top of the layer of Black Poly Mesh.

D. Place another sheet of **BLACK POLY MESH** (as described in step B) on top of the Volcansorb followed by one full bag (approx. 8") of **ACTIVATED CARBON (BLACK SMALL ROCKS)** spread out evenly on top.

E. Place another sheet of **BLACK POLY MESH** (as described in step B) on top of the Carbon followed by one full bag (approx. 4") of **ION EXCHANGE MEDIA (WHITE PELLETS)**.

F. Place the last sheet of **BLACK POLY MESH** (as described in step B) followed by the other half of the bag (approx. 4") of **VOLCANSORB** (Refer to Fig.SER.1).

G. Uncoil the **SERIES I TANK FLOAT SWITCH** (Pump Down) from the Series II Equipment Skid and lead to the third compartment of the SERIES I. Connect the float switch to the supplied **TIE STRAP** (refer to Figure SER.1) with 3 1/2" of wire length from the tie strap to the float head. There should be at least 1" between the float switch and the top of the media bed and the float should not touch the HCA-2 cover.

Multi-Media Filter Bed Layers

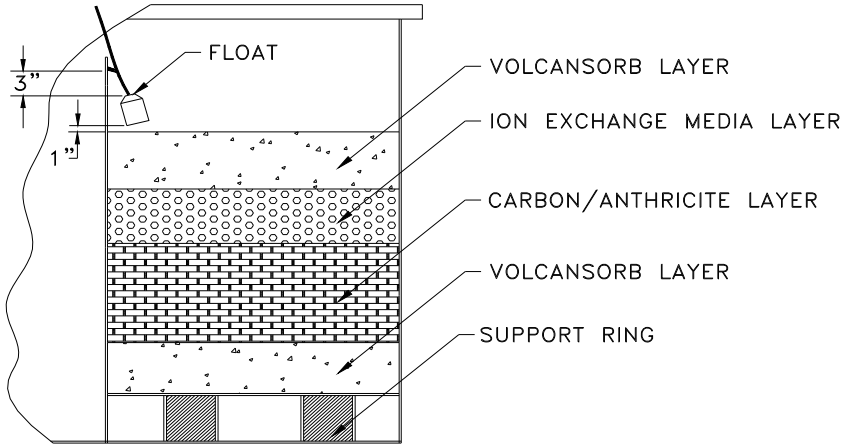


Figure SER.1

Series II Equipment Skid

Inlet Connection

A. Plumb the **OUTLET** from the Series I Tank to the Series II PROCESS PUMP Inlet. This line should include the supplied Y-Strainer and 1 1/2" ball valve (on the outlet of the Series I).

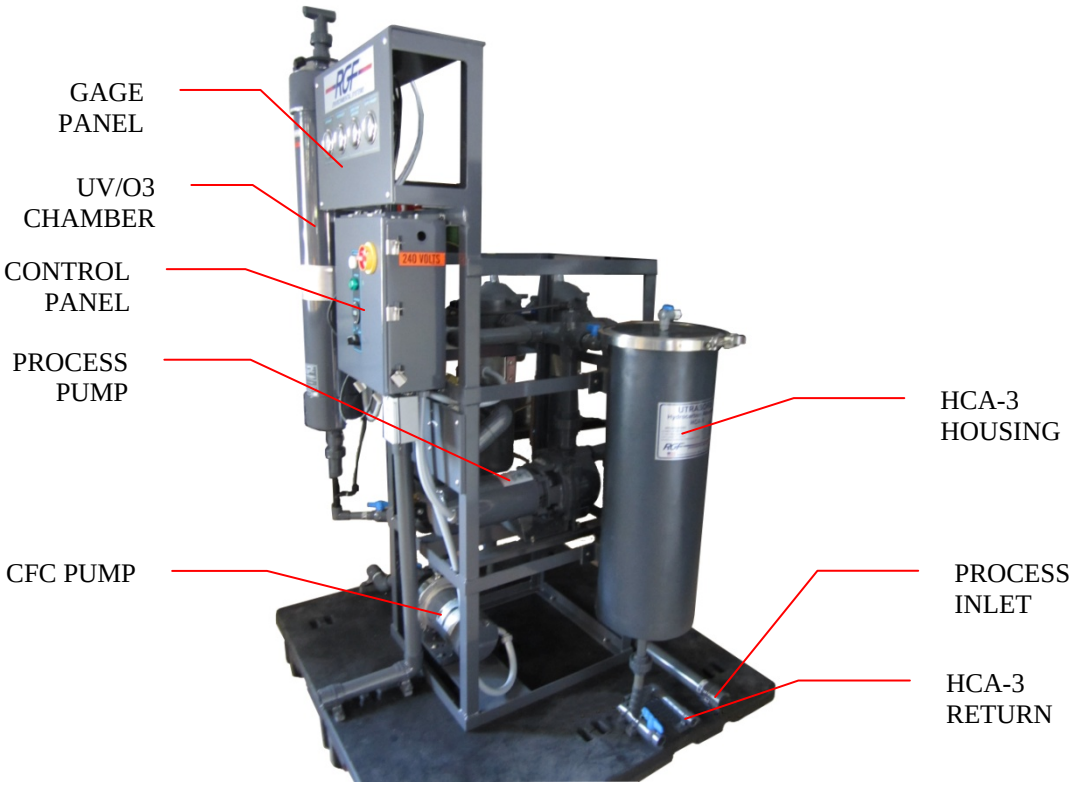
B. The Y-Strainer should be connected as indicated below or can be located between the Series I and II as desired.

C. Attach the supplied 6" x 1 1/2" threaded nipple into the female adapter on the inlet of the Series II.

D. Attach the Y-Strainer onto the nipple with the indicator arrow facing towards the Series II. The ideal position for the Y-Strainer is in the straight down position or at a 45° from the ground.

E. Connect the supplied male adapter into the remaining end of the Y-strainer, then attach the 1 1/2" ball valve and continue plumbing to the Series I.

SERIES II FILTRATION SKID



CFC System Inlet / Outlet Connection

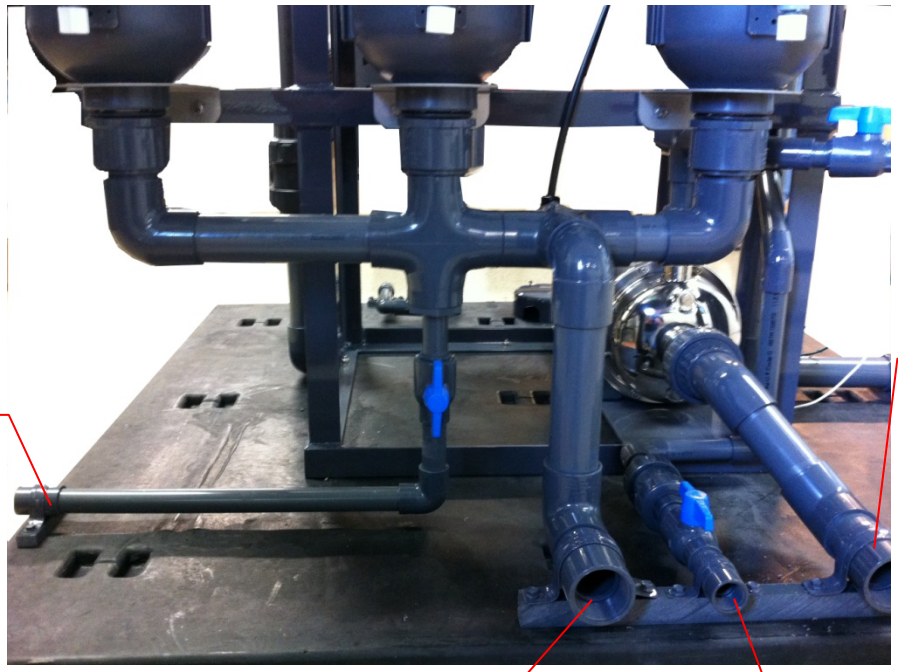
A. Plumb from the **CFC SYSTEM INLET** to the **SERIES III STORAGE TANK OUTLET**. This line requires the use of an isolation ball valve.

B. Plumb from the **CFC SYSTEM RETURN** from the 3/4" fitting on top of the UV/O^3 Catalytic Chamber to the **SERIES III STORAGE TANK CFC SYSTEM RETURN INLET**.

C. Plumb the **CFC BLEED BACK** from the 1/4" fitting on top of the UV/O^3 Catalytic Chamber using part of the supplied 1/4" poly hose and lead into the **BLEED BACK INLET** on the Hydrocarbon Accumulator. (Fig. HCA.1)

Fresh Water Inlet Connection

A. Plumb a FRESH WATER SOURSE to the equipment skid ¾" FPT FRESH WATER INLET. This line requires the use of an isolation ball valve and backflow preventer.



Drain Return / Bleed Line Connections

A. Plumb any 3/4" **POLISHING FILTER DRAINS** to the **MAIN DRAIN RETURN LINE**.

B. Plumb any 1 ½" POLISHING FILTER DRAINS to the MAIN DRAIN RETURN LINE.

C. Plumb the Polishing Filters **SOLIDS BLEED VALVES** (bottom hose valves on housings) using part of the supplied 3/8" poly hose and lead back to the **BLEED BACK INLET** on the Hydrocarbon Accumulator. (Fig. HCA.1)

NOTE:

The top hose valves are only needed for bleeding air from canister during startup.

➢ Electrical Connections

A. The 220 volt Electrical Connections to the Series II Electrical Juction Box should be connected by a certified electrician, according to local and national codes.

WARNING

Do not apply power to the system until directed to do so in the specific startup procedure!

Series III Storage Tank

Overflow / Drain Connection

NOTE:

Check with local authorities as to local codes for overflow water.

A. Plumb from the **STORAGE TANK OVERFLOW** to the nearest overflow/storm water containment, sanitary sewer or secondary storage tank according to local and national code or plumb back to the Main Drain Return Line.

B. Plumb from the **STORAGE TANK DRAIN**, to the **MAIN DRAIN RETURN LINE**. This line requires the use of an isolation ball valve.

Fresh Water Inlet Connection

A. Plumb a **FRESH WATER SOURCE** to the 3/4" slip **FRESH WATER MAKE UP INLET**. This line requires the use of an isolation ball valve and backflow preventer.

Float Switch Connections

A. Attach all of the **STORAGE TANK FLOAT SWITCHES** according to Section 8.3 Electrical Diagram. These connections should be connected by a certified electrician according to local codes.

Section 3: System Startup and Operation

System Startup

Before you begin

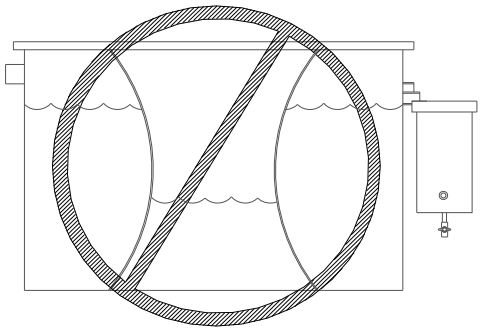
The following startup procedures must be followed thoroughly in order to prevent damage to the system components. Remember:

Do not apply power to the system until directed to do so in the specific startup procedure!

Series I Tank

A. Close all **DRAIN VALVES** and **ISOLATION VALVES** (i.e. S1D-1, S1D-2, S1D-3 Drains, Fresh Water Back Flush and Hydrocarbon Accumulator Drain Valve). **Do Not Open the Isolation Valves until directed to do so**.

B. Fill each compartment of the Series I Tank evenly and, at the same time, with fresh water until the level reaches the point where the second compartment starts to overflow into the third compartment.



C. The oil skimmer will need to be adjusted when the feed pump is in operation. Adjust the level of the skimmer until it is just barely meeting the surface of the water. (Fig. SKM.1). The skimmer won't start skimming oil until a thin layer of oil forms on the surface of the first compartment. One must remember that oil floats on the surface of the water, and the oil skimmer removes the floating oils. When the feed pump is off, the level will equalize in each compartment and the water level will fall below the level of the skimmer due to the loss of the driving head.

NOTE:

When the feed pump is off, the level will equalize in each compartment and the water level will fall below the level of the oil skimmer due to the loss of the driving head. **Do not readjust the oil skimmer** to this lower level as it will cause the Hydrocarbon Accumulator to function improperly.

Oil Skimmer Adjustment

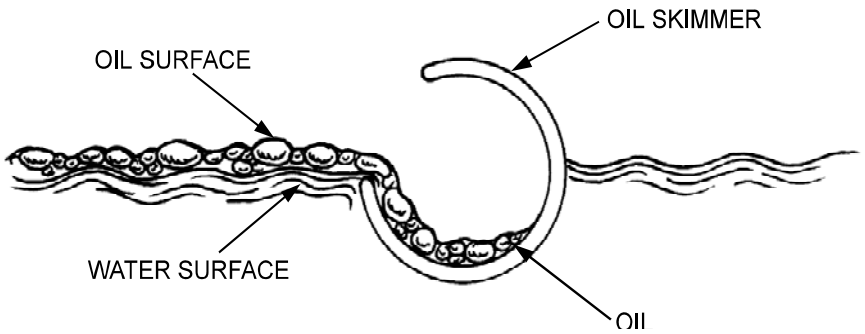


Figure SKM1

D. Check the **FLOAT SWITCH** in the third compartment above the Multi-Media Bed to ensure it is free to swing. Adjust the tether length of the float switch to obtain the proper pumping range (length should be approx. 3 1/2").

E.

Series II Equipment Skid

Filling the System

A. Close all **SYSTEM VALVES** (e.g., valves PD-1, PD-2, PP-1)

B. Ensure all filters are installed and the lids are hand tightened.

C. Recheck all unions to ensure they are not missing o-rings and are all hand tightened.

D. Open all of the purge valves on top of the filter housings and Hydrocarbon Absorber (PF-1, PF-2).

E. Open the fresh water valves for the system (e.g., FW-1, FW-2 and FW-3). Allow the system to fill until water starts streaming from the purge valves, and then close the fresh water valves and the purge valves (PF-1, PF-2).

F. Open all of the **ISOLATION VALVES** between the components of the system.

G. Prime the Process Pump by removing the gauge fitting on the top of the Process Pump piping assembly. Water should start emitting from the gauge fitting. Continue until a steady stream emits, then replace the gauge fitting.

NOTE:

Proper priming of the Process Pump is of extreme importance. Failure to ensure proper priming will inhibit proper operation of the pump and eventually destroy it.

H. Prime the CFC System Pump by removing the gauge fitting on the top of the CFC Pump piping assembly. Water should start emitting from the gauge fitting. Continue until a steady stream emits, then replace the gauge fitting.

NOTE:

Proper priming of the CFC Pump is of extreme importance. Failure to ensure proper priming will inhibit proper operation of the pump and eventually destroy it.

Series III Storage Tank

A. Close the Storage Tank **DRAIN VALVE** and **ISOLATION VALVES**.

B. Turn on the Fresh Water Supply to the Storage Tank. Fill the Storage Tank approximately 3/4 full (400 gallon mark) with fresh water using a garden hose.

C. Ensure all of the **FLOAT SWITCHES** inside of the Storage Tank are free to swing

Start-Up

A. Open all of the isolation ball valves between the components of the system

NOTE:

POWER CAN NOW BE APPLIED TO THE SYSTEM COMPONENTS.

B. Place the OFF/ ON / START switch on the control panel in the Start position, the switch will spring return to the "ON" position when released.

C. Start the CFC system by holding the **CFC SYSTEM PRIME LEVER** up (refer to Figure CFC-1) until the CFC pressure reaches approx. 20-24 psi, then release. The lever should remain in the up position. If it does not, then the CFC System is not properly primed, check the system valves to ensure they are properly opened and re-bleed the CFC pumps. Once the CFC System is properly started, the Aux. System light and UV/O^3 Catalytic Chamber indicator (blue light on the side of the chamber) should be illuminated indicating that power has been applied to the CFC System. Also, the CFC Pumps will run continuously, and the Chemical Injector Pump will pump periodically. If in the event the CFC system pressure drops below 5 psi, the lever will shut down all Aux. systems to prevent equipment damage.

CFC System Prime Lever

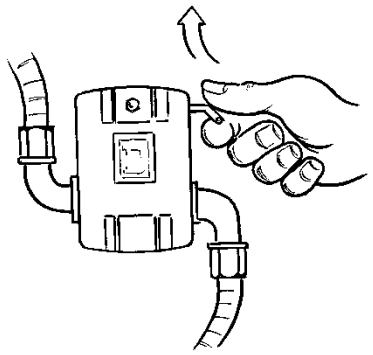


Figure CFC-1

System Operation

Series I Tank

Operation

Water enters the Series I Tank from the Centrifugal Coalescing Separator and first enters into the Aeration Tower before entering the tank. Once inside the tank, the water passes through the Inclined Tube Coalescor, which helps to separate solids and float oils. The oils which float on the surface of the first compartment are skimmed off by the oil skimmer, and are deposited into the Hydrocarbon Accumulator.

The water then flows through the solids grid upward through the HCA-2 Filter before gravity flowing into the third compartment. The water in this compartment is drawn out of the bottom of the tank by the process pump on the Series II skid. As the water is drawn out of the third compartment, it travels through the layers of the Multi-Media Bed.

Controlling Flow

The flow through the Series I is controlled by throttling the inlet flow control valve to match the demand of the process pump on the Series II. This adjustment should be made at start up with new media. The flow control valve should not need to be adjusted again. This will help in determining when the filter media needs to be back flushed or replaced. When you notice that the water is exiting out the overflow in the third compartment and that the Process pump is not drawing the water out of the third compartment, this will indicate that the media is blinded and needs maintenance immediately.

Series II Equipment Skid

Process System

Water enters the Process System from the upstream component by the suction of the Process Pump and is passed through the Polishing Filters before it is transferred to the Storage Tank.

Controlling Flow

Flow through the Process System is controlled by throttling the PP-1 valve.

CFC System (Continuous Flow Control)

Water is continuously fed through the CFC system from the Storage Tank by the suction of the CFC System Pump and is supplied either to the CO^3P Process or to the supply header (SH-1). Also, a small amount of water from the CO^3P Process is continuously bled back to the Hydrocarbon Accumulator inlet. All of the water from the CFC Pump will flow through the CO^3P Process until there is a demand at the supply header, at which time a majority of the flow will be supplied to the supply header (SH-1). The flow through the CO^3P Process passes the recycled water through the Ozone and Chemical Injection Venturi and then through the UV/O3 Catalytic Chamber, and is returned to the Storage Tank. Flow rate through the CO^3P system is controlled by valve CFC-1.

Controlling Flow

Valve CFC-1 should be fully opened for normal operating conditions, however if insufficient flow is delivered to the supply header, CFC-1 may be throttled, but should NEVER be shut completely off.

IMPORTANT:

Valve CFC-1 must never be shut completely off. The UV/O^3 Catalyzation Chamber requires continuous flow or the bulb will overheat and malfunction.

➢ WATER SUPPLY

The supply header on the Control Panel controls the water supply to the washing equipment. This header allows the option of using either Recycled (wash) water or rinse (fresh) water. Two manual ball valves are positioned either open or closed. To use the Fresh Water Rinse - Open the fresh water supply valve and close the recycled water supply valve. For Recycled water supply reverse the valve positions to Recycled water supply valve open and Fresh water supply valve closed. When no water supply is desired, both valves should be turned to the "closed" position.

As an option; automatic control of the supply system can be accomplished by replacing the manual valves with Solenoid operated valves. These solenoid valves will be positioned automatically to provide either FreshWater Rinse or Recycled Water using a remote switch located on the front control panel or a remote control panel.

Series III Storage Tank

➢ Operation

Water enters the Tank from either the Process system or Fresh water make-up. The water inside the tank is continuously pumped by the CFC System, through the CO^3P Process, and returned. When wash water supply is needed, wash water flow is pumped by the CFC System to the Supply Outlet Header. Float switches inside of the tank control the operation of the system.

Operational Notes

WARNING

• UV/O^3 CATALYTIC CHAMBER

1) DO NOT look at the UV light in the chamber. PERMANENT DAMAGE OR BURNS TO EYES OR SKIN MAY RESULT.

2) DO NOT run the UV Chamber without water flow through the Chamber, The UV bulb needs water flow to keep it cool. DAMAGE TO THE BULB WILL RESULT.

2) DO NOT open or attempt to repair the chamber. If problems occur, call your serviceman or distributor for further instruction.

3) DO NOT BREATHE OR INHALE THE OZONE GAS. PROLONGED BREATHING OF NOTICEABLE AMOUNTS OF OZONE may result in: respiratory irritation to nasal passages, throat, bronchial and pulmonary membranes; headache, nausea, burning and/or watery, irritated eyes. In some instances (such as enclosed spaces and tanks), significant concentrations of ozone may collect. Adequately vent all tanks and enclosed spaces before entering for maintenance or repair until the level of ozone has depleted down to acceptable levels (<0.1 ppm). If an ozone odor is still noticeable, continue ventilating until the odor is non-detectable. Ozone odor is similar to the smell near copy machines when making copies or Mig and Tig welders in operation and is the "fresh air " odor one sometimes notices after a thunderstorm.

GENERAL NOTE:

At a level of 1 ppm, ozone becomes intolerable to humans. A human reaction to this level is the same as the reaction to a strong bleach or ammonia odor. Usually, the nose will indicate discomfort.

CAUTION

- ***POLISHING FILTER***

1) Before servicing be sure to RELIEVE THE PRESSURE on the Polishing Filter(s) by using the drain valve and bleed valve or PERSONAL INJURY COULD RESULT!!!.
2) *RGF* Filters have been lab tested and time tested - COPY FILTERS HAVE BEEN KNOWN TO BREAK UP OR DISSOLVE, THEREBY PLUGGING OTHER PARTS OF THE UNIT CAUSING EXCESSIVE PRESSURE AND EQUIPMENT DAMAGE!!!

WARNING

- ***CFC SYSTEM PUMP:***

1) Proper priming of the CFC System Pump is essential to the operation of the pump. Improper priming of the pump will cause poor performance and eventual pump failure.
2) DO NOT OPERATE the CFC System Pump if the Storage Tank is emptied or DAMAGE TO THE PUMP WILL RESULT.

CAUTION

- ***PROCESS PUMP:***

1) TO PREVENT DAMAGE TO THE PROCESS PUMP, DO NOT OPERATE without sufficient prime and net positive suction head (NPSH).
2) DO NOT OPERATE THE PUMP while the system valves are closed.

Section 4: Preventative Maintenance Schedule

Overview

The following section is developed to keep the **ULTRASORB® System** in top working order. It is **NECESSARY** to follow the maintenance procedures below precisely as stated. The lack of maintenance, in the long run, will reduce productivity and can be both costly and time consuming. It is recommended that this format be copied and incorporated as a regular work routine.

Turn off all power and release pressure before servicing the system. <u>All gauges must read zero</u>!

Required Tools and supplies

- ✓ Hammer
- ✓ Adjustable End Wrench
- ✓ 5 H.P. Shop VAC For Extracting Old Media
- ✓ Garden Hose For Back Flushing
- ✓ Tube Brush For UV/O^3 Chamber Cleaning
- ✓ Ph Test Strips
- ✓ Garden Hose Nozzle
- ✓ #1 Flat Head Screw Driver For Venturi Adjustment If Needed
- ✓ Garbage Bag For Proper Filter Disposal
- ✓ Rubber Boots And Gloves
- ✓ Proper Safety Equipment
- ✓ Square Head Shovel For Digging Out Trench Valley

Maintenance Schedule

WARNING

Turn off all power, and release pressure before servicing the system. <u>All gauges must read zero</u>!

Series I Tank

Daily Maintenance

A. Open the drain valves SID-1, SID-2 and SID-3 of the Series I Tank on each of the three compartments individually, for approximately 15 seconds, to flush out the bottom of the tank. Check the clarity of the water coming from the drains. If the water is very murky, let run for several more seconds until the water becomes clearer.

B. Remove any floating debris or scum from the surface of each of the compartments of the tank.

C. If there is a large amount of oil in the Hydrocarbon Accumulator, it will need to be drained off and disposed of properly. To remove accumulated oils from the hydrocarbon accumulator:

1. **Rotate skimmer to 12:00 position (or highest position) to take out of service**
2. **Drain the excess water out of the bottom of the Hydrocarbon Accumulator using the tank drain valve. Shut valve when oil approaches the drain.**
3. **Drain the oil off by connecting a hose to the tank drain and connecting the other end to a 5 gallon can or drum and opening the Drain Valve.**
4. **Clean out the accumulator to remove any oils that have been attracted to the vessel.**
5. **Fill the accumulator 1/2 full with water prior to returning skimmer to service.**

Series II Equipment Skid

Daily System Check

Daily, with the system running, log the pressure gauge readings. Check the status of the indicator lights, hour meter, and chemical injection pump. Check the water level in the Storage Tank. Keep an accurate record of all of the readings and indicators to determine when certain components of the equipment skid will need maintenance.

Use the following as a general rule:

Polish Filter Gauges

If the pressure difference for the Polishing Filters is 10 psi or more, the filters need to be manually cleaned.

CFC Pump Discharge Gauge

This gauge indicates the pressure in the CFC System. The system should operate at approximately 20 psi when there is no recycled water usage and 15-20 psi when there is recycled water usage.

Polishing Filters

Daily Maintenance

Daily, check the inlet and outlet pressure difference on the Polishing Filters, if it is greater than 10 psi, the filters need to be cleaned or replaced

UV/O^3 Catalytic Chambers

DAILY MAINTENANCE

A. Ensure the UV/O^3 Catalytic Chamber indicator light on the side of the chambers (at the top) is illuminated.

Weekly Maintenance

Turn off all power, and release pressure before servicing the system. <u>All gauges must read zero</u>!

Trenches, Sumps, Pits, and Clarifiers

➢ Weekly Maintenance

Weekly, or as required, the trenches, sumps, pits and clarifiers of the pad need to be checked for sediment level. The trenches' sediment level should not be more than half of the depth of the trench. Dig out the trench using a shovel, and dispose of the waste accordingly. The sumps and pits should be dug out if there is at least 1/4 of the depth full of sediment. The clarifiers should be removed and dug out on a weekly basis, or as required, regardless of the amount of sediment.

IMPORTANT:

Dig out the trenches, sumps, pits and clarifiers as regularly as possible. Keeping them cleared of sediment build up will result in better water quality throughout the entire system.

Series I Tank

➢ Weekly Maintenance

Perform a Series I Tank Multi-media back-flush on a weekly basis regardless of the amount of debris. To back-flush the Series I Tank:

Turn off all power, and release pressure before servicing the system. <u>All gauges must read zero</u>!

A. Close isolation ball valve

B. Turn **ON** Fresh Water supply and open the Back-Flush Hose Valve SIFW-1 for the Series I Tank and let water run out of the Overflow.

C. Let run out for several minutes, allowing it to back flush the Multi-media filter and loosen and remove any solids to the Overflow.

D. Close the Back Flush Hose Valve SIFW-1 and shut **OFF** Fresh Water supply.

Y-Strainer

➢ Weekly Maintenance

Turn off all power, and release pressure before servicing the system. <u>All gauges must read zero</u>!

A. Close the isolation valve to the Series I and (PF-4) on the Series II

B. Unscrew bottom of the Y-strainer and completely clean screen basket.

C. Y-strainer. Make sure o-ring is in place.

D. Open isolation valve to the Series I and (PF-4).

E. Check system for leaks.

Polishing Filters

➢ Weekly Maintenance

Weekly the Polishing Filters need to be removed and manually cleaned by the following procedure:

Turn off all power, and release pressure before servicing the system. <u>All gauges must read zero</u>!

Manually Cleaning the Polishing Filters

A. **OPEN** the Polishing Filters drain valve (PD-1) and solids bleed valves.

B. Allow to drain and relieve pressure. **The Pressure Gauges Should Read "Zero"**.

C. Disconnect all of the air bleed lines from the lids.

D. Remove the Polishing Filter Lids by turning them counterclockwise.

E. Remove and manually clean the Polishing Filters using a fresh water hose to flush all debris from the filter and the inside of the filter housings. Replace filters to the housings.

F. Replace the lids by turning clockwise; ensure the filter seals are in place on the housings.

G. Replace all of the air bleed lines to the lids.

H. **SHUT** the Polishing Filter drain (PD-1) and solids bleed valves **PD-1**.

I. Turn the main power to the system back **ON**.

Storage Tanks

Weekly Maintenance

A. Open the drain valve to the Storage Tank and allow draining for 1 minute to remove any accumulated solids from the bottom of the tank.

B. Check inside the tank to ensure the float switches are free to swing. Remove any accumulated debris or scum from the surface of the tank water.

Monthly Maintenance

UV/O^3 Catalytic Chambers

➢ Monthly Maintenance

Once a month, or as required, the UV/O^3 Catalytic Chamber needs to be cleaned by the following procedure:

Shut off all power to the system before attempting to service or repair the UV/O^3 Catalytic Chamber. The chamber operates under high voltage, which can cause severe shock if ends are removed while power is applied.

A. Close the Isolation Ball Valves (CFC-1) to the CFC System.

B. Disconnect the union at the top of the **UV/O^3** chamber. It may be necessary to disconnect the bottom union to thoroughly clean the lower portion of the tube.

NOTE:

Use caution in handling the UV/O^3 Catalytic Chamber. The quartz glass tube is extremely fragile and will break if the chamber is mishandled.

D. Insert an appropriate sized bottle brush and scrub the interior of the quartz glass tube. If a heavy build up of scale is present, prepare a solution of Citric Acid and scrub the tube until clean
E. Reconnect the inlet and outlet and open isolation ball valve (CFC-1).
F. Turn the main power to the system back **ON**.

As Required Maintenance

Series I Tank

➢ Biannual Maintenance

Biannually, or if flow through the Series I Tank is severely restricted, the Series I Tank will need to be drained and the filters will need to be removed and replaced or cleaned.

A. Turn the main power to the system **OFF.** Close the upstream and downstream component isolation valves

B. Drain the Series I Tank completely using the SID-1, SID-2 and SID-3 valves.

C. Remove the Inclined Plate hold down, and then remove the Inclined Plates. Use a fresh water hose to flush accumulated solids from inside the Plates. Flush out and remove all sediments and solids from inside the first compartment. Replace the Inclined Plates and the hold down.

D. Remove the HCA-2 cover then the **Hold Down Pins** and remove the HCA-2 Absorber and dispose of properly. Remove the Solids Grid. Use a fresh water hose to flush accumulated solids from the Solids Grid. Flush out and remove all sediments and solids from inside the second compartment. Replace the Solids grid to the second compartment. Replace the HCA-2 Absorber with a new one to the second compartment. Replace the Hold Down Rods, then the cover.

E. Remove the media bed from the third compartment and dispose of properly (A shop vac with a three inch hose will help to remove media). Use a fresh water hose to flush out and remove all sediment and solids from inside the third compartment. Replace the Multi-media Bed with a new one using the specific installation procedure for the Series I Multi-media bed.

F. Close all drains and refill the tank according to the Series I start-up.

G. Turn the main power to the system **ON**.

Winterizing the System

In areas of the country where the system will be shut down for the winter or there is a possibility of local freezing, the system will need to be drained down to prevent damage to the internal components and piping of the system. The water from the system should be hauled off or evaporated. All main sumps to the system should be turned off, pumps removed and covered to prevent damage to the sump basins. All power to the system should be shut off completely. The components of the system should be drained completely (e.g. pumps, filter housings, UV/O^3 Chamber)

Section 5: General Theory

Overview

The Piping and Instrumentation Diagram in the Engineering Diagram Section outlines the path that the waste stream follows as it is recycled. The General Theory section explains each process of the recycling process. A comprehensive understanding of theory of the **ULTRASORB® System** should be achieved to assist in the proper installation, operation and maintenance of the system.

Series I Tank

The waste stream enters the Series I Tank where it passes through a number of different solids and oil removers.

The first compartment of the tank contains the Inclined Tube Coalescor, which separates the oils, solids and water mixture. The 60° incline causes the oils to collect at the top of the plate where the smaller globules coalesce to form larger oil drops which then float up to the surface (Figure INC.1). The solids separate to the bottom of the tube where they eventually settle to the bottom of the tank. The oils on the surface are skimmed off by the Oil Skimmer and then collected in the Hydrocarbon Accumulator. The solids that separate to the bottom of the first compartment of the Series I tank are periodically flushed with regular maintenance.

Inclined Tube Coalescor

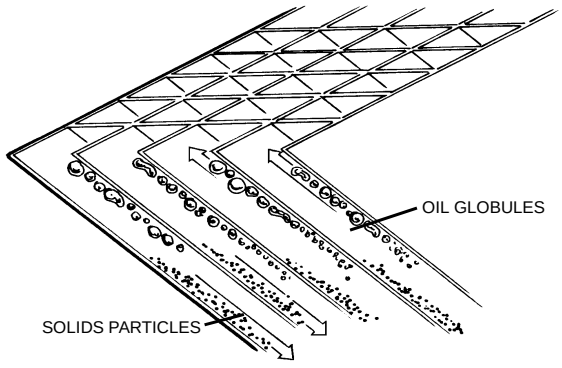


Figure INC.1

The second compartment of the tank contains a solids filter and oil absorber. The weight of the water that collects in the first compartment pushes the water up through the Solids Separation Grid, which attracts and settles small solids which passed through the Inclined Plate Coalescors, and then the HCA-2 Hydrocarbon Absorber absorbs oils. The water then overflows into the third compartment.

The third compartment contains the Multi-Media Filtration Bed. The water is pulled through this compartment by the Process or Transfer system pulling the water through the filter media. As it passes through the filter, it flows through a series of media. The first layer, the Volcansorb Layer, is a solids filter. In the second layer, the water is drawn through the Ion Exchange Media Layer, where inorganic (heavy metals) materials are removed. The third layer is the Carbon Layer, where oils, odors and organics are adsorbed. Finally, the water flows through another layer of Volcansorb. The water then leaves the Series I Tank and enters the next phase of the system (Fig SER.1).

Series I

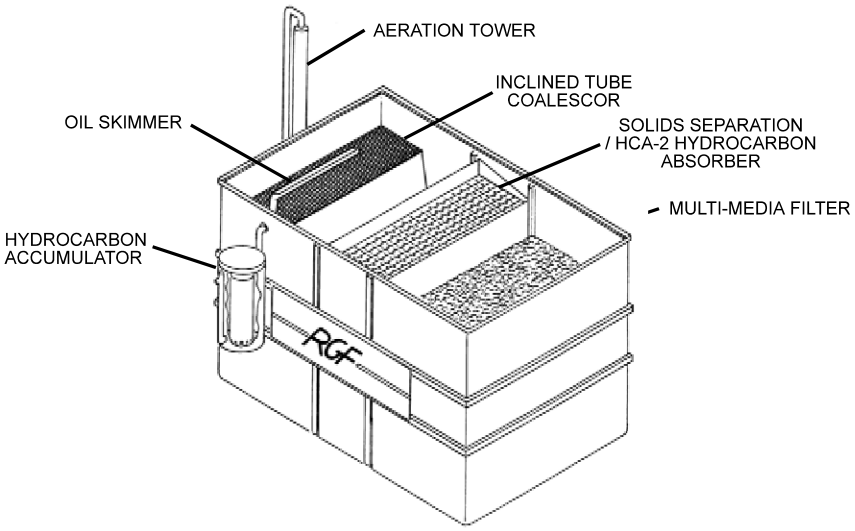


Figure SER.1

Series II Equipment Skid

Process System

The process water enters the Process System of the Series II equipment Skid by the suction of the Process Pump. The water is filtered through the two primary Polishing Filters of the system down to the 10 micron range before passing it on to the Storage Tank. The Polishing Filters are equipped with air and solids purge valves. From the Process System, the water then enters into the Storage Tank.

Supply Header

The supply header comprises a manifold of piping and valves which allows the operator to select the water source to be supplied to the wash equipment. The operator may select either wash or rinse water to be delivered to the wash equipment. Rinse water typically is municipally supplied 40-60 psig "tap" water.

Continuous Flow Control System (CFC System)

The CFC system consists of the CFC Pump, the UV/O^3 Chamber, Venturi injection. The purpose of the system is to continuously provide recycled water at moderate supply header pressure and to continuously circulate water through the Catalytic Oxidation Process (CO^3P). Although the terms CFC and CO^3P are related and the systems utilize the same components. CFC refers to the mechanism for the hydraulic delivery system, and CO^3P refers to the chemical and photochemical process for water treatment.

CFC Pump

The CFC Pump is a 1/2 Hp. centrifugal circulation pump that pumps the processed water from the storage tank to the Supply Header and through the CO^3P system.

Catalytic Oxidation Process (CO^3P System)

The Catalytic Oxidation Process is designed to reduce the Biologic Oxygen Demand (B.O.D.) and Chemical Oxygen Demand (C.O.) of the recycled water. This is accomplished through the contact with hydrogen peroxide, ozone and ultraviolet light. The tri-reaction is completed when the ultraviolet light (catalyst and oxidizer) in the chamber excites the ozone (oxidizer) and hydrogen peroxide (oxidizer) to cause them to react faster in the aqueous solution (refer to Figure TRI-1). UltraViolet light is also a remarkable sterilizer of living organics such as bacteria and algae. In turn, the three works together in breaking down organics to clarify the water before it is reused. This is all accomplished by the CFC system, which transfers the water from the tank passing it by the hydrogen peroxide injection and ozone injection and through the UV/O^3 Catalytic Chamber and returning it back to the tank.

RGF Catalytic Oxidation Process

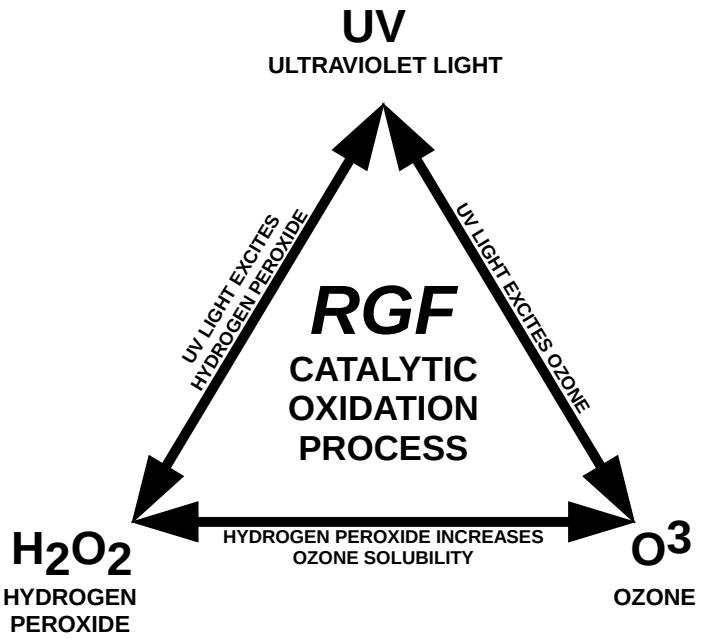
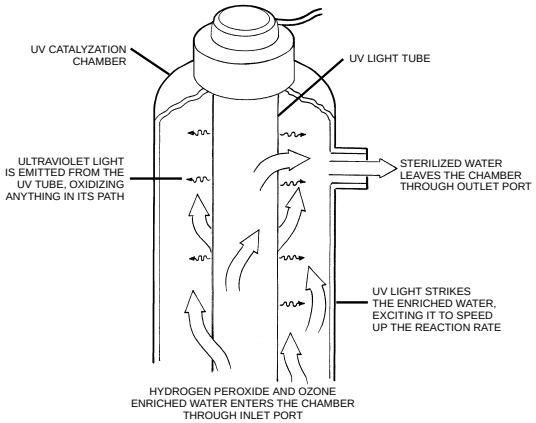


Figure TRI-1

UV/O3 Catalytic Chamber

A cylindrical vessel used to produce Ozone (O_3) which is Venturi injected in the CFC system, to prevent bacteria or algae growth. The chamber also produces ultraviolet light, which is a sterilizer used to UV distroy organics and excite ozone and hydrogen peroxide in the Catalytic Oxidation Process (CO^3P) as the water passes through the chamber (refer to figure UV/O3-1).



UV/O^3 Catalytic Chamber

Figure UV/O3-1

Section 6: Controlling Water Quality

Overview

Controlling the waste water quality on the **ULTRASORB® System** is a very important process that can greatly enhance the quality of your recycled water. By controlling the pH level, Total Alkalinity, the amount of oxidizers and soaps that are used, you will be able to improve the quality of water in your system. There are many factors which control the water quality. These factors are listed below in order of their appearance in the following section:

pH / Alkalinity

6.1.1 pH

6.1.2 Total Alkalinity

Oxidizers

Hydrogen Peroxide

Ozone

Ultra Violet Light

Cleaning Agents

Enviro-Control

Water Conditioner 1 (WC-1)

Solids

Total Dissolved Solids (T.D.S.)

Total Suspended Solids (T.S.S.)

pH / Alkalinity

pH

pH (potential hydrogen) is a relative measure to indicate how acidic or alkaline a substance is. Thus, it denotes the degree or strength of alkaline or acidity. Some acids or alkaline substances are stronger than others and, in order to compare them, the pH scale has been devised. The pH numerical index ranges from 1.0 (extremely acidic) to 14.0 (extremely alkaline). The midpoint of 7.0 indicates that the solution is neutral. That is, it is neither acidic nor alkaline. Pure distilled water is a neutral solution. Note: High pH's tend to emulsify oils and reduce the efficiency of the unit, the use of high pH cleaners should be minimized.

The pH scale is a logarithmic scale and even though the difference from 0 to 14.0 doesn't seem very great, every unit on the pH scale is a difference of 10 times, and every two units is a difference of 100. For example, if you have an alkaline cleaning solution of 10.0 and increase it to 11.0, you are making that solution 10 times more alkaline. If you go up two degrees to a pH of 12.0, the solution becomes 100 times more alkaline, and so on.

➢ *Controlling pH:*

To Raise pH:

One chemical usually added to raise the pH level is Sodium Carbonate. How much to add is basically a trial and error operation, but a general rule of thumb that is good to follow is to add 1/4 pounds of Soda Ash for every 1,000 gallons of water within the system. After adding the Soda Ash, wait for about an hour before re-checking the pH level. Take whatever further action is indicated by the test.

To Lower pH:

The chemical normally added to lower the pH level is called Muriatic Acid, which is actually a dilute form of the more hazardous hydrochloric acid and comes in liquid form. Another acid product is the so-called Dry Acid or Sodium Sulfate, which comes in a granular form. **Acid of any type should always be added directly to the water, NEVER the water to the acid! The amount of acid required is determined by performing an acid demand test with the water test kit.**

Total Alkalinity

Total Alkalinity is the measure of the total amount of alkaline chemicals in the water and **not** the same as pH. pH measures the **strength** of an alkaline (or acid), while alkalinity measures the **amount** of alkali's present. While pH and Total Alkalinity are not the same thing, **Total Alkalinity can have an effect on how fast or easily changes in pH can be accomplished**.

➢ *Controlling Alkalinity*

For our purposes, the **Total Alkalinity should be kept at about 150 ppm**. In general, alkalinity has not been a problem for recycling, providing you are using a **neutral soap**. If you have a drum of water and introduce a scoop of alkaline clearer, you may change the pH and get a reading of 12. That does not mean that if you add a second scoop of cleaner, you will get a different reading - in fact, it will probably be identical. What will change is the Total Alkalinity.

Oxidizers

Hydrogen Peroxide

Hydrogen peroxide is an oxidizer that exhibits outstanding purifying characteristics. It is not affected by the pH level and the only by products after oxidation are oxygen and water. Also, the hydrogen peroxide level does not need to be closely controlled. It can have levels ranging from 1 - 10 ppm. It will significantly reduce the amount of B.O.D. (biological oxygen demand) and C.O.D. (chemical oxygen demand) and will also remove any odors that may be present and increase the clarity of the water.

Ozone

Ozone is another oxidizer that exhibits outstanding purifying characteristics. Ozone is different than hydrogen peroxide in that it is not in a liquid form. Ozone is produced by a unique process developed by ***RGF*** in which a special chamber called the **TurboHydrozone®** uses air as it's agent to produce the ozone. A simple look at the blue indicator light on the chamber assures ozone is being produced. The ozonated air is then bubbled inside of the storage tank or is vacuum dragged into the CO^3P System by the Ozone Venturi, which agitates the water thus oxidizing it, which reduces B.O.D.'s and C.O.D.'s, removes odors, and improves water clarity.

UltraViolet Light

UltraViolet (UV) light is the third oxidizer used by ***RGF*** to complete the catalytic oxidation process (CO^3P). UV light is a sterilizer which kills organics by emitting ultraviolet light inside of the UV Catalytic Chamber. This ultraviolet energy is also used to excite the hydrogen peroxide and the ozone that is already in the water to enhance their individual oxidation potentials.

Cleaning Agents

In discharge systems the use of soaps or chemical additives is not recommended. If one must use detergents or additives they should be neutral pH., quick splitting verity and used sparingly. Cleaning Agents are added to open looped recycling water systems to help remove the oils and road film off of the equipment being cleaned. Cleaning agents contain surfactants which help to relieve the surface tension of the water enabling the oils and particles to detach more readily from the equipment being cleaned. Some cleaning agents however, may cause the oils to emulsify which will not allow for easy removal which in turn may end up back on the equipment. In order to prevent this, the cleaning agents in consideration for use with the system should be formulated with low to moderate foaming and limited oil emulsifying

properties while remaining a neutral pH cleaner. ***RGF*** recommends the following two cleaning agents to be used with your system.

Enviro-Control

RGF has developed a specially formulated soap for closed-looped recycling systems called **Enviro-Control** to use with your system. This soap is a water white blend of biodegradable surfactants containing all of the qualities listed above, plus it helps prevent bacteria and algae growth, inhibit corrosion, it has no dyes, perfumes, or thickeners added, and it helps to flocculate oil accumulation.

Enviro-Control can be purchased in a super concentrated form through your distributor or ***RGF*** at **1-407-848-1826** or **FAX 1-407-848-9454**.

Water Conditioner-1 (WC-1)

Water conditioners are a good addition to a recycling system because they help to maintain good water quality and help in releasing suspended solids. ***RGF*** has available a water conditioner that can do all of this and more, the **Water Conditioner 1 (WC-1)**. This water conditioner has many water quality improving abilities. It aids in the flocculation of suspended solids, reduces B.O.D. and C.O.D. loading, and helps to softens the water. WC-1 also inhibits corrosion on your system, providing more years of service and will help to lower the total suspended solids count, which will improve the color and clarity of your recycled water. Since WC-1 can provide all of these benefits, it should be made a regular part of the chemical additions to your system.

Dissolved and Suspended Solids

Total Dissolved Solids (T.D.S.)

T.D.S. represents the total conductive material actually dissolved in the water (refer to Section 11.0 Addendum's / Training Bulletin - TB 001). It is the same as salt or sugar dissolved in water and should not be confused with suspended solids or turbity. Total dissolved solids can include both organic and inorganic materials. Inorganic materials can be soluble in many cases and add to T.D.S.. Any chemical addition to the water will increase T.D.S. (except hydrogen peroxide). Water treatment chemicals often solve one problem but create another problem. While an addition of a flocking agent may remove suspended solids and turbidity, it may drastically increase T.D.S.

Eventually a solution with increasing T.D.S. will reach a level where it is considered to be saturated (i.e. it has reached it's solubility constant). Saturation is when the addition of a soluble or dissolved solid reaches the maximum ability of the water to hold it in solution at a given temperature. When the T.D.S. level exceeds this level, the material comes out of solution and either settles or forms crystals, which is how rock candy is made.

T.D.S. is measured by a special conductivity meter which works on the principle that "pure" water has no conductivity of electrical current. The addition of material such as T.D.S. increases the electrical conductivity, therefore; the higher the reading, the higher the T.D.S. level. Readings are in microsiemens - a unit of low electrical current.

Total Suspended Solids (T.S.S.)

T.S.S. represents the total amount of fine colloidal particles floating in a liquid, too small to settle out but, kept in motion by Brownian movement (refer to Section 11.0 Addendum's / Training Bulletins - TB 002). Brownian movement is the rapid vibratory motion of particles suspended in a liquid, caused by the bombardment of the particle by the moving molecules of the liquid. The velocity varies inversely with the size of the particles and also depends on the viscosity of the medium. T.S.S., unlike T.D.S. (Total Dissolved Solids), does not dissolve in water and are deemed important because these solids will create unsightly conditions, sludge deposits, and a demand for oxygen. Suspended solids can be organic or inorganic.

The standard way of testing waste water for suspended solids is to filter the waste water through a 0.45 μm (1 micron = 1 millionth of a meter) porosity filter. Anything on the filter paper after drying at a temperature of approximately 103°C is considered a portion of the suspended solids. Another way to measure suspended solids is by a device called a spectrophotometer. This device is used to measure photo metrically, the quantity of light of a particular wavelength (S.S. = 810 nm) that is absorbed by the suspended solids in solution.

Section 7: Engineering Drawings

Outline

System Layout

A recommended layout and stub up locations drawing for the system to adequately accommodate all of the components.

Series I Tank

An engineered diagram of the Series I Tank which indicates all of the inlet and outlet connections and dimensions of the tank, as well as location of major components.

Series II Equipment Skid

An engineered diagram of the Series II Equipment Skid which indicates all of the inlet and outlet connections and dimensions of the skid, as well as location of major components.

Series III Storage Tank

An engineered diagram of the Series III Storage Tank which indicates all of the inlet and outlet connections and dimensions associated with the tank.

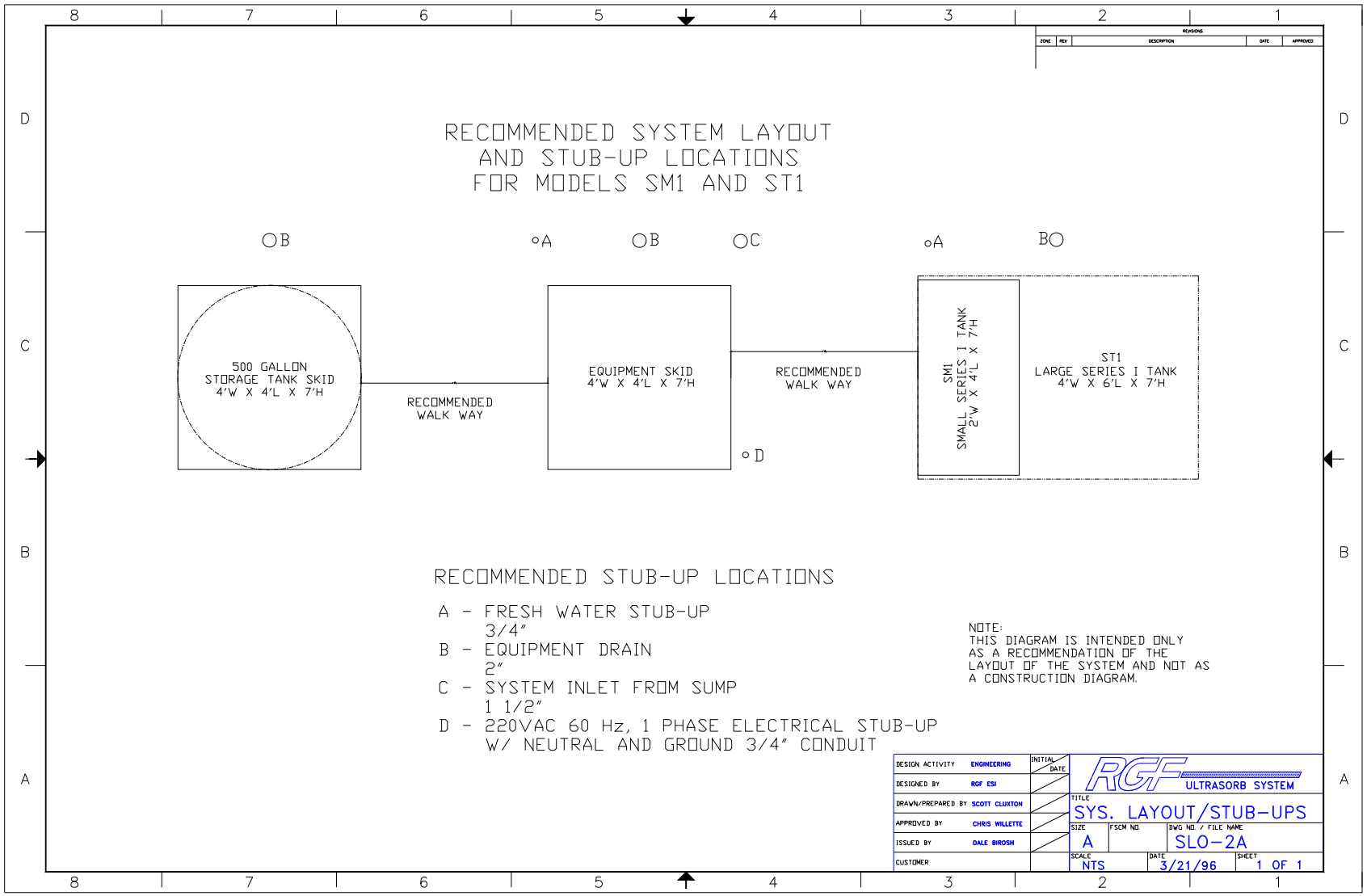
Plumbing & Instrumentation Diagram (P&ID)

An engineered diagram which indicates the flow path of the system outlining placement and nomenclature of valves, pressure gauges and unions.

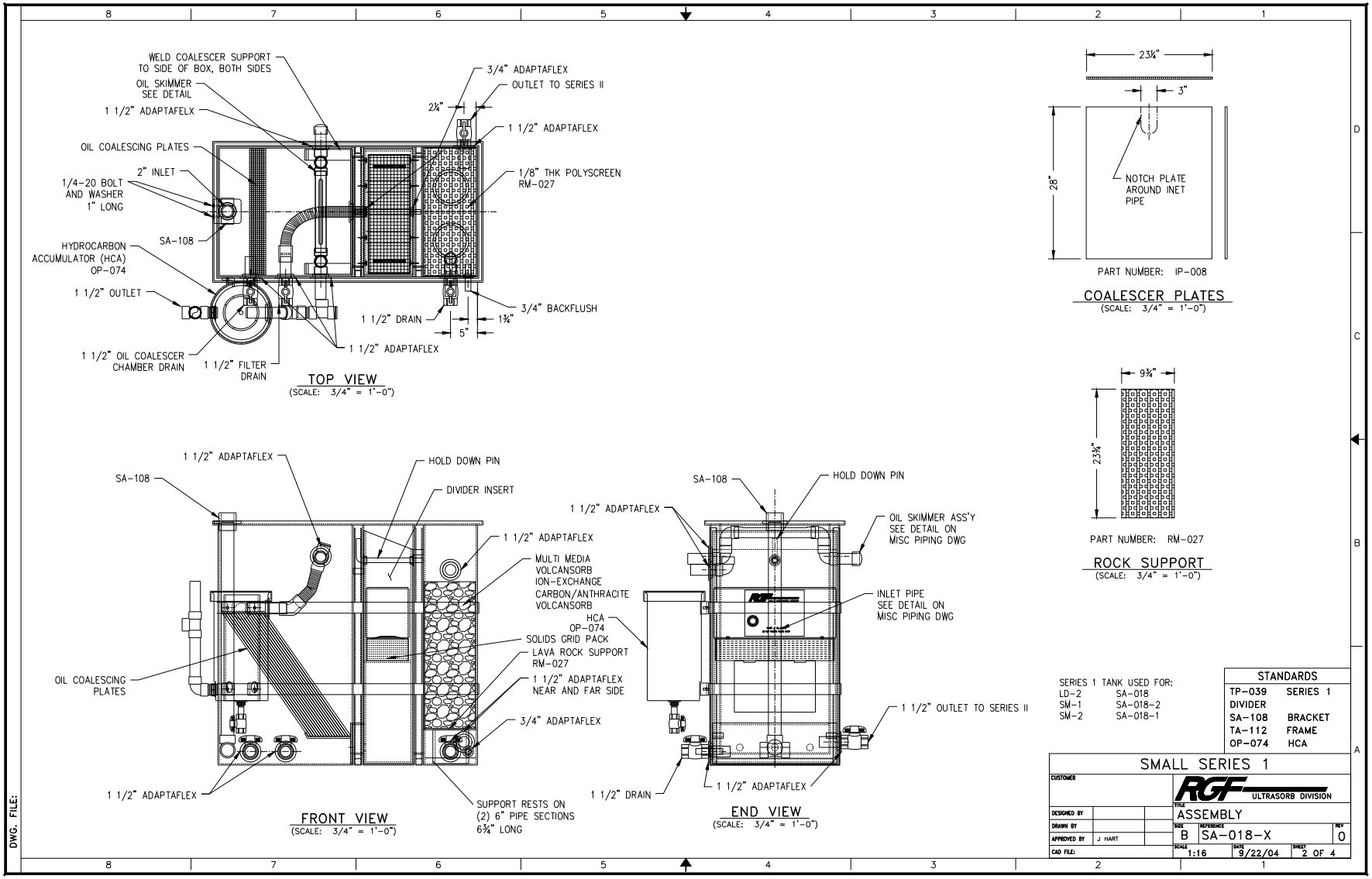
Electrical Diagram

An engineered diagram of the electrical connections and components associated with the system. This diagram is a very useful tool for the electrician when the installation is performed.

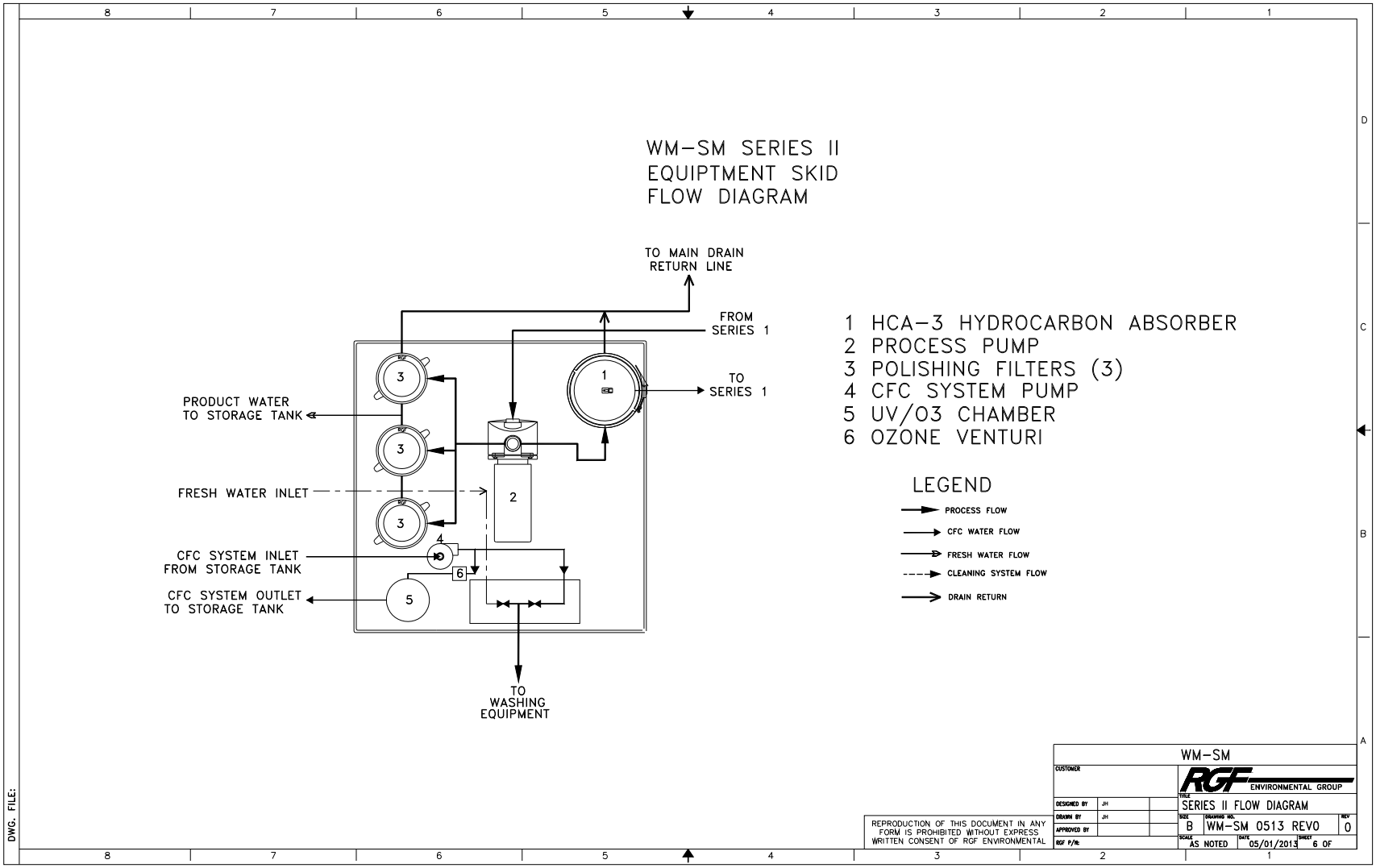
System Layout



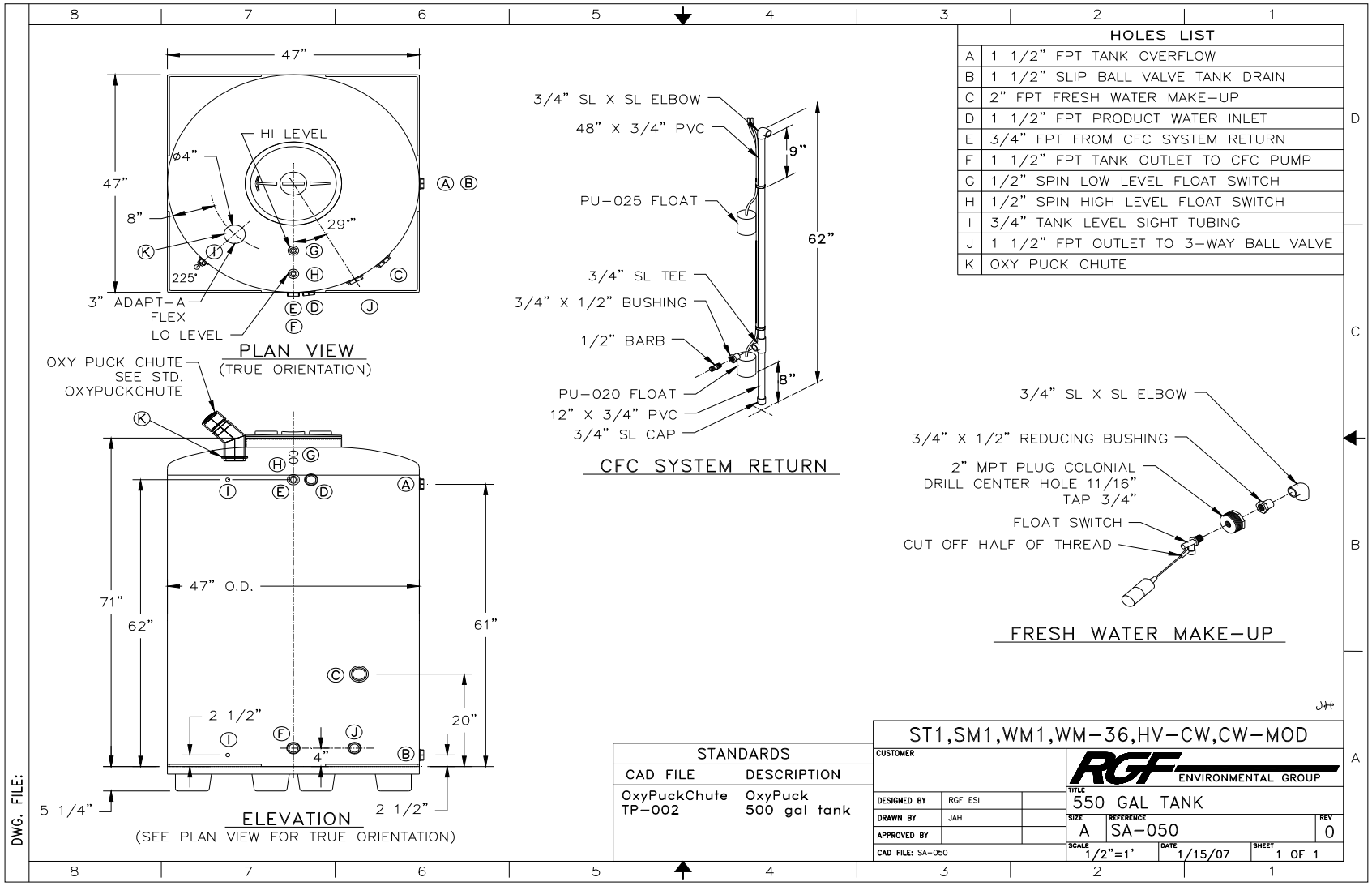
Series I Tank



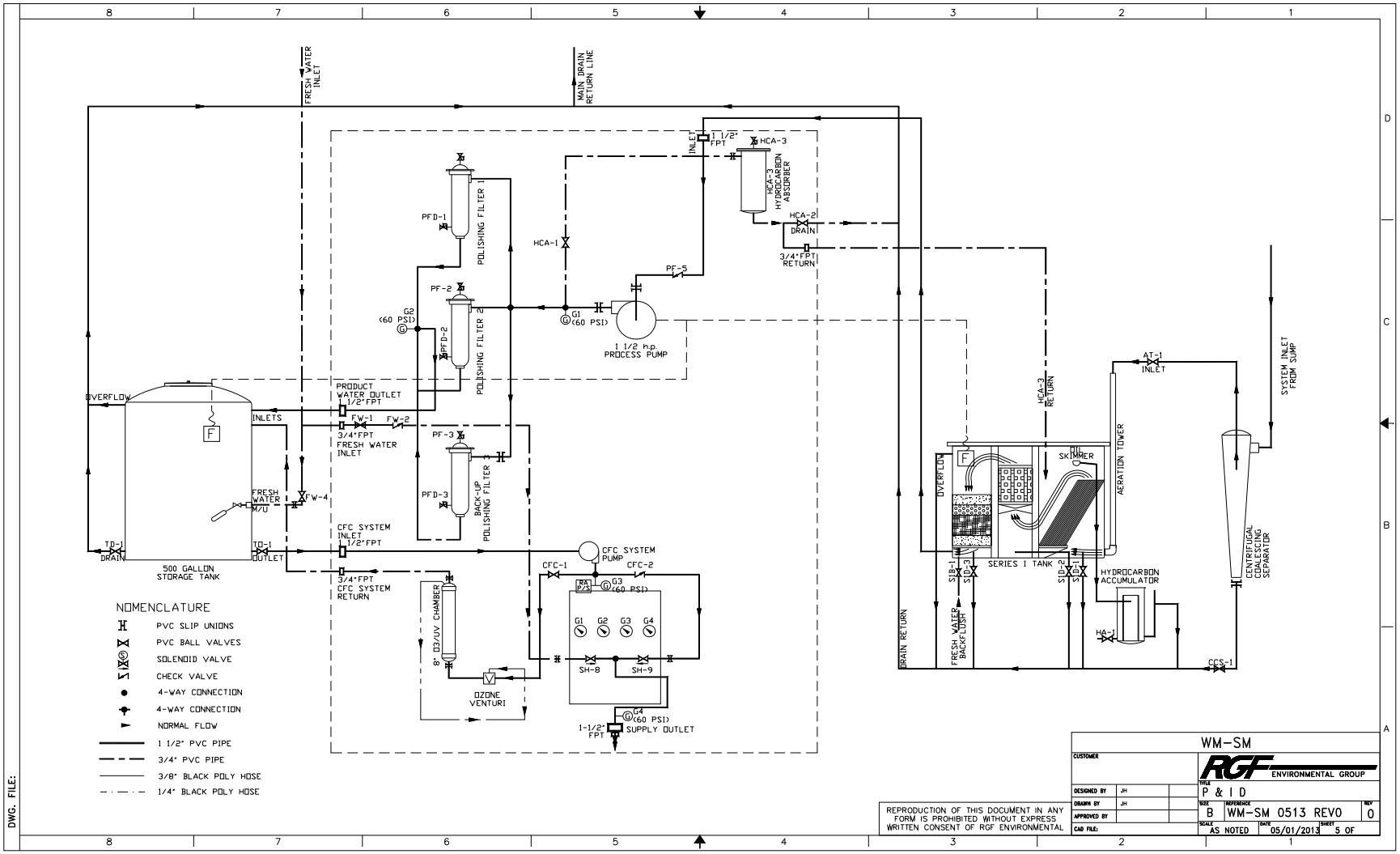
Series II Equipment Skid



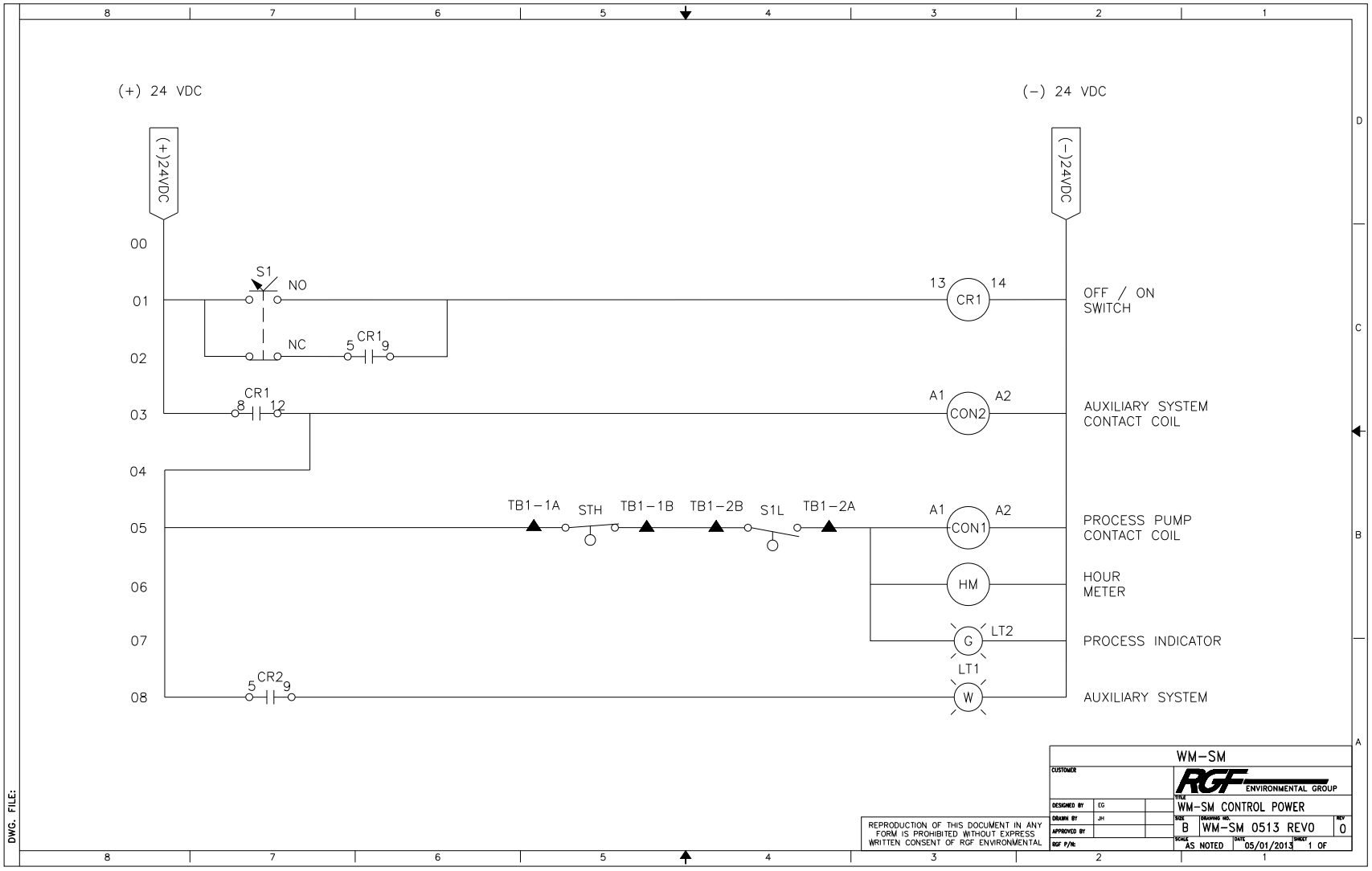
Series III Storage Tank



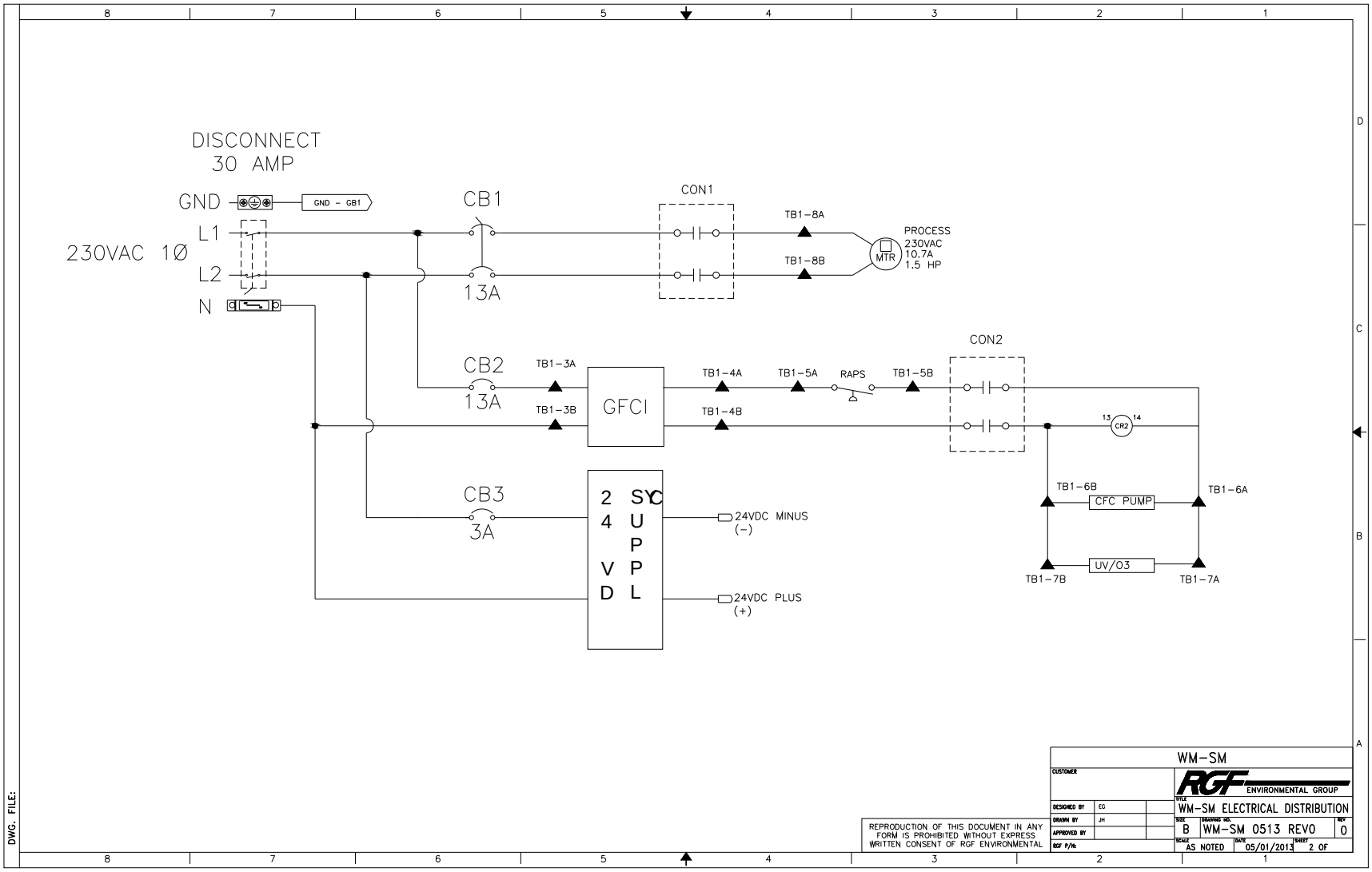
Piping & Instrumentation Diagram



Electrical Diagram



ELECTRICAL DISTRIBUTION



Section 8: Troubleshooting

Flow

SYMPTOM	PROBABLE CAUSE	SOLUTION
PROCESS SYSTEM		
1. PROCESS PUMP NOT OPERATING	A) POWER IS NOT APPLIED TO PUMP	A) VERIFY POWER IS APPLIED; THE PROCESS SYSTEM CONTROL SWITCH IS IN THE PROCESS POSITION AND THE BREAKER IS SHUT. ENSURE FLOAT SWITCHES ARE PROPERLY POSITIONED, UNOBSTRUCTED AND FREE TO SWING AND ADEQUATE WATER IS IN BOTH SUCTION AND DISCHARGE TANKS ENSURE THE PROPER ELECTRICAL CONNECTIONS WERE MADE TO THE SYSTEM. REFER TO THE PROCESS PUMP COMPONENT MANUAL.
	B) PUMP HAS LOST PRIME	B) VERIFY SYSTEM LINEUP. ENSURE UNOBSTRUCTED FLOW TO PUMP SUCTION. REPRIME PUMP ENSURING THAT PUMP CASING IS WATER FILLED. OPEN THE PRIMING PLUG AND RE-PRIME PUMP.
	C) SYSTEM VALVES ARE IMPROPERLY ALIGNED	C) CONDUCT VALVE LINEUP WITH P&ID.
2. NO OR LOW FLOW THROUGH PROCESS SYSTEM	A) POLISH FILTERS ARE CLOGGED WITH PARTICULATE	A) PERFORM A POLISHING FILTER BACK FLUSH IN ACCORDANCE WITH PMS. IF THIS DOES NOT REMEDY PROBLEM THEN FILTERS ARE FOULED AND NEED TO BE REPLACED.

CFC SYSTEM		
1. CFC PUMP NOT OPERATING	A) POWER IS NOT APPLIED TO PUMP	A) VERIFY POWER IS APPLIED; BREAKER IS SHUT. ENSURE THE PROPER ELECTRICAL CONNECTIONS WERE MADE TO THE SYSTEM. REFER TO THE CFC PUMP COMPONENT MANUAL.
	B) PUMP HAS LOST PRIME	B) CHECK WATER LEVEL IN STORAGE TANK. ENSURE UNOBSTRUCTED FLOW TO PUMP SUCTION. REPRIME PUMP ENSURING THAT PUMP CASING IS WATER FILLED. CONDUCT VALVE LINEUP WITH P&ID.
		C) CONDUCT VALVE LINEUP WITH P&ID.
	C) SYSTEM VALVE IS IMPROPERLY ALIGNED	
2. UV/O3 CHAMBER ON HOUSING IS OFF	A) OZONE GENERATOR IS DEFECTIVE	A) CALL YOUR DISTRIBUTOR OR RGF FOR FURTHER TROUBLESHOOTING ADVICE.
3. UV/O3 CHAMBER LEAKS	A) UV BULB RUBBER GROMMET IS IMPROPERLY SEATED.	A) RE-SEAT BULB INTO GROMMET.
	B) UV CHAMBER IS OVER PRESSURIZED	B) ENSURE UNOBSTRUCTED FLOW. CONDUCT VALVE LINEUP WITH P&ID.
	C) INNER CHAMBER GLASS IS CRACKED OR BROKEN.	C) INNER CHAMBER MUST BE REPLACED.
4. CHEMICAL INJECTION PUMP NOT OPERATING CORRECTLY.	A) POWER IS NOT APPLIED TO PUMP	A) CHECK FOR POWER TO THE PUMP.
	B) LOW OR EMPTY CHEMICAL CONTAINER.	B) FILL CHEMICAL CONTAINER WITH APPROPRIATE MIXTURE.
	C) SUCTION AND DISCHARGE HOSES ARE KINKED.	C) CHECK HOSES FOR KINKS. REMOVE PUMP FLEXIBLE HOSE REALIGN AND REPLACE.
	D) PUMP IS NOT RUNNING.	D) CHECK CHEMICAL METERING KNOB FOR SETTING. IF NOT OFF, AND PUMP STILL NOT RUNNING, THEN PUMP IS DEFECTIVE.

Electrical

The Ultrasorb® system should be installed by a licensed Electrician and should have a properly sized overcurrent protection (i.e. circuit breaker) device installed upstream of the device. Electrical Troubleshooting should be conducted by an electrically trained individual after he has carefully reviewed the electrical drawing in Section 8.3. All indications should be considered: LED illumination, pump rotation, and fluid flow.

SYMPTOM	PROBABLE CAUSE	SOLUTION
PROCESS SYSTEM		
1. INDICATOR LIGHTS NOT OPERATING	A) POWER IS NOT APPLIED	A) VERIFY POWER IS APPLIED; THE SYSTEM
	B) LIGHT IS BLOWN OUT	B) CONSULT TECHNICIAN OR REMOVE 4X4 ELECT. BOX FROM REAR OF PANEL AND REPLACE LIGHT.
	C) LOOSE WIRES	C) CHECK ALL WIRE CONNECTIONS WITH MAIN POWER TURNED OFF AND TIGHTEN IF LOOSE.
	D) BAD GROUND	D) OPEN MAIN ELECT. BOX , CHECK GROUND STRIPS FOR LOOSE WIRE THEN TIGHTEN, IF NECESSARY
2. PROCESS SWITCHES NOT OPERATING	A) POWER IS NOT APPLIED	A) VERIFY POWER IS APPLIED; THE SYSTEM CONSULT TECHNICIAN OR REMOVE 4X4 ELECT. BOX FROM REAR OF PANEL AND REPLACE.
	B) LOOSE WIRES	B) CHECK ALL WIRE CONNECTIONS WITH MAIN POWER TURNED OFF AND TIGHTEN IF LOOSE.
	C) BAD GROUND	C) OPEN MAIN ELECT. BOX , CHECK GROUND STRIPS FOR LOOSE WIRE THEN TIGHTEN IF NECESSARY
	D) BLOWN SWITCH	D) REMOVE 4X4 BOX ON REAR OF PANEL AND REPLACE PER ELECT. DIAGRAM.
3. UV/O3 LIGHT NOT OPERATING	A) GFI BLOWN BREAKER	A) OPEN GFI COVER AND PRESS RESET
	B) GFI LOOSE WIRES	B) CHECK ALL WIRE CONNECTIONS WITH MAIN POWER TURNED OFF AND TIGHTEN IF LOOSE.
	C) BURNED OUT BULB	C) CALL RGF OR YOUR DISTRIBUTOR

Chemistry

NOTE:

If repeated attempts to reduce smell or clear up the recycled water fail to improve the water quality, or if the amount of soap needed to clean adequately rise to an unacceptable level. the water has become over burden with dissolved and suspended solids. the system should be drained and the spent water disposed of in accordance with local, state, and federal regulations.

SYMPTOM	PROBABLE CAUSE	SOLUTION
CHEMICAL		
1. EFFLUENT RECYCLED WATER SMELLS	A) HYDROGEN PEROXIDE FEED SYSTEM SOLUTION IS LOW OR EMPTY. B) HYDROGEN PEROXIDE FEED SYSTEM IS NOT WORKING PROPERLY. C) UV/O3 CHAMBER NOT OPERATING.	A) REFILL HYDROGEN PEROXIDE FEED SYSTEM. B) REFER TO THE LMI PUMP OPERATION MANUAL. C) SEE ELECTRICAL: UV/O3 CHAMBER NOT OPERATING.
2. EFFLUENT RECYCLED WATER IS VERY CLOUDY.	A) HYDROGEN PEROXIDE FEED SYSTEM SOLUTION IS LOW OR EMPTY. B) HYDROGEN PEROXIDE FEED SYSTEM IS NOT WORKING PROPERLY. C) UV/O3 CHAMBER NOT OPERATING. D) THE WATER CONDITIONER (WC-1, OPTIONAL) HAS NOT BEEN ADDED OR RESIDUAL LEVEL IS LOW.	A) REFILL HYDROGEN PEROXIDE FEED SYSTEM. B) REFER TO THE LMI PUMP OPERATION MANUAL C) SEE ELECTRICAL: UV/O3 CHAMBER NOT OPERATING. D) INCREASE THE WC-1 INJECTION RATE.

NOTE:

If repeated attempts to reduce smell or clear up the recycled water fail to improve the water quality, or if the amount of soap needed to clean adequately rises to an unacceptable level. the water has become overburden with dissolved and suspended solids. The system should be drained and the spent water disposed of in accordance with local, state and federal regulations.

Section 9: Replacement Parts

General Ordering Information

When preparing to order replacement parts for your system:

- Have the **Model #** and **Serial #** of the unit ready when trying to order.
- Have the ship to address ready.
- Identify the part needed with the part # and description and call *RGF* or your local distributor to place an order.

Replacement Parts List

The following is a list of commonly needed replacement parts.

Filters And Parts

FL-56	SERIES I FILTER MEDIA
FL-01X	HCA-2 HYDROCARBON ABSORBER
FL-003P-X	HCA-3 HYDROCARBON COALESCER
FL-86	5” DIA. POLISHING FILTER (25 M)
FP-51	O-RING FOR POLY FILTER HOUSING

Chemicals

CE-029	OXY PUCKS
EC-1-5	ENVIRO-CONTROL - 55 GALLONS
WC-1-5	WC-1 WATER CONDITIONER - 5 GALLONS

Pumps And Parts

PU-131	1/2 Hp. CFC SYSTEM PUMP
PU-140	1-1/2 Hp. CENTRIFUGAL PROCESS PUMP
PU142	VITON SEAL FOR 1 1/2 Hp., PUMP
PU-32	1/3 Hp. S.S. LIFT STATION SUMP PUMP
PU-20	PUMP UP FLOAT SWITCH (30' CORD)
PU-25	PUMP DOWN FLOAT SWITCH (30' CORD)

Valves And Unions

VA-06-1	3/4" PVC BALL VALVE
VA-06-4	1 1/2" PVC BALL VALVE
VA-37	3/4” SOLENOID VALVE ASSEMBLY (NORMALLY CLOSED)
VA-38	3/4” ELECTRIC SOLENOID COIL ONLY (120 VAC)
VA-XX	1 1/2” SOLENOID COIL ONLY (120 VAC)
VA-22	1/2” BRASS FLOAT VALVE WITH FLOAT
VA-56	1 1/2” SOLENOID VALVE ASSEMBLY (NORMALLY CLOSED)
PF-253	3/4" PVC UNION
PF-256	1 1/2" PVC UNION
VA-51	1/4" FPT X 3/8" TUBE 90 DEG PVC VALVE

Misc. Parts

SA-005T-16	UV/O3 CHAMBER
PT-117	OZONE VENTURI
PT-12	*RGF* GRAY TOUCH-UP PAINT
HF-23	1/4" O.D. POLYETHYLENE TUBING

Section 10: Sub-Component Manuals

GFI Reset

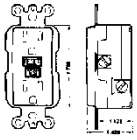
LEVITON

How To Install & Test Your GFCI Outlet

Ground Fault Circuit Interrupter Duplex Receptacle

TO BE INSTALLED AND/OR USED IN ACCORDANCE WITH APPROPRIATE ELECTRICAL CODES AND REGULATIONS

ALL MODELS 125V AC 60Hz ONLY
20A Feed-Through Rating. 15A Outlet Rating
Cat. No. 6498. -I, -W Feed-Through without Indicator Light
Cat. No. 6598. -I, -W with Indicator Light
Cat. No. 6599. -I, -W without Indicator Light
Catalog Number indicates Brown Color, -I Ivory, -W White



GFCI: Standard 943
Class A
Receptacle (Outlet)
Standard 498
UL LISTED

GENERAL CAUTIONS AND WARNINGS - READ THIS FIRST!
Carefully read the instructions appropriate to your needs. IF YOU DO NOT UNDERSTAND ANY PART OF THEM, CONSULT A QUALIFIED ELECTRICIAN.

- Install only on a GROUNDED 120-Volt AC circuit protected by a fuse or circuit-breaker. **EXCEPTION:** Where a grounding means does not exist in the receptacle enclosure, either a non-grounding or ground-fault circuit-interrupter-type receptacle shall be used. [See NEC210-7(d) Exception 1993] In this application, DO NOT connect a grounding conductor from the GFCI to any outlet supplied from the GFCI receptacle.
- Do NOT install to replace a duplex outlet in which the two halves of the duplex are controlled by different fuses or circuit breakers.
- If the circuit you wish to protect is controlled by a double pole circuit breaker or by two fuses, see APPENDIX.
- For testing procedure refer to Step A-10.

WARNING: This device is not to be used directly or indirectly with life support apparatus or associated circuitry.
CAUTION: Do not paint this device, it may not work properly!

WHAT THE GFCI DOES FOR YOU

This device protects you against hazardous electrical shock that may be caused if your body becomes a path through which electricity travels to reach ground. This could happen when you touch an appliance or cord that is 'live' through faulty mechanism, damp or worn insulation, etc. You could be touching plumbing or other material that leads to ground.

When protected by the GFCI you may still feel a shock, but the GFCI should cut it off quickly enough so a person in normal health should not have serious electrical injury (infants and very small children may still be affected.)

WARNING: The GFCI will NOT protect against:

- Line-to-line shocks like the kind gotten by touching metal inserted in both straight slots of an outlet.
- Current overloads or line-to-line short circuits; **the fuse or circuit breaker at the distribution box or panel must provide such protection.**

CAUTION: If the GFCI trips of its own accord this indicates a possible ground fault condition which is potentially hazardous. Investigate the ground fault condition at once by making a thorough check to determine where the ground fault exists in the equipment plugged into your GFCI. Correct the defect at once. Carry out the test procedure as outlined to ensure that your GFCI is operating properly. If the GFCI does not reset this indicates a ground fault still exists and must be corrected.

BEFORE INSTALLATION
CAREFULLY READ THE FOLLOWING:

IMPORTANT: There are three possible options you may choose from to properly install your GFCI.

Read the following three options to determine which set of instructions are appropriate for the option you want.

The GFCI can be wired so that protection against ground faults is provided at its own outlets **ONLY**. (follow instruction A)

The GFCI can be wired so that protection against ground faults are provided to ALL outlets on the same branch circuit, including the GFCI outlets. (Follow Instruction B)

The GFCI can be wired so that protection is provided to SOME outlets on the same branch circuit including the GFCI outlets. (Follow Instruction C)

GROUND FAULT CIRCUIT INTERRUPTER
DUPLEX RECEPTACLE
HOMEOWNERS TEST RECORD

TEST REMINDER

FOR MAXIMUM PROTECTION AGAINST ELECTRICAL SHOCK HAZARD OPERATE TEST SWITCH ON GROUND FAULT CIRCUIT INTERRUPTER AT LEAST ONCE A MONTH.

RECORD DATE

PLACE THIS TEST RECORD IN A CONSPICUOUS PLACE AS A REMINDER TO TEST REGULARLY.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
19												
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SEE TEST PROCEDURE ABOVE

LEVITON

LEVITON MANUFACTURING CO., INC.
59-25 Little Neck Pkwy., Little Neck, NY 11362-2591

TEST PROCEDURE

Like a fire extinguisher or other safety device your GFCI outlet should be checked every month to make sure it is operating properly to protect you. Just follow the simple instructions below and then enter the date of the test on the reverse side of this card.

1. Push black TEST button. Red RESET button should pop out from inner surface. This should result in power being OFF at all outlets protected by the GFCI. Verify by plugging test lamp into every such outlet. If your GFCI has an indicator Light, this light should be ON when circuit is complete. Test with test lamp to determine condition of circuit and proper operation of indicator Light.

CAUTION: If RESET button does not pop out or if test lamp or indicator light remains lit when RESET button **does not** pop out DO NOT USE ANY OUTLETS ON THE CIRCUIT CALL A QUALIFIED ELECTRICIAN.

2. If the GFCI tests okay, restore power by pushing the RESET button back in THE RESET BUTTON MUST BE PUSHED FIRMLY AND FULLY INTO PLACE UNTIL IT LOCKS AND REMAINS DEPRESSED AFTER PRESSURE HAS BEEN REMOVED IF THE GFCI FAILS RESET PROPERLY DO NOT USE — CALL A QUALIFIED ELECTRICIAN. Test lamp and/or Indicator Light should again light.

3. IF GFCI TRIPS BY ITSELF at any time during or after installation reset and perform test procedures 1 and 2 above. IF RESET BUTTON DOES NOT POP OUT WHEN TEST BUTTON IS DEPRESSED, **DO NOT USE GFCI.** CALL A QUALIFIED ELECTRICIAN.

Process Pump

BGT

ITT

Residential Water Systems

Goulds Pumps

GT IRRI-GATOR™ Self-Priming® Centrifugal Pumps – 60 Hz

New base on 1½ – 3 HP models.

GOULDS PUMPS

Goulds Pumps is a brand of ITT Corporation.

www.goulds.com

Engineered for life

FEATURES

① ■ **Self-Priming Design:** Once pump is initially primed, filled with water, it will reprime when the water level rises above the end of the suction pipe.

■ **Serviceable:**
- Back pullout design allows disassembly of pump for service without disturbing piping.
- Two compartment motor for easy access to motor wiring and replaceable components.

■ **Diffuser (Guidevane):** Bolt down diffuser provides positive alignment with impeller. Diffuser has stainless wear ring for extended performance in abrasive conditions. F.D.A. compliant, injection molded, food grade, glass filled Lexan® for durability and abrasion resistance.

■ **Impeller:** F.D.A. compliant, glass filled Noryl®. Corrosion and abrasion resistant.

■ **Corrosion Resistant:** Electro-coat paint process is applied inside and out, then baked on.

■ **Casing:** Cast iron construction. Four (4) bolt, back pull-out design. Tapped openings provided for vacuum gauge and casing drain.

■ **Powered for Continuous Operation:** Pump ratings are within the motor manufacturer's recommended working limits. Can be operated continuously without damage.

■ **Mechanical Seal:** Carbon/ceramic faces, BUNA elastomers. 300 series stainless steel metal parts. Pump design prevents the seal from running dry.

Goulds Pumps

GT Irri-Gator Self-Priming Centrifugal Pumps

APPLICATIONS

Specifically designed for the following uses:

- Lawn sprinkling
- Irrigation
- Air conditioning systems
- Heat pumps
- Water transfer
- Dewatering

SPECIFICATIONS

Pump:

- Pipe connections: 1½" NPT suction 1½" NPT discharge
- Capacities: to 110 GPM at 5 foot suction lift.
- Heads: to 128 feet.
- Reprime capabilities: to 25 feet suction lift.
- Maximum working pressure: 125 PSIG.
- Maximum water temperature: 140° F (60° C).
- Rotation: clockwise when viewed from motor end.

Motor:

- NEMA standard open drip proof.
- 60 Hz, 3500 RPM.
- Stainless steel shaft.
- Single phase: ¾–1½ HP, 115/230 V; 2 and 3 HP, 230 V only. Built-in overload with automatic reset.
- Three phase: 230/460 V. Overload protection must be provided in starter unit. Starter and heaters (3) must be ordered separately.
- Optional TEFC motors are available. See price book for order numbers.

AGENCY LISTINGS

Canadian Standards Association

Underwriters Laboratories

Goulds Pumps is ISO 9001 Registered.

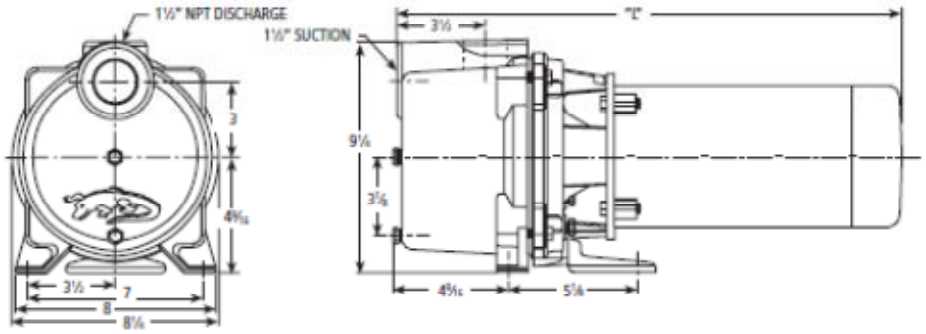
STANDARD ODP MODELS

Model	HP	Phase
GT07	⅞	1
GT10	1	
GT15	1½	
GT20	2	
GT30	3	
GT073	⅞	3
GT103	1	
GT153	1½	
GT203	2	
GT303	3	

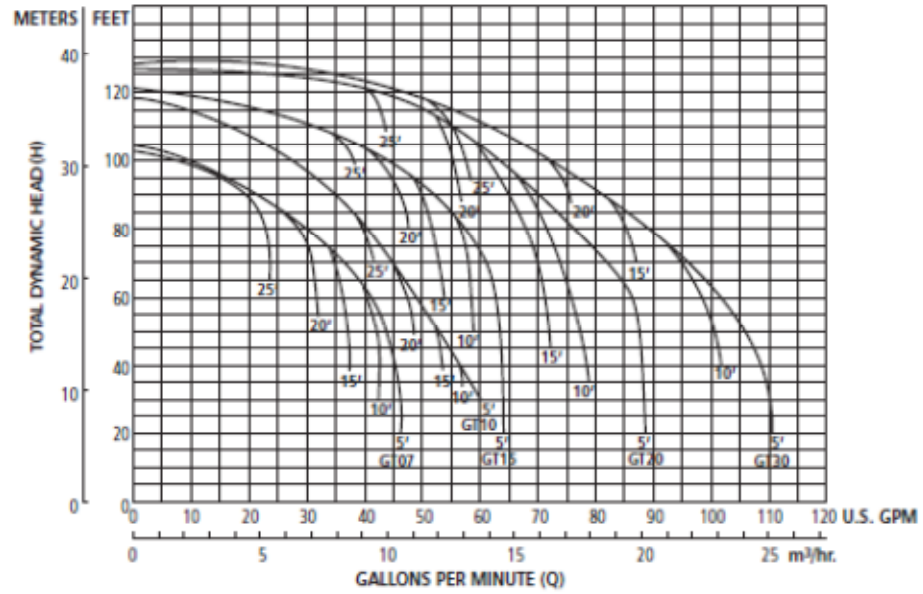
DIMENSIONS AND WEIGHTS

Model	GT07	GT10	GT15	GT20	GT30	GT073	GT103	GT153	GT203	GT303
HP	⅞	1	1½	2	3	⅞	1	1½	2	3
Length "L"	19 9/16	19 7/8	21 3/16	20 5/8	21 11/32	19	19 1/4	20 1/8	20 15/16	21 3/16
Width	8 1/4									
Height	9 3/4									
Weight (lbs.)	48	52	60	65	76	49	52	55	69	71
Phase	Single					Three				

(All dimensions are in inches and weights in lbs. Do not use for construction purposes.)



PERFORMANCE CURVE



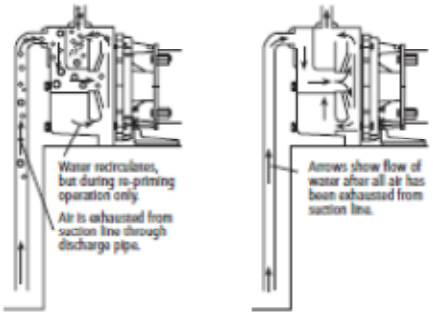
Single and three phase have same performance.

PERFORMANCE RATINGS

Model	PSI Discharge Pressure	Suction Lift In Feet				
		5	10	15	20	25
GT07/ GT073	20	44	41	36	31	24
	30	34	31	26	22	14
	40	10	4	0	0	0
GT10/ GT103	20	53	51	49	46	41
	30	43	41	38	36	32
	40	29	22	16	8	0
GT15/ GT153	20	63	59	54	49	39
	30	60	55	51	46	37
	40	45	38	33	20	14
GT20/ GT203	20	86	77	70	59	46
	30	80	72	67	57	44
	40	65	60	57	50	43
GT30/ GT303	20	105	100	88	76	60
	30	92	90	84	75	57
	40	73	67	62	55	50

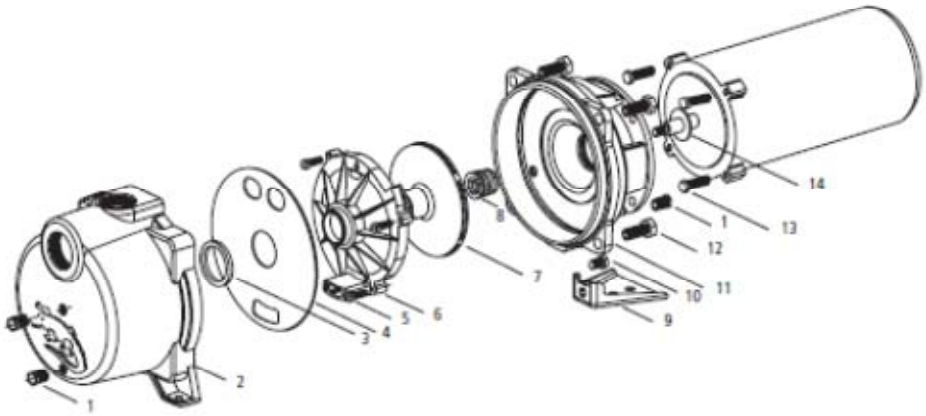
Performance ratings are in GPM.

SELF-PRIMING (AFTER INITIAL PRIME)①



COMPONENTS

Item No.	Description
1	Plug – ¼" NPT
2	Casing
3	Seal ring – diffuser
4	Diaphragm
5	Machine screw
6	Diffuser
7	Impeller
8	Mechanical seal
9	Foot
10	Bolt – foot to adapter
11	Motor adapter
12	Bolt – casing to adapter
13	Bolt – adapter to motor
14	Deflector



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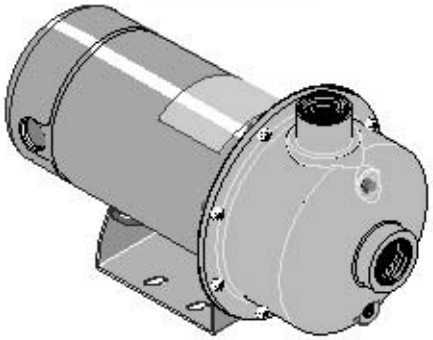
OWNER'S MANUAL

INSTALLATION AND OPERATING INSTRUCTIONS
REPAIR PARTS LIST

"SSCX" AND "SSCXS" SERIES CENTRIFUGAL PUMP

High Head



MODELS

HP	Model Number	ODP MOTORS 115/230/60/1	ODP MOTORS 208-230/460/60/3	TEFC MOTORS 115/230/60/1	TEFC MOTORS 208-230/460/60/3
1/2	SS1XN-½	B78635	B78636	B78647	B78648
3/4	SS1XN-¾	B78637	B78638	B78649	B78650
3/4	SS1XS-¾	B82411	B82412	B82413	B82414
1	SS1XN-1	B78639	B78640	B78651	B78652
1	SS1XS-1	B82415	B82416	B82417	B82418
1-1/2	SS1XN-1½	B78641	B78642	B78653	B78654
1-1/2	SS1XS-1½	B82419	B82420	B82421	B82422
2	SS1½XN-2	B78643*	B78644	B78655*	B78656
2	SS1XS-2	B82423*	B82424	B82425	B82426
2-1/2	SS1½XN-2½	B78645*	B78646	B78657*	B78658
2-1/2	SS1XS-2½	B82427*	B82428	B82429*	B82430

* 230 Volt only.

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BE495 (Rev. 1/6/04)

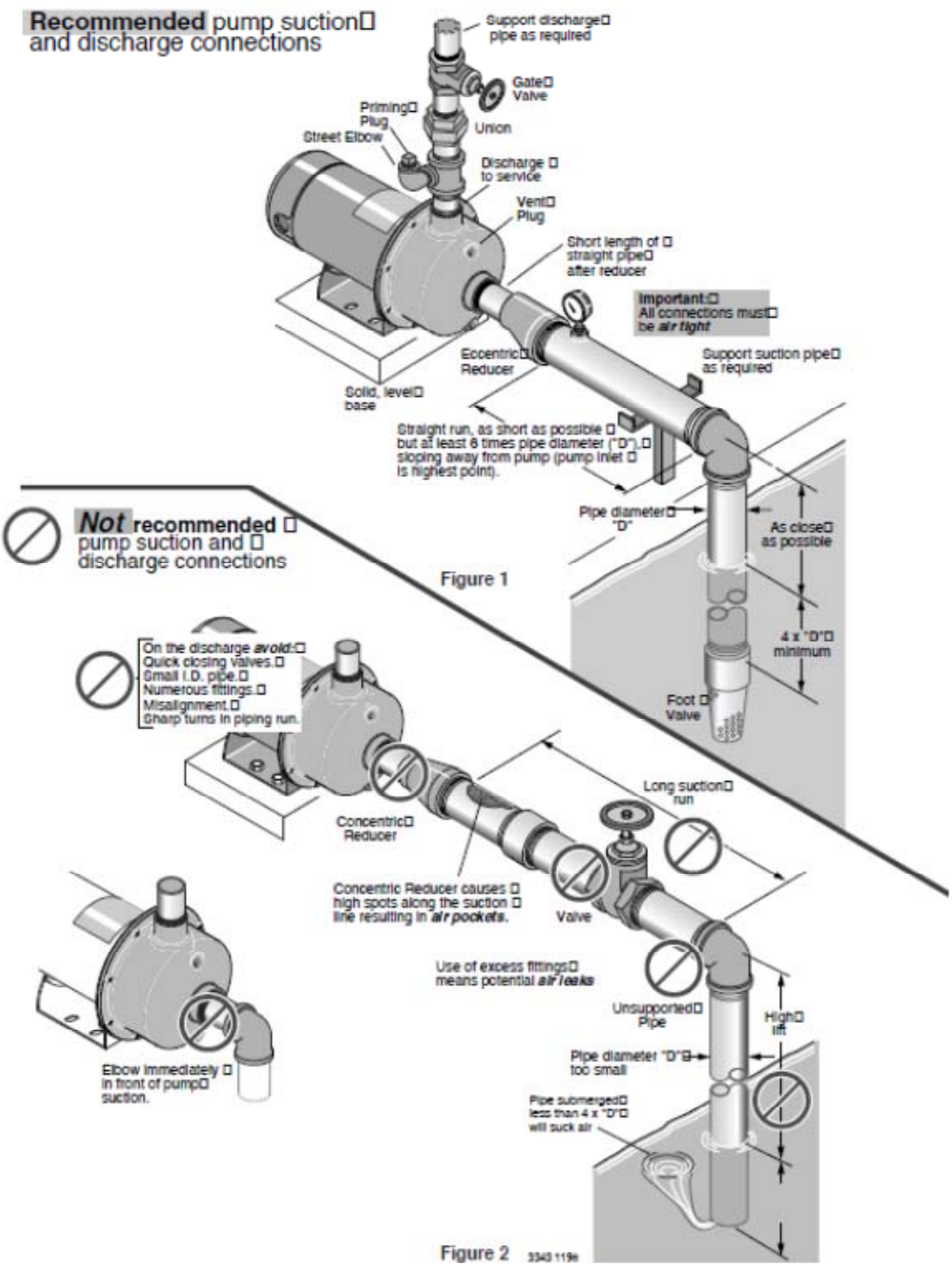


Figure 1

Figure 2 3343 119R

PIPING - GENERAL

Support both suction and discharge piping independently at a point near the pump to avoid putting a strain on the pump housing. Start all piping **AT THE PUMP.**

Increase pipe diameter at both the suction and discharge by one (1) standard pipe size (minimum) to obtain desired performance and flow rate. Refer to Table I when sizing pipe for your pumping system.

NOTE: Do not use pipe with **smaller** diameter on the suction side of pump.

TABLE I

Pipe Tapping Size On Pump		Recommended Pipe Size	
Suction	Discharge	Suction	Discharge
1-1/4	1	1-1/2	1-1/4
1-1/2	1-1/4	2	1-1/2

SUCTION PIPE

Increase pipe size from pump tapping as shown in Table I.

Figure 1 (Page 2) depicts a recommended run of pipe and fittings for the suction side of a centrifugal pump. Please refer to this illustration when choosing pipe and fittings for your suction connection.

IMPORTANT: All connections must be air tight!

Figure 2 (Page 2) depicts conditions that are **NOT DESIRABLE** on the suction side of a centrifugal pump and may cause problems in flow rate and priming. Please look this illustration over carefully before choosing pipe and fittings for your suction connection.

DISCHARGE PIPING

Increase pipe size from pump tapping as show in Table I. Figure 1 (Page 2) depicts a recommended run of pipe and fittings for the discharge. Install tee with priming plug as close to pump as possible. Figure 2 (Page 2) notes conditions that should be avoided. Please read over carefully before making discharge connection.

PRIMING THE PUMP

A pump is primed when all air in the suction line and pump volute has been evacuated and replaced with water.

To Prime:

1. Close valve in discharge line.
2. Remove priming plug from tee and fill pump and suction line with water until water is flowing back out of tee.
3. Replace priming plug.
4. Start pump and slowly open valve until desired water flow is achieved.
   NOTE: If no water is pumped after 5 minutes, turn off pump, close valve, and repeat steps 1 thru 4.

⚠WARNING **Risk of explosion and scalding**. Never run pump against closed discharge. To do so can boil water inside pump, causing hazardous pressure buildup and possible explosion.

⚠ CAUTION **Risk of flooding**. Do not run the pump dry. This will damage mechanical seal and void warranty. It may cause burns to person handling pump.

⚠ CAUTION **Motor normally operates at high temperature and will be too hot to touch.** It is protected from heat damage during operation by an automatic internal cutoff switch. Before handling pump or motor, stop motor and allow it to cool for 20 minutes.

TABLE II - RECOMMENDED FUSING AND WIRING DATA - 60/50 CYCLE MOTORS

MODEL	MOTOR HP	VOLTAGE	MAX. LOAD AMPERES	BRANCH FUSE* RATING AMPS	DISTANCE IN FEET FROM MOTOR TO METER				
					0' TO 100'	101' TO 200'	201' TO 300'	301' TO 400'	401' TO 500'
					WIRE SIZE				
SINGLE PHASE - ODP MOTORS									
SS1XN-½	1/2	115/230/1	8.8/4.4	15/15	14/14	12/14	10/14	8/14	8/12
SS1XN-¾	3/4	115/230/1	12.4/6.2	20/15	12/14	10/14	8/14	6/12	6/12
SS1XS-¾	3/4	115/230/1	14.8/7.4	20/15	12/14	8/14	6/14	6/12	4/10
SS1XN-1	1	115/230/1	14.8/7.4	20/15	12/14	8/14	6/14	6/12	4/10
SS1XS-1	1	115/230/1	19.2/9.6	25/15	10/14	8/14	6/12	4/10	4/10
SS1XN-1½	1-1/2	115/230/1	19.2/9.6	25/15	10/14	8/14	6/12	4/10	4/10
SS1XS-1½	1-1/2	115/230/1	24.0/12.0	30/15	10/14	6/12	6/12	4/10	3/8
SS1½XN-2	2	115/230/1	24.0/12.0	30/15	10/14	6/12	6/12	4/10	3/8
SS1XS-2	2	115/230/1	26.0/13.0	35/20	8/12	6/12	4/10	4/10	3/8
SS1½XN-2½	2-1/2	115/230/1	26.0/13.0	35/20	8/12	6/12	4/10	4/10	3/8
SS1XS-2½	2-1/2	115/230/1	26.0/13.0	35/20	8/12	6/12	4/10	4/10	3/8
SINGLE PHASE - TEFC MOTORS									
SS1XN-½	1/2	115/230/1	8.2/4.1	15/15	14/14	12/14	10/14	8/14	8/12
SS1XN-¾	3/4	115/230/1	11.6/5.8	20/15	14/14	10/14	8/14	6/14	6/12
SS1XS-¾	3/4	115/230/1	14.2/17.1	20/15	12/14	12/14	10/14	8/12	8/10
SS1XN-1	1	115/230/1	14.2/17.1	20/15	12/14	12/14	10/14	8/12	8/10
SS1XS-1	1	115/230/1	16.0/9.0	25/15	10/14	8/14	6/12	4/10	4/10
SS1XN-1½	1-1/2	115/230/1	16.0/9.0	25/15	10/14	8/14	6/12	4/10	4/10
SS1XS-1½	1-1/2	115/230/1	11.7	15	14	14	12	10	10
SS1½XN-2	2	230/1	11.7	15	14	14	12	10	10
SS1XS-2	2	230/1	11.7	15	14	14	12	10	10
SS1½XN-2½	2-1/2	230/1	11.7	15	14	14	12	10	10
SS1XS-2½	2-1/2	230/1	11.7	15	14	14	12	10	10
THREE PHASE - ODP MOTORS									
SS1XN-½	1/2	230/460/3	2.3/1.15	15	14/14	14/14	14/14	14/14	14/14
SS1XN-¾	3/4	230/460/3	3.1/1.55	15	14/14	14/14	14/14	14/14	14/14
SS1XS-¾	3/4	230/460/3	3.6/1.8	15	14/14	14/14	14/14	14/14	14/14
SS1XN-1	1	230/460/3	3.6/1.8	15	14/14	14/14	14/14	14/14	14/14
SS1XS-1	1	230/460/3	4.7/2.35	15	14/14	14/14	14/14	14/14	14/14
SS1XN-1½	1-1/2	230/460/3	4.7/2.35	15	14/14	14/14	14/14	14/14	14/14
SS1XS-1½	1-1/2	230/460/3	6.8/2.4	15	14/14	14/14	14/14	12/14	12/14
SS1½XN-2	2	230/460/3	6.8/2.4	15	14/14	14/14	14/14	12/14	12/14
SS1XS-2	2	230/460/3	8.5/4.25	15	14/14	14/14	14/14	12/14	12/14
SS1½XN-2½	2-1/2	230/460/3	8.5/4.25	15	14/14	14/14	14/14	12/14	12/14
SS1XS-2½	2-1/2	230/460/3	8.5/4.25	15	14/14	14/14	14/14	12/14	12/14
THREE PHASE - TEFC MOTORS									
SS1XN-½	1/2	208-230/460/3	2.2/1.1	15	14/14	14/14	14/14	14/14	14/14
SS1XN-¾	3/4	208-230/460/3	2.9/1.45	15	14/14	14/14	14/14	14/14	14/14
SS1XS-¾	3/4	208-230/460/3	3.6/6.8	15	14/14	14/14	14/14	14/14	14/14
SS1XN-1	1	208-230/460/3	3.6/6.8	15	14/14	14/14	14/14	14/14	14/14
SS1XS-1	1	208-230/460/3	4.8/2.4	15	14/14	14/14	14/14	14/14	14/14
SS1XN-1½	1-1/2	208-230/460/3	4.8/2.4	15	14/14	14/14	14/14	14/14	14/14
SS1XS-1½	1-1/2	208-230/460/3	6.0/3.0	15	14/14	14/14	14/14	14/14	12/14
SS1½XN-2	2	208-230/460/3	6.0/3.0	15	14/14	14/14	14/14	14/14	12/14
SS1XS-2	2	208-230/460/3	7.0/3.5	15	14/14	14/14	14/14	12/14	12/14
SS1½XN-2½	2-1/2	208-230/460/3	7.0/3.5	15	14/14	14/14	14/14	12/14	12/14
SS1XS-2½	2-1/2	208-230/460/3	7.0/3.5	15	14/14	14/14	14/14	12/14	12/14

*A Fusetron is recommended instead of a fuse in any motor circuit.

ELECTRICAL

Connection diagram for dual voltage, single-phase motors. Your dual-voltage motor's terminal board (under the motor end cover) will match one of the diagrams below. Follow that diagram if necessary to convert motor to 115 Volt power. Connect power supply wires to L1 and L2.

For 3-phase motors, TEFC motors, and motors that do not match these pictures, follow the connection diagram on the motor nameplate, or in the connection box.

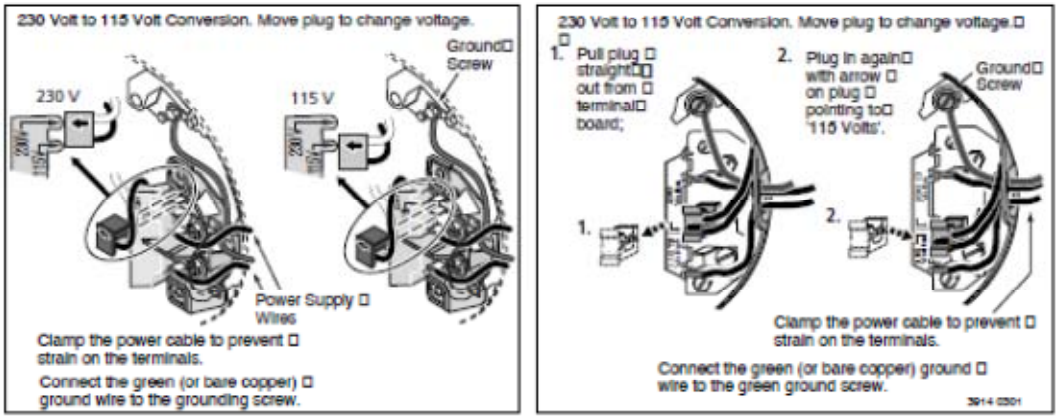


FIGURE 3 – 115/230V Dual Voltage Single Phase Wiring Diagram – ODP Motors

⚠WARNING Hazardous voltage. Can shock, burn, or cause death. Disconnect power to motor before working on pump or motor. Ground motor before connecting to power supply.

WIRING

⚠ **Ground motor before connecting to electrical power supply. Failure to ground motor can cause severe or fatal electrical shock hazard.**

⚠ **Do not ground to a gas supply line.**

⚠ **To avoid dangerous or fatal electrical shock, turn OFF power to motor before working on electrical connections.**

⚠ **Supply voltage must be within ±10% of nameplate voltage. Incorrect voltage can cause fire or damage motor and voids warranty. If in doubt consult a licensed electrician.**

⚠ **Use wire size specified in Wiring Chart (Page 3). If possible, connect pump to a separate branch circuit with no other appliances on it.**

⚠ **Wire motor according to diagram on motor nameplate. If nameplate diagram differs from diagrams above, follow nameplate diagram.**

1. Install, ground, wire and maintain your pump in compliance with the National Electrical Code (NEC) in the U.S., or the Canadian Electrical Code (CEC), as applicable, and with all local codes and ordinances that apply. Consult your local building inspector for code information.
2. Provide a correctly fused disconnect switch for protection while working on motor. For switch requirements, consult your local building inspector for information about codes.
3. Disconnect power before servicing motor or pump. If the disconnect switch is out of sight of pump, lock it open and tag it to prevent unexpected power application.
4. Ground the pump permanently using a wire of the same size as that specified in wiring chart (Page 3). Make ground connection to green grounding terminal under motor canopy marked GRD. or ⏚.
5. Connect ground wire to a grounded lead in the service panel or to a metal underground water pipe or well casing at least 10 feet long. Do not connect to plastic pipe or insulated fittings.
6. Protect current carrying and grounding conductors from cuts, grease, heat, oil, and chemicals.
7. Connect current carrying conductors to terminals L1 and L2 under motor canopy. When replacing motor, check wiring diagram on motor nameplate against Figure 3. If the motor wiring diagram does not match either diagram in Figure 3, follow the diagram on the motor.

IMPORTANT: 115/230 Volt single phase models are shipped from factory with motor wired for 230 volts. If power supply is 115 volts, remove motor canopy and reconnect motor as shown in Figure 3. Do not try to run motor as received on 115 volt current.

8. Motor has automatic internal thermal overload protection. If motor has stopped for unknown reasons, thermal overload may restart it unexpectedly, which could cause injury or property damage. Disconnect power before servicing motor.
9. If this procedure or the wiring diagrams are confusing, consult a licensed electrician.

SERVICE

PUMP SERVICE

This centrifugal pump requires little or no service other than reasonable care and periodic cleaning. Occasionally, however, a shaft seal may become damaged and must be replaced. The procedure as outlined below will enable you to replace the seal.

NOTICE: Pumps use mechanical seals with a rubber seat ring or a sealing O-Ring. THESE SEALS ARE COMPLETELY INTERCHANGEABLE.

NOTICE: The highly polished and lapped faces of this seal are easily damaged. Read instructions and handle the seal with care. Some models are equipped with an impeller screw, which has a left hand thread. Before unscrewing the impeller, remove the impeller screw.

REMOVAL OF OLD SEAL

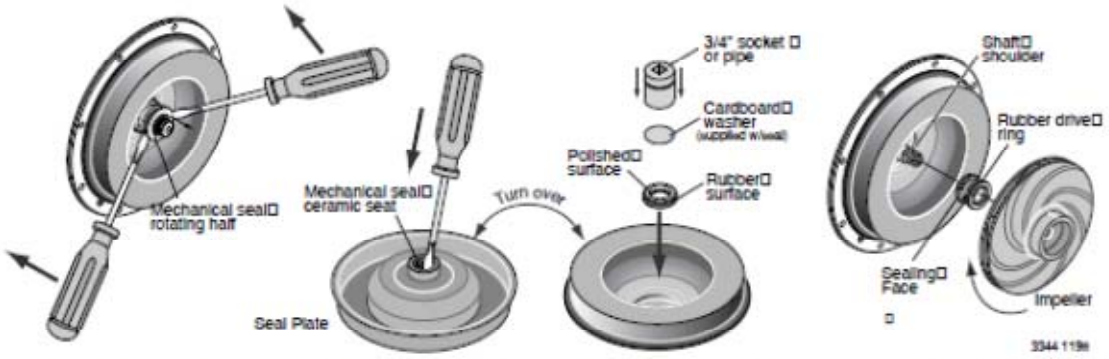
1. After unscrewing impeller, carefully remove rotating part of seal by prying up on sealing washer, using two screwdrivers (see Figure 4A). Use care not to scratch motor shaft.
2. Remove seal plate from motor and place on flat surface, face down. Use a screwdriver to push ceramic seat out from seal cavity (see Figure 4B).

INSTALLATION OF FLOATING SEAT (Figure 4C)

1. Clean polished surface of floating seat with clean cloth.
2. Turn seal plate over so seal cavity is up, clean cavity thoroughly.
3. Lubricate outside rubber surface of ceramic seat with soapy water and press firmly into seal cavity with finger pressure. If seat will not locate properly in this manner, place cardboard washer over polished face of seat and press into seal cavity using a 3/4" socket or 3/4" piece of standard pipe.
4. **DISPOSE OF CARDBOARD WASHER.** Be sure polished surface of seat is free of dirt and has not been damaged by insertion. Remove excess soapy water.

INSTALLATION OF ROTATING PART OF SEAL UNIT (Figure 4D)

1. Reinstall seal plate using extreme caution not to hit ceramic portion of seal on motor shaft.
2. Inspect shaft to make sure that it is clean.
3. Clean face of sealing washer with clean cloth.
4. Lubricate inside diameter and outer face of rubber drive ring with soapy water and slide assembly on motor shaft (sealing face first) until rubber drive ring hits shaft shoulder.
5. Screw impeller onto shaft until impeller hub hits shaft shoulder. This will automatically locate seal in place and move the sealing washer face up against seat facing. Reinstall impeller screw (if used).



A-Seal removal-rotating half B-Seal removal-ceramic seat C-Ceramic seat installation D-Rotating half installation

FIGURE 4: Seal replacement

TROUBLE - CAUSES AND REMEDY

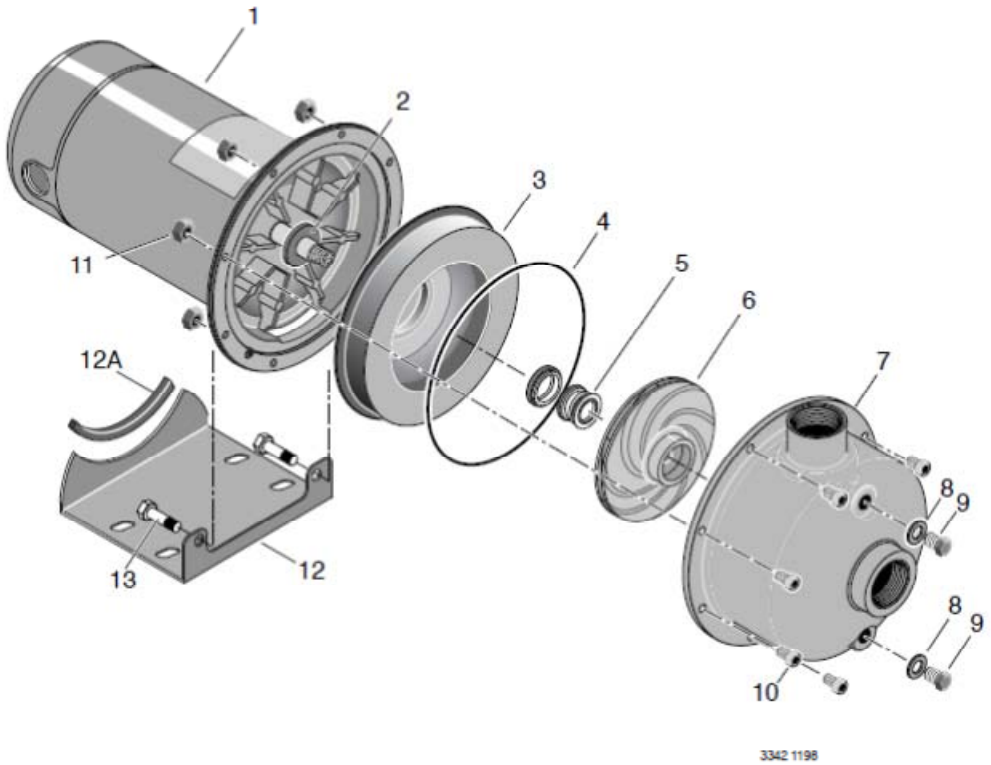
TROUBLE AND CAUSE	REMEDY
FAILURE TO PUMP	
1. Pump not properly primed.	1. Make sure pump casing and suction line are full of water. See priming instructions.
REDUCED CAPACITY AND/OR HEAD	
1. Air pockets or leaks in suction line.	1. Check suction piping.
2. Clogged impeller.	2. Remove and clean.
PUMP LOSES PRIME	
1. Air leaks in suction line.	1. Check suction piping
2. Excessive suction lift and operating too near shut-off point.	2. Move pump nearer to water level.
3. Water level drops while pumping, uncovering suction piping.	3. Check water supply. Add length of pipe to suction to keep submerged end under water.
MECHANICAL TROUBLES AND NOISE	
1. Bent shaft and/or damaged bearings.	1. Take motor to authorized motor repair shop.
2. Suction and/or discharge piping not properly supported and anchored.	2. See that all piping is supported to relieve strain on pump assembly.

REPAIR PARTS LIST

Key No.	Part Description	No. Used	MOTOR AND HORSEPOWER					
			SS1XN-¾	SS1XN-¾	SS1XN-1	SS1XN-1½	SS1½XN-2	SS1½XN-2½
			B78635 B78647 B78636 B78648 1/2 HP	B78637 B78649 B78638 B78650 3/4 HP	B78639 B78651 B78640 B78652 1 HP	B78641 B78653 B78642 B78654 1-1/2 HP	B78643 B78655 B78644 B78656 2 HP	B78645 B78646 B78657 B78658 B80427† B80428†† B80429† B80430†† 2-1/2 HP
1*	Motor, 115/230V/60 Hz., 1 Phase, ODP	1	B80440	B80441	B80442	B80443	B80444	B80445
1*	Motor, 115/230V/60 Hz., 1 Phase, TEFC	1	B80452	B80453	B80454	B80455	B80456	B80457
1*	Motor, 208-230/460V/60 Hz., 3 Phase, ODP	1	B80446	B80447	B80448	B80449	B80450	B80451
1*	Motor, 230/460V/60 Hz., 3 Phase, TEFC	1	B80458	B80459	B80460	B80461	B80462	B80463
2	Water Slinger	1	17351-0009	17351-0009	17351-0009	17351-0009	17351-0009	17351-0009
3	Seal Plate	1	C3-200SS	C3-200SS	C3-200SS	C3-200SS	C3-200SS	C3-200SS
4	O-Ring**	1	111P0490	111P0490	111P0490	111P0490	111P0490	111P0490
5	Shaft Seal***	1	U109-6A	U109-6A	U109-6A	U109-6A	U109-6A	U109-6A
6	Impeller - 1 Phase	1	C105-92PNS	C105-92PMS	C105-92PLS	C105-92PBSS	C105-214PCASS	C105-214PASS
6	Impeller - 3 Phase	1	C105-92PNSA	C105-92PMSA	C105-92PLSA	C105-92PBSSA	C105-214PCASS	C105-214PASS
-	Impeller Screw - 1 Phase	1	–	–	–	–	C30-14SS	C30-14SS
-	Impeller Screw - 3 Phase	1	C30-14SS	C30-14SS	C30-14SS	C30-14SS	C30-14SS	C30-14SS
7	Casing/Diffuser Assembly	1	723S2990	723S2990	723S2990	723S2990	C101-286SS	C101-286SS
8	Washer	2	111P0990	111P0990	111P0990	111P0990	111P0990	111P0990
9	Stainless Steel Plug	2	121P2100	121P2100	121P2100	121P2100	121P2100	121P2100
10	Screw	8	121P0310	121P0310	121P0310	121P0310	121P0310	121P0310
11	Nut, M6x1	8	U36-207SS	U36-207SS	U36-207SS	U36-207SS	U36-207SS	U36-207SS
12	Base	1	J104-9F	J104-9F	J104-9F	J104-9F	J104-9F	J104-9F
12	Base (1 Phase, TEFC only)	1	J104-9A	J104-9A	J104-9A	J104-9A	J104-9A	J104-9A
12A	Motor Pad	1	C35-5	C35-5	C35-5	C35-5	C35-5	C35-5
13	Capscrews, 3/8-16x3/4"	2	U30-72SS	U30-72SS	U30-72SS	U30-72SS	U30-72SS	U30-72SS

* For repair or service to motors, always give the motor Model Number and any other data found on the Motor Model Plate.
** Models B80427, B80428, B80429 and B80430 use Part Number U9-434.
*** Models B80427 and B80428 use Shaft Seal Number U109-432SS.
Models B80429 and B80430 use Shaft Seal Number U9-437.
† These models use Motor Number B80445.
†† These models use Motor Number B80451.
- Not illustrated.

SSCXS Series

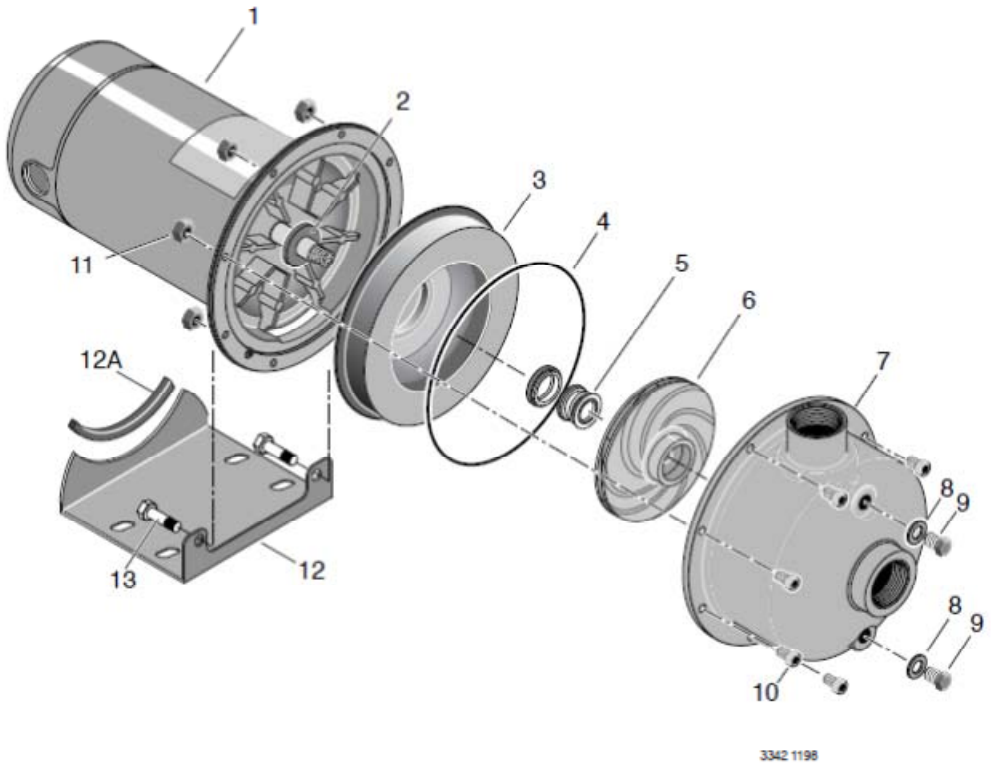


REPAIR PARTS LIST

Key No.	Part Description	No. Used	MOTOR AND HORSEPOWER				
			SS1XS-¾	SS1XS-1	SS1XS-1½	SS1XS-2	SS1XS-2½
			B82414 B82413 B82412 B82411	B82418 B82417 B82416 B82415	B82422 B82421 B82420 B82419	B82426 B82425 B82424 B82423	B82430 B82429 B82428 B82427
			3/4 HP	1 HP	1-1/2 HP	2 HP	2-1/2 HP
1	Motor, 115/230V/60 Hz., 1 Phase, ODP	1	B80442	B80443	B80444	B80445	B80445
1	Motor, 115/230V/60 Hz., 1 Phase, TEFC	1	B80454	B80455	B80456	B80447	B80447
1	Motor, 208-230/460V/60 Hz., 3 Phase, ODP	1	B80448	B80449	B80450	B80451	B80451
1	Motor, 230/460V/60 Hz., 3 Phase, TEFC	1	B80460	B80461	B80462	B80463	B80463
2	Water Slinger	1	17351-0009	17351-0009	17351-0009	17351-0009	17351-0009
3	Seal Plate	1	C3-200SS	C3-200SS	C3-200SS	C3-200SS	C3-200SS
4	O-Ring	1	U9-434	U9-434	U9-434	U9-434	U9-434
5	Shaft Seal*	1	U109-196A	U109-196A	U109-196A	U109-196A	U109-196A
6	Impeller	1	731S6230	731S6220	731S6210	731S6200	731S6190
•	Impeller Screw - 1 Phase	1	–	–	–	C30-14SS	C30-14SS
•	Impeller Screw - 3 Phase	1	C30-14SS	C30-14SS	C30-14SS	C30-14SS	C30-14SS
7	Casing/Diffuser Assembly	1	723S2990	723S2990	723S2990	723S2990	723S2990
8	Washer	2	111P0990	111P0990	111P0990	111P0990	111P0990
9	Stainless Steel Plug	2	121P2100	121P2100	121P2100	121P2100	121P2100
10	Screw	8	121P0310	121P0310	121P0310	121P0310	121P0310
11	Nut, M6x1	8	U36-207SS	U36-207SS	U36-207SS	U36-207SS	U36-207SS
12	Base	1	J104-9F	J104-9F	J104-9F	J104-9F	J104-9F
12	Base (1 Phase, TEFC only)	1	J104-9A	J104-9A	J104-9A	J104-9A	J104-9A
12A	Motor Pad	1	C35-5	C35-5	C35-5	C35-5	C35-5
13	Capscrews, 3/8-16x3/4"	2	U30-72SS	U30-72SS	U30-72SS	U30-72SS	U30-72SS

* Models B82413, B82414, B82417, B82418, B82421, B82422, B82425, B82426, B82429, B82430 use Part Number U9-437.
• Not illustrated.

SSCX Series



Section 11: System Warranties

RGF ENVIRONMENTAL GROUP

ULTRASORB® System
Limited Warranty

This warranty supersedes and replaces any warranty statements orally made by the Sales Person, Distributor, or Dealer or contained in written instructions or other Brochures or informational documents in relation to this product.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF

The Manufacturer Warrants, parts only for a period of twelve (12) months from the time of startup, not to exceed fourteen (14) months from the date of shipment, the new **ULTRASORB®** System to be free from defects in material and workmanship under the normal use and service when operated and maintained in strict accordance with the **ULTRASORB®** System operating instructions.

The Manufacturer's obligations under this warranty is being limited to repairing or replacing any part found to its satisfaction to be so defective, provided that such part is, upon request, returned to the Distributor or Manufacturer, with freight prepaid. This warranty does not cover parts damaged by decomposition from chemical action or wear caused by abrasive materials, nor does it cover damage resulting from misuse, abuse, or any other than its intended use, accident, neglect, or from improper operation, maintenance, installation, modification or adjustments.

This warranty does not cover parts or equipment used with the **ULTRASORB®** System that are not made by the manufacturer, since these items are covered by warranties from the respective manufacturer. The Manufacturer makes no warranty as to electrical apparatus or other materials not of its manufacturer.

The Manufacturer's sole responsibility shall be limited to repair or replacement of the equipment within the terms stated herein above.

The Manufacturer shall not be liable for consequential or punitive damages whether or not caused by manufacturer's negligence or resulting from any expressed or implied warranty or breach thereof. Consequential damages for the purpose of this agreement shall include, but are not limited to, the loss of use, income or profit, or loss of or damage to property occasioned by or arising out of in-operation, use, the operation, installation, repair, or replacement of the equipment or otherwise.

It is understood that any controversy or claim arising out of or relating to the **ULTRASORB® System Warranty** herein or the alleged breach thereof, shall be settled by arbitration in accordance with the rules of the Arbitration Association of America, Palm Beach County, Florida, and judgment upon the award rendered by the arbitrator(s) may be entered in any court baring jurisdiction thereof.

PROCESS PERFORMANCE WARRANTY

The Manufacturer Warrants that when installed and operated in accordance with the Manufacturer's written instructions, the **ULTRASORB®** System will remove dirt, oil, and grease from wash water. No other warranty expressed or implied should be considered valid. There are numerous operating conditions which will affect the efficiency of the **ULTRASORB®** System, thereby making any general water quality statement unrealistic.

WARRANTY SERVICE

In order to validate your warranty, fill out the **Warranty Validation Form** and return to ***RGF*** at the address below:

RGF WARRANTY DEPARTMENT
Outside of Florida (800) - 842 - 7771
In Florida (561) - 848 - 1826
FAX (561) - 848 - 9454

To obtain warranty service contact ***RGF*** and a warranty representative will help with the warranty problem and determine the status and a **Warranty Authorization Number** will be given at that time. Be prepared to answer specific questions on the problem at hand. If there are warranted parts that need to be returned, fill in the **Warranty Authorization Number on the Warranty Request Form** along with the items being submitted for warranty and an brief explanation of the problem or defect and return it and the part(s) to:

RGF Environmental Group, Inc
c/o Warranty Department
1101 W 13th Street
Riviera Beach, Florida 33404

RGF ENVIRONMENTAL GROUP

ULTRASORB® System
Limited Warranty Policy

RGF ENVIRONMENTAL GROUP, INC. ["Manufacturer"] Warrants the **ULTRASORB® System** to be free from DEFECTS in Material and Workmanship.

HOW LONG IS THE WARRANTY?

- For twelve (12) months from the date of initial startup of the system; not to exceed fourteen (14) months from the date of delivery.
- The Installation / Startup Record and Warranty Registration Form should be signed and dated by an authorized officer or employee of the customer and returned to RGF promptly to activate the warranty.

HOW DO I CONTACT RGF ENVIRONMENTAL GROUP ABOUT MY WARRANTY, A QUESTION, OR A COMPLAINT?

- A question or a complaint mat be addressed directly by your local Distributor or dealer.
- If they cannot answer the question or complaint directly, then call or FAX the Warranty Department at RGF at:

RGF WARRANTY DEPARTMENT
Outside of Florida (800) - 842 - 7771
In Florida (561) - 848 - 1826
FAX (561) - 848 - 9454

ARE THERE ANY PARTS THAT ARE NOT COVERED BY THIS WARRANTY? (That the Manufacturer will not repair or replace)

- Parts that are damaged by decomposition from chemical action or wear caused by abrasive materials, nor does it cover damage resulting from misuse, abuse, any other than it's intended use, accident, neglect, or from improper operation, maintenance, installation modification or adjustments.
- Parts not made by the Manufacturer, such as the electric pressure pump motor or other materials not of it's manufacturer. However, RGF will process the claim with the pump or other manufacturer.

WHAT SHOULD BE DONE IN THE EVENT THAT THE EQUIPMENT IS DAMAGED BY SHIPPING?

- Immediately upon receipt of the system, the purchaser is responsible to take the shipping containers off of the truck and inspect the equipment and parts for damage.

- If there is any visible damage to the equipment:
  1. Notify the driver of the courier company immediately and write on the Bill of Lading what is damaged or missing.
  2. Call **RGF** immediately at **1 - (800) - 842 - 7771** outside of Florida, **1 - (561) - 848- 1826** in Florida, or **FAX 1- (561) - 848 - 9454.**

WHAT IF DAMAGE IS FOUND ON THE EQUIPMENT AFTER THE COURIER HAS LEFT?

- Claims for concealed shipping damage must be reported to the courier and a copy sent to RGF in writing via **FAX 1 - (561) 848 - 9454** or certified U.S. mail within fifteen (15) days from the date of delivery.

  NOTE:
  The courier company will not cover the damages if the foregoing steps are not adhered to.

STEPS THAT SHOULD BE TAKEN IF WARRANTY WORK OR REPLACEMENT IS NEEDED.

- Call your local distributor or RGF Warranty Department and notify them of the problem or malfunction. Be prepared to be very descriptive with the problem.

- If it is determined that a part has malfunctioned due to defect, a **Warranty Authorization Number** will be given for tracking the part. Fill out the **Warranty Request Form** along with the Warranty Authorization number and return it along with the defective part prepaid to:

  RGF Environmental Group, Inc
  c/o Warranty Department
  1101 W 13th Street
  Riviera Beach, Florida 33404

THINGS THAT SHOULD BE DONE TO HELP KEEP THE ULTRASORB SYSTEM RUNNING EFFICIENTLY.

- Read the Operations Manual thoroughly.
- Make sure all of the employees who operate the system are fully trained on the procedures for operating the system and follow preventive maintenance routines strictly.

- Do not run water that has contaminants through the system that it is not designed to remove.

- Make sure the system is operated in accordance with the Manufacturer's suggested instructions.

- Replace filters as recommended in the Operations Manual.

- Control the water quality in accordance with RGF's suggested guidelines.

- Keep sump pits, trenches, and weirs cleared of heavy sediment build up. Heavy solids build up will cause the sump pump to overheat and fail to operate properly. Failure to prevent this will void the sump pumps warranty.
- Lack of a water clarifier (such as hydrogen peroxide, chlorine, WC-1, Ozone, etc.) will cause algae to grow resulting in plugged filters and foul smell.

WHAT SERVICE IS EXPECTED FROM THE DISTRIBUTOR?

- The Distributor will install, perform the initial startup, and train your personnel.

Should there be any questions relating to this warranty policy information, please feel free to contact our customer service representative at:

RGF Customer Service	
Outside of Florida	**(800) - 842 - 7771**
In Florida	**(561) - 848 - 1826**
FAX	**(561) - 848 - 9454**
or Write	**RGF Environmental Group, Inc.** **c/o Customer Service Dept.** **1101 W 13th Street** **Riviera Palm Beach, FL 33404**

Product Registration and Return Forms

RGF® ENVIRONMENTAL GROUP, INC.

RGF ENVIRONMENTAL GROUP

ULTRASORB® System
Warranty Request Form

NOTE: THIS FORM MUST BE COMPLETED AND ACCOMPANY ALL RETURNED ITEMS

Warranty Authorization Number: W-_____

CUSTOMER:
NAME _____
ADDRESS _____
_____
PHONE _____ FAX _____

DISTRIBUTOR:
NAME _____
ADDRESS _____
_____
CONTACT _____

UNIT:
MODEL _____
SERIAL # _____
DATE OF PURCHASE _____

ITEMS BEING SUBMITTED FOR WARRANTY:

PLEASE LIST THE PARTS AND GIVE A BRIEF DESCRIPTION OF THE PROBLEM.

ITEMS
1) _____
2) _____

DESCRIPTION (COMMENTS)
1) _____
2) _____
3) _____

SHIP TO: ***RGF ENVIRONMENTAL GROUP, INC.***
c/o WARRANTY DEPTMENT
1101 W 13th STREET
RIVIERA BEACH, FLORIDA 33404
FAX 561-848-9454

(FOR *RGF* USE ONLY)
DATE ITEMS RECV'D _____
RECEIVED BY _____
REPLACEMENT PART SENT/WARRANTY APPROVED ☐ WARRANTY DENIED ☐

ULTRASORB® System
Warranty Validation Form

To validate the Warranty for the system, this form must be read, signed and returned to:

RGF Environmental Group, Inc
c/o Warranty Department
1101 13th Street
Riviera Beach, Florida 33404
FAX 561-848-9454

1. I have inspected the system upon arrival for shipping damage and have reported any problems to the local distributor, the Courier Company, or *RGF* within the required time period.

2. I have been provided with training on the operation and procedures for the system by the distributor or *RGF* representative, during the installation and startup of the system.

3. I understand it is the customer's responsibility to:

- Regularly monitor and maintain the water chemistry of the system and to utilize properly only any chemicals or cleaning agents that are compatible with the equipment.
- To regularly clean out the sump pit and perform suggested preventive maintenance on the system in order to keep the system in good working order. I understand that failing to do so will adversely effect the efficiency of the system. I also understand, that it is my responsibility to properly dispose of the used filters, pit sediment, and any other by-products accordingly.
- Protect the system from extreme (high/low) temperatures to prevent damage to the components and piping of the system.
- Notify the local distributor or *RGF* Warranty Dept. immediately upon any malfunction of the system in order to receive warranted work or parts.

4. I understand that any controversy or claim arising out of or relating to the **ULTRASORB® System Warranty** herein or the alleged breach thereof, shall be settled by arbitration in accordance with the rules of the Arbitration Association of America, Palm Beach County, Florida, and judgment upon the award rendered by the arbitrator(s) may be entered in any court baring jurisdiction thereof.

I hereby acknowledge the above.

Customers Name _____
Address _____
_____

Signature _____ **Date** _____

ULTRASORB® System
Installation / Startup Record

Model Number _____ **Installation Date** _____

Serial Number _____ **Start-Up Tech.** _____

Distributer _____

Customer _____

Address _____

_____

Phone (___)_____**FAX ( )**_____**Contact**_____

Names of Trainees	Position	Initials

What is Being Cleaned_____**Hr's. Per Day**_____

Washpad Design & Const. By?_____

Is the Washpad Satisfactory? Yes ___ No ___ If No, Explain_____

_____

_____

Was the Unit Missing Parts? Yes ___ No ___ If Yes, Explain_____

_____

_____

Did the Unit Have Shipping or Hidden Damage? Yes ___ No ___ If Yes, Explain_____

_____

_____

List Any Options/Modifications with this Unit._____

_____

_____

ULTRASORB® System
Installation / Startup Checklist

MAINTENANCE PROCEDURES, CHECK IF COVERED & APPLICABLE

_____ **Overall System Description**
_____ **EPA & Sewer Rules**
_____ **Wash Pad Maintenance**
_____ **Solids Cleaning Procedure**
_____ **Bleed Lines**
_____ **Solids Grid**
_____ **Filter Media**
_____ **Hydrocarbon Absorber III**
_____ **Jet Pump and Switch**
_____ **TurboHydrozone**
_____ **Polishing Filters**
_____ **Pressure Tank**
_____ **Options:**_____
_____ **Options:**_____

_____ **Sump Pump & Maintenance**
_____ **Electrical, Shutoffs, Etc.**
_____ **Centrifugal Separator**
_____ **Oil Accumulator**
_____ **Coalescing Tubes**
_____ **Hydrocarbon Absorber II**
_____ **Centrifugal Pump**
_____ **Chlorinator**
_____ **Fresh Water Make-up**
_____ **Air Compressor**
_____ **Pressure Gauges**
_____ **3 Way Control Valve**
_____ **Options:**_____
_____ **Options:**_____

CRITICAL FUNCTIONS AND PROCEDURE DISCUSSIONS

_____ **Basic Water Chemistry; pH, Alkalinity, TDS**
_____ **Algae/Bacteria Control; Chlorine, Hydrogen Peroxide Water Cycling, WC1**
_____ **Water Testing; ETS Kit, pH Paper, TDS Meter**

_____ **Operator Safety; Clothing, Ventilation, Etc.**
_____ **Cleaning Agents; Enviro-Control, Ultra-Safe**
_____ **Water Management Recycled / Fresh Water**
_____ **Where to Get Help; Manuals, Distributor, *RGF***

CUSTOMER HANDOUTS AND SUPPORT MATERIAL

_____ **Operating Manuals**
_____ **Maintenance Video**
_____ **Water Test Kit**
_____ **Spare Parts List**

CUSTOMER EVALUATION OF START-UP TRAINING:

How Would You Rate Your Training? Good ____ Fair ____ Poor ____
General Comments_____
_____
_____
_____

***RGF* Tech. Rep. Signature**_____

Trainees Signature_____

ULTRASORB® System
Client Questionnaire

Company Name_____

Contact Person_____

Location_____

Phone (____)_____

***RGF* Dealer/Salesman**_____

Purchase Date (approx.)_____

Model_____ **Serial Number**_____

HOW WOULD YOU RATE THE FOLLOWING:

	GOOD	FAIR	POOR
General Operation	_____	_____	_____
Recycled Water Quality	_____	_____	_____
Quality of System	_____	_____	_____
Service & Support	_____	_____	_____
Warranty	_____	_____	_____
Installation / Training	_____	_____	_____
Safety	_____	_____	_____
***RGF* Dealer / Salesman**	_____	_____	_____
Value	_____	_____	_____

Would you purchase another *RGF* System? Yes ____ No _____

Comments_____

Completed By:_____ **Date**_____

Please return this form to:

RGF Environmental Group, Inc
c/o Customer Service Dept.
1101W 13th Street
Riviera Beach, FL 33404
Fax: 516-848-9454

-

Glossary of Terms

Aeration Tower

Tall 2" dia. PVC pipe on the Series I Tank used to mix air into the waste stream to enhance oil separation and remove V.O.C.'s (volatile organic compounds).

CFC System Pump

A continuous flow control centrifugal pump used to circulate the recycled water through the CO^3P System (Chemical Injection, Ozone Venturi and UV/O^3 Catalytic Chamber) and supplies the water to the cleaning equipment.

CO^3P system

(Catalytic Oxidation Process) System of low cost oxidant production is designed to provide a hydroxyl radical for contaminated water treatment. This system utilizes ozone, UV and hydrogen peroxide to create a hydroxyl radical ion for maximum oxidation and biodegradation.

Control Panel

Contains all the controls for the system: flow control valves, pressure gauges, indicator lights, and the hour meter.

HCA-2 Hydrocarbon Absorber

Located above the Solids Separation Grid in the Series I, designed as the second measure of removing oils from the waste stream through the use of oleophillic materials such as polyisocyanurate foam.

Hydrocarbon Accumulator

Collects skimmings from the Oil Skimmer and Auto Oil Purge Valves and removes excess water from the accumulated oil and stores the waste oil for future disposal.

Inclined Tube Coalescor

Located in the first compartment of the Series I is a series of 1/4" square polypropylene plates on a 60 degree incline (which provides the maximum coalescing efficiency), used to settle solids and to further coalesce and float oils to be skimmed by the Oil Skimmer.

Main Drain Return Line

A recommended method of returning the drains of the system to the front end of the trench system. This line should be sized accordingly to accommodate the system drains.

Multi-Media Filter Bed

The third and final compartment of the Series I contains several layers of carbon, ion exchange and volcansorb media, which are used to absorb heavy metals or oils and trace chemicals.

Oil Purge Valve

A 1/4" petcock valve skims oil off the top of the Coalescing Centrifugal Separator and is collected in the Hydrocarbon Accumulator.

Oil Skimmer

Located in the first compartment of the Series I Tank above the Inclined Tube Coalescor, skims oil off the surface of the water to be collected in the Hydrocarbon Accumulator.

Ozone and Chemical Venturi

A Venturi used in the CO^3P system, which draws ozone produced by the UV/O^3 Catalytic Chamber and mixes it with the hydrogen peroxide before it enters the chamber.

Peristaltic Chemical Injection Pump

A peristaltic chemical pump that adds hydrogen peroxide or other chemicals to the recycled water to help control algae, bacteria, odor and pH. Hydrogen peroxide is an oxidant in the Catalytic Oxidation Process (CO^3P) that also increases ozone solubility.

Polishing Filter

Housed in a polypropylene vessel, used to pre-filter the water before it is processed through the rest of the system.

Process Pump

A centrifugal pump located on the equipment rack of the Series II Equipment Skid, pumps the process water through the specific filters of the system.

Series I Tank

A rectangular tank that houses the Inclined Plate Coalescor, Oil Skimmer, Solids Separator/HCA-2 Hydrocarbon Absorber and the Multimedia Filtration Bed.

Series II Electrical Junction Box

Contains all the electrical relays, timers and terminals for the system and connects them to the motors, lights, switch and UV chambers of the system.

Series II Equipment Skid

Contains all of the components of the system for processing the water.

Series III Storage Tank

A 500 (or 800) gallon cylindrical polyethylene tank used to store the recycled water for later use.

Solids Separation Grid

Located in the second compartment of the Series I, designed to attract and settle small solids, which passed through the Inclined Plate Coalescors, before passing through the HCA-2 Hydrocarbon Absorber.

UV/O^3 Catalytic Chamber

The new UV/O^3 combination chamber produces over three times the ozone and approximately twice the ultraviolet radiation as our initial design. When these two components of the CO^3P process are combined into one unit, they become more effective, efficient and compact.

Vision 2000

The Vision 2000 line of Ultrasorb® systems were designed as modular units, to suit various treatment technologies. RGF has several individual components that may be integrated together to suit your environmental needs.