NPS WASTEWATER SYSTEMS LIMITED

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CLEARSTREAM SYSTEMS OWNERS MANUAL

MODEL 500H	416 IGPD
MODEL 600H	500 IGPD
MODEL 750H	624 IGPD
MODEL 1000H	832 IGPD
MODEL 1500H	1248 IGPD

CLEARSTREAM® WASTEWATER SYSTEMS, INC.

NSF® CLASS I

050921

INTRODUCTION

The Clearstream System is one of the finest aerobic wastewater systems available today. Our system converts the sewage from your residence or business into a clear odorless liquid. This high degree of treatment is accomplished at a remarkable low operating cost per month. The system has been simplified over the years to make it as inexpensive to operate and as low in long term maintenance as possible. Homeowners who have lived with the nuisance of a septic odor lingering in their neighborhood will truly appreciate the pleasure of owning a Clearstream System

PROCESS DESCRIPTION

The Clearstream Wastewater Treatment System operates in the extended aeration mode of the activated sludge process.

Wastewater enters the aeration chamber of the system through a 4" Sch. 40 PVC inlet pipe. The wastewater is then mixed throughout the aeration chamber by releasing compressed air near the bottom of the chamber through a fine bubble diffuser. The rising air bubbles transfer oxygen to the wastewater which allows aerobic organisms to thrive and ultimately decompose the incoming waste matter

The turbulence caused by the rising air bubbles also creates a mixing pattern which keeps the sludge in suspension. As incoming wastewater enters the aeration chamber, existing "mixed liquor" from the aeration chamber is displaced into the bottom of the cone-shaped clarifier.

The clarifier chamber allows the water to still so that suspended solids in the "mixed liquor" can settle back into the aeration chamber for further biological breakdown.

The remaining clear water in the upper zone of the clarifier chamber is then discharged through the surge control weir and out the 4" Sch. 40 outlet pipe.

When properly loaded and maintained, the aforementioned process allows the Clearstream Wastewater Treatment System to provide years of satisfactory service for the consumer Clearstream Models meet the performance requirements of NSF Standard 40 Class I with a 30 day average of <25 mg/I CBOD and <30 mg/I TSS. Actual NSF test results used to determine if Clearstream met Standard 40 requirements averaged 6 mg/I BOD and 9 mg/I TSS

OPERATING MANUAL

In order for the Clearstream System to function at optimum performance levels the system will require periodic service. The normally expected service that is associated with the system includes:

1.Repair or replace aerator	2 to 10 years
2.Clean filters on aerator	6 mos. to 2 years
3.Break Lip scum in clarifier	6 mos. to 2 years
4.Pump sludge from aeration tank	2 to 5 years*
5.Pump sludge from pretreatment tank	2 to 5 years*
6.Check aeration diffusers	annually
7.Check surge control weir	6 mos.

* Any sludge removed from pretreatment tank or Clearstream Unit must be disposed of according to all provincial, local, and federal regulatory requirements.

To remove solids from pretreatment tank drop pump hose through access opening on top of tank all the way through to the bottom of the tank. Pump out the whole tank volume, then fill the tank back up immediately. To remove solids from aeration chamber, drop hose through access opening in tank all the way to the bottom of the tank. Pump only *1/2* of the total tank volume and fill tank back up with water immediately.

To determine if all system components are functioning properly, look and/or listen to see if the visual/audio alarm system is illuminated or making a buzzing sound. If the alarm is activated then either the aerator has thrown its breaker or the high level float inside the clarifier is indicating a high water level condition. Verification of either condition can be made by visually monitoring the push button breaker to see if it is in the out position indicating it has been thrown and opening the access opening to the treatment unit to see if the water level inside the clarifier is at alarm level. After inspection of the clarifier be sure to securely fasten the access cover back in place and tighten the tamper resistant bolt or bolts firmly.

To determine if the system has the desirable “mixed liquor” and effluent characteristics first remove the access cover. Monitor for odors coming from the tank. If the odor is a sweet or a musty smell the system is operating in a desirable aerobic condition. If the odor is foul or smells like a rotten egg, then the system is operating in an undesirable anaerobic condition. Visually monitor the “mixed liquor” for color. If the color is a brownish color, then it is operating in a desirable aerobic condition. If it is grey or black in color it is operating in an undesirable anaerobic condition. The system effluent should be clear with very few noticeable light brown solids suspended in the effluent. The effluent should not be dark or turbid in color or clear with great numbers of light brown suspended solids noticeable. After inspection of the system’s interior, be sure to securely fasten the access cover back in place and tighten the tamper resistant bolt or bolts firmly.

To collect effluent samples from a system, a sample port must be added downstream of the effluent discharge. The sample port should be installed so that effluent cannot remain below the discharge water line and build up solids. A sample bottle should be capable of being lowered into the port on a string and laid on its side in the direct flow line of the discharge and removed when full of effluent.

The expected effluent from the system should be less than 25 mg/I CBOD and less than 300 mg/I TSS with a PH range of 6-9.

For the Clearstream Aerobic Wastewater Treatment Unit to function properly it must be used for the treatment of domestic wastewater from residences or other waste flows with similar loading characteristics. Typical domestic wastewater consists of the flow from toilets, lavatories sinks bathtubs/showers, and washing machines. To prevent malfunctions of your Clearstream Unit, the following guidelines should be followed:

1. Any sewage system, whether aerobic or septic, should not have inorganic materials (plastics, cigarette butts, throwaway diapers, feminine napkins, condoms etc.), that the bacteria cannot consume, discharged into the system.

2. Large amounts of harsh chemicals oil, grease, high sudsing detergents, discharge from water softeners, disinfectants or any other chemical or substance that kills bacteria should not be discharged into the system.

3. Excessive use of water over the design flow of the system, or organic overloading in excess of design parameters will cause the system not to perform to its fullest capabilities.

4. The proper operation of this or any other sewage treatment system depends upon the proper organic loading and the life of the micro-organisms inside the system. Clearstream is not responsible for the in-field operation of a system, other than the mechanical and structural workings of the system itself. Field abuse and overloading of the system can only be cured by the user of the system.

5. When wastewater discharge, into a Clearstream Unit is seasonal or intermittent to a point that the owner wishes to turn off the electricity (for more than three (3) months) to the aerator, the aerator inlet and outlet should be sealed to keep out moisture until the unit is ready to be restarted.

CLEARSTREAM INSTALLATION INSTRUCTIONS

Before installation of the Clearstream Treatment Tank, first install a trash trap (septic tank) with a volume of not less than 50% and not more than 100% of the gallon per day rating of the Clearstream unit.

CLEARSTREAM TANK INSTALLATION:

Note: To determine which is inlet and which is outlet. The inlet is a 7" stub of sch40 PVC pipe. The outlet is a much longer pipe connected to an internal filter. The difference can be easily observed from, the outside of The tank, before it is installed.

t Prepare an excavation having minimum dimensions of at least one (1) toot larger than the diameter of the tank- Make sure the depth of the excavation is deep enough to allow gravity flow to the inlet of the system and that the excavation bottom is level. Never install the Clearstream tank deeper than a depth that will require more than a maximum of 18 inches of riser depth, The access cover shall always be above final grade after tank installation- In applications where more than the maximum 18 inches of riser is required, install a lift pump upstream of the Clearstream tank in order to pump the trash tank effluent to the Clearstream tank at normal grade. In these special applications where a lift pump is required, contact NPS for more details as to pump size, maximum dosages and maximum flow rates.

2 Set the Clearstream tank in a prepared excavation that has a solid, level bottom that will eliminate tank settling. The excavation bottom should have no rocks or sharp objects present.

3 When lowering a fiberglass tart into the prepared excavation use the lifting eyes which are bolted into the tank top. When lowering a concrete tank into the prepared excavation use a spreader bar or nylon sling. Never lift fiberglass Clearstream tanks unless they are empty of all liquids,

4 Make sure the inlet 4" sch40 PVC pipe is aligned properly to the incoming sewage line and that the outlet 4" sch40 pipe is aligned to the downstream discharge line. Before setting the tank in the prepared excavation open the access cover and verify that the inlet and outlet pipes are aligned correctly,

5 For the Clearstream unit to function properly, the tank must be level- To properly level the tank, remove the access cover and lay a three (3) foot level across the access opening in several directions. Shift the tank in the hole as necessary to make the tank level in all directions. The tank may be slightly out of level, but it should not be out of level enough to cause tank malfunctions.

6. Fill the tank with water checking periodically making sure the tank remains level,

7 Connect the 4 sch40 PVC Clearstream inlet pipe to the outlet pipe from the trash tank. Make sure the trash tank outlet pipe is level with or higher than the inlet pipe to the Clearstream unit- The 4" sdh40 PVC outlet pipe from the Clearstream unit should now be connected to the discharge line. The Clearstream unit should only be connected to a plumbing system from a waste-water source which has been properly trapped and vented in compliance with provincial and Local plumbing codes

8. Back fill the excavation in layers with a back fill material that will settle properly around the tank. Tamp the back fill material as each layer is placed around the tank. If necessary, use water to help settle the soil around the tank. Special care should be taken to either tamp soil under where inlet and outlet pipes are bridging the excavation or use some other method of supporting pipes across the excavation. Do not back fill with heavy clay or large rocks.

9. Before completing the backfill, be sure the signal wire conduit from the alarm float to the Control Panel has been laid underground.

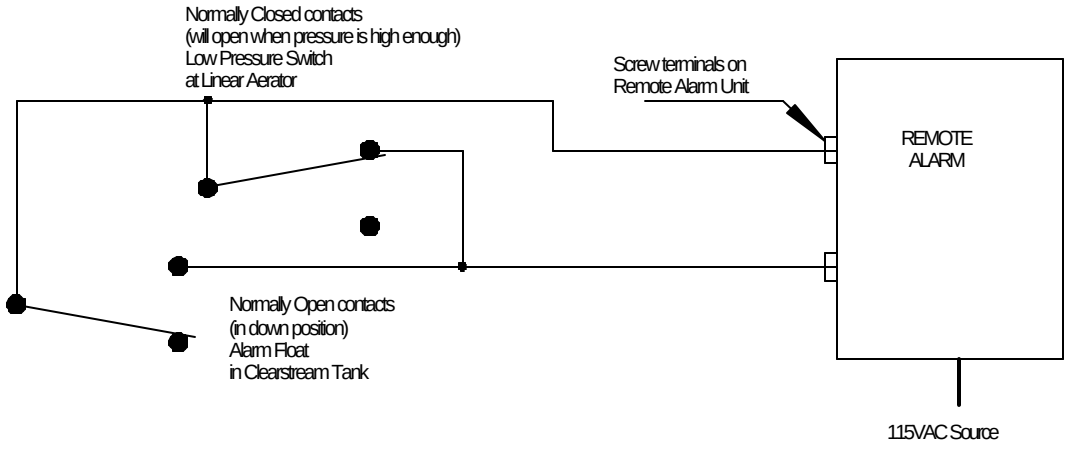
10. For below normal grade installations a Clearstream 20 inch diameter riser may be used on all models except the 1500 G.P.O. units. The 1500 G.P.O. units must use a 32 inch diameter riser. In no case shall more than 18 inches of total riser depth be used on a single Clearstream unit to bring the access cover above final grade. AU risers must be sealed with silicone to prevent ground water intrusion before back fill is completed.

11. Before leaving excavation site, be sure to securely fasten the Clearstream access cover in place with the tamper resistant bolt/bolts. Tighten bolts firmly to keep unauthorized personnel from gaining access to inside of tank.

CLEARSTREAM AERATOR AND ALARM PANEL INSTALLATION:

1. Mount the remote alarm unit in a location that can be easily noticed by the occupants.

2. Wire 115 Volt, 60Hz. power from an electrical disconnect to Clearstream Aerator. Wire from High Level Alarm Float to the Remote Alarm Panel. The Normally Closed contacts of the low pressure switch on the linear aerator (if present) should be wired in parallel at the alarm box with the Normally Open High Level Alarm Float in the Clearstream tank. When discharge pump is used wire power to pump tank and pump tank alarm float. All electrical wiring should be installed by a qualified person in compliance with applicable sections of the National Electrical Code or other more stringent local codes.



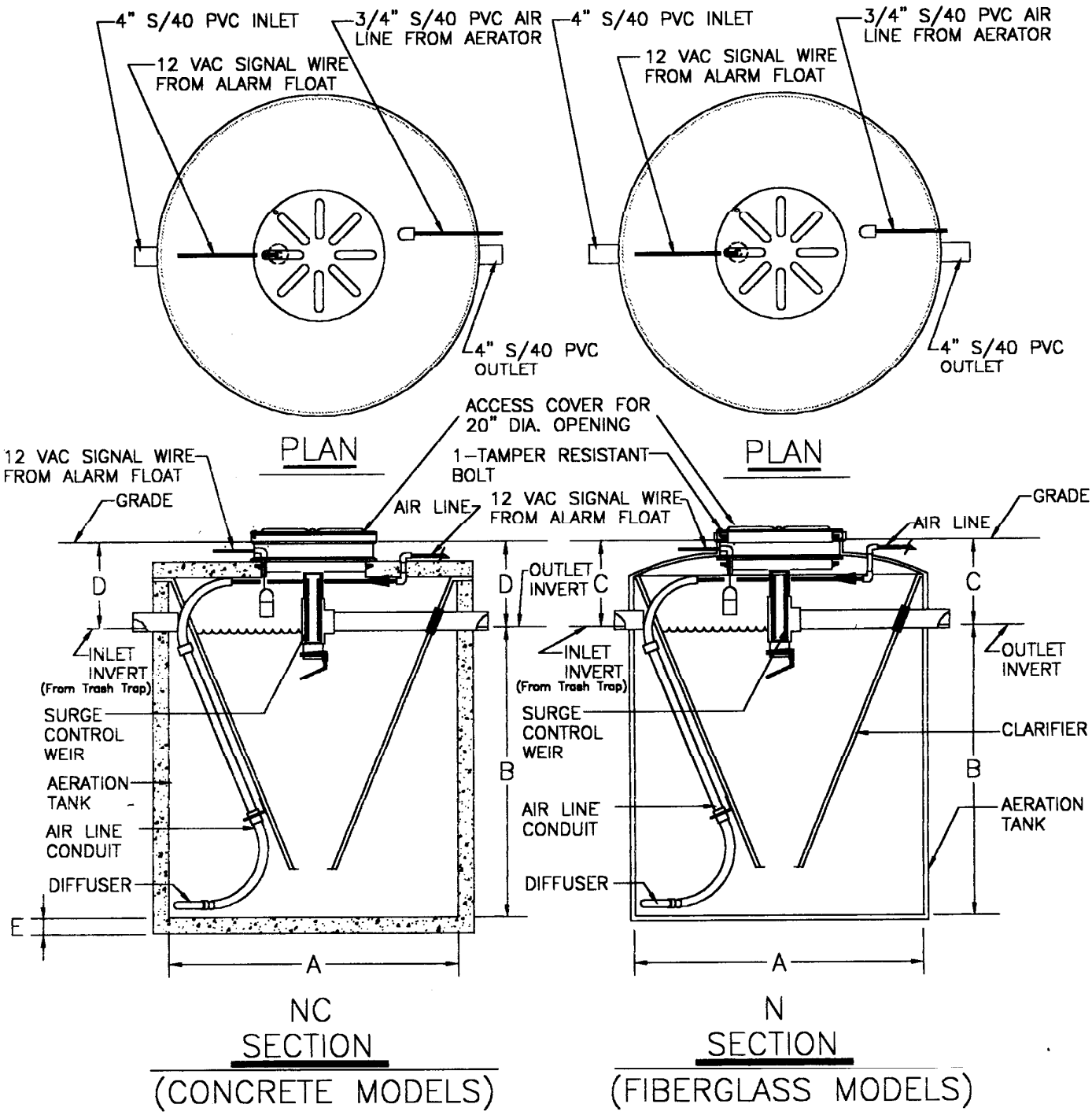
3. Install Aerator Model CS-103 as close as practical to tank, but in no case greater than one hundred (100) feet away (50'on 1500 G.P.D. units). Run 3/4' Sch.40 PVC air line from aerator connector to air line connection at Clearstream tank. Be careful to back fill underground air line in a manner which will not cause air line to leak. Aerator must be installed in a location that is dry, non-dusty and highly ventilated.

4. Turn power on at electrical disconnect and check for proper system operation.

COMPLIANCE WITH LAWS:

The Clearstream Unit must never be installed without first obtaining all permits and approvals from the local regulatory body. In areas that do not have local control over environmental activities, all applicable Provincial and Federal environmental codes must be adhered to. Only properly licensed and trained individuals should install Clearstream equipment.

DESIGN DRAWINGS



MODEL	A	B	C	D	E
500N/NC	5'-3"	5'-3"	1'-7½"	1'-4¾"	3"
600N/NC	6'-4"	4'-7"	1'-5½"	1'-5¾"	3"
750N/NC	6'-4"	5'-5"	1'-7½"	1'-5¾"	3"
1000N/NC	6'-4"	7'-3"	1'-5¾"	1'-5¾"	3"
1500N/NC	8'-0"	6'-10"	2'-0"	1'-7¾"	4"

U.S. Patent Numbers
5,221,470
5,770,081
5,785,854

SPECIFICATIONS
Clearstream Units

Model 500H

Treatment Capacity	416 IGPD
BOD Loading	125 lbs. BOD
Aerator (Model CS-103EL)	2.4 scfrn
Aerator (Model CS-103E)	2.4 sclm
Electrical	115v./60Hz/.75 amps/82 watts
*Electrical	115v./60Hz/3.8 amps/151 watts

Model 600H

Treatment Capacity	500 IGPD
BOD Loading	1.5 lbs. BOD
Aerator(Model CS-103EL)	2.8 scfm
*Aerator(Model CS-103E6)	2.8 scfm
Electrical	115v./60Hz/.75 arnps/82 watts
*Electrical	115v./60Hz/3.8 amps/157 watts

Model 750H

Treatment Capacity	524 IGPD
BOD Loading	1.85 lbs BOD
Aerator (Model CS-103FL)	3.6 scfm
*Aerator (Model CS-103F)	3.6 scfm
Electrical	115v./60Hz/1.05 amps/120 watts
*Electrical	115v./60Hz/4.7 arnps/195 watts

Model 1000H

Treatment Capacity	832 IGPD
BOD Loading	2.5 lbs. BOD
Aerator (Model CS-103G)	4.8 scfm
Electrical	115v./60Hz/4.7 arnps/220 watts

Model 1500H

Treatment Capacity	1248 IGPD
BOD Loading	3.75 lbs BOD
Aerator(Model CS-103H)	7..2scfrn
Electrical	115v./60Hz/6.58 amps/425 watts

Pretreatment Tank

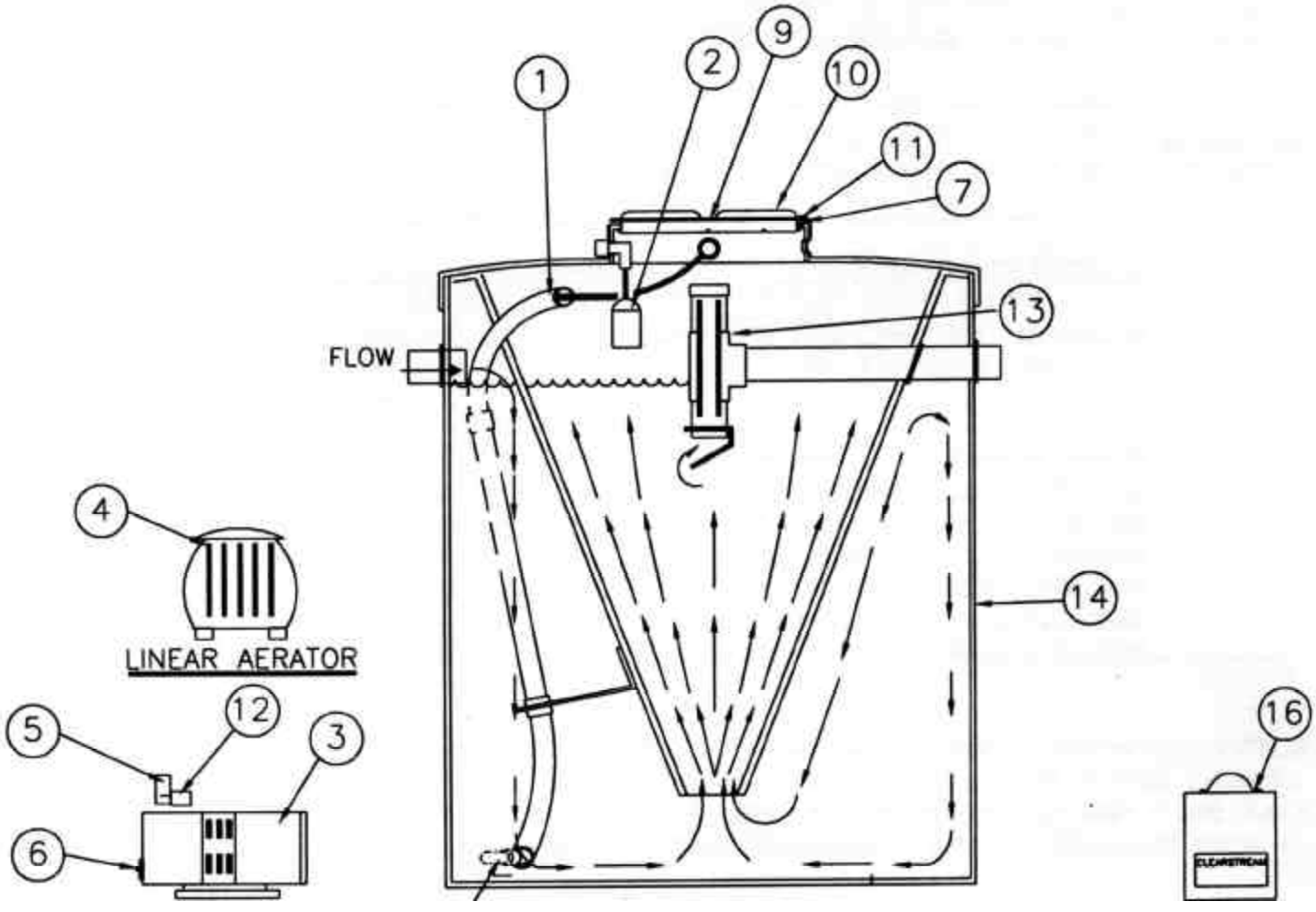
Minimum Capacity	1/2 Plant design flow
Minimum Liquid Depth	30 inches
Four Inch Inlet Tee Baffle Discharge	6 inches below liquid level
Four Inch Outlet Tee Baffle Intake	25% to 50% of liquid level

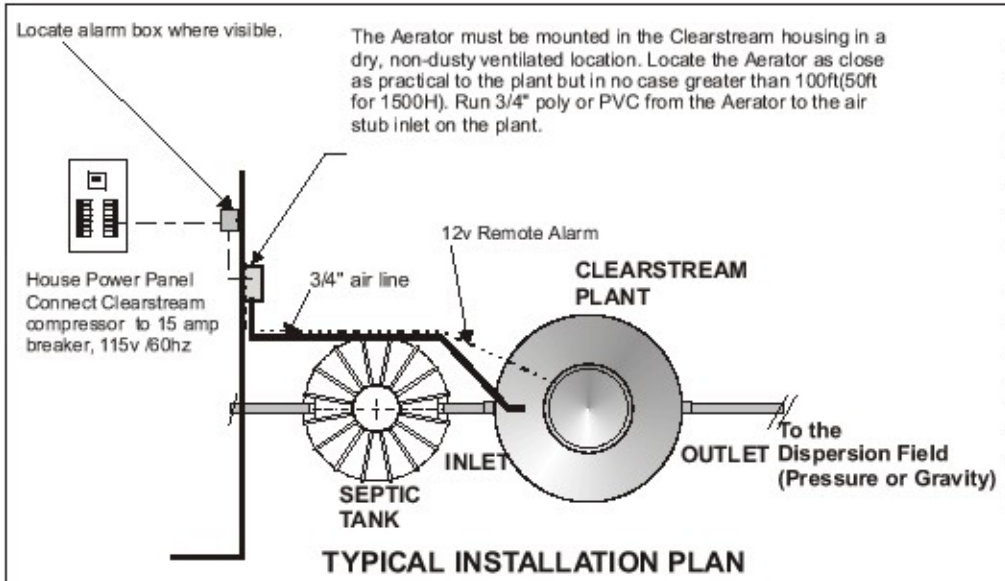
Inlet flow line must be a minimum of two (2) inches higher than the outlet flow line.

*Alternate aerator option

PARTS LIST AND FLOW DIAGRAM

PART NAME	PART NUMBER
1. AIR SUPPLY HOSE ASSEMBLY	CS-101
2. ALARM FLOAT	CS-102
3. ROTARY VANE AERATOR (OPTIONAL)	CS-103(E,E6,F,G,
4. LINEAR AERATOR	CS-103(EL,FL)
5. EXTERNAL AIR FILTER	CS-104
6. INTERNAL AIR FILTER	CS-106
7. TINNERMAN FASTENER (1500N ONLY)	CS-110
8. FRP 32" DIA. EXTENSION (1500N ONLY)	CS-115
9. NAMEPLATE	CS-107
10. ACCESS COVER	CS-108
11. TAMPER RESISTANT BOLT	CS-109
12. CHECK VALVE	CS-105
13. FLOW CONTROL WEIR	CS-111(A,B,C,D,E
14. TANK	CS-112
15. DIFFUSER	CS-113
16. ALARM PANEL	CS-114(A,B,C,D,E
17. POLY 20" DIA. EXTENSION	CS-116(A,B,C)

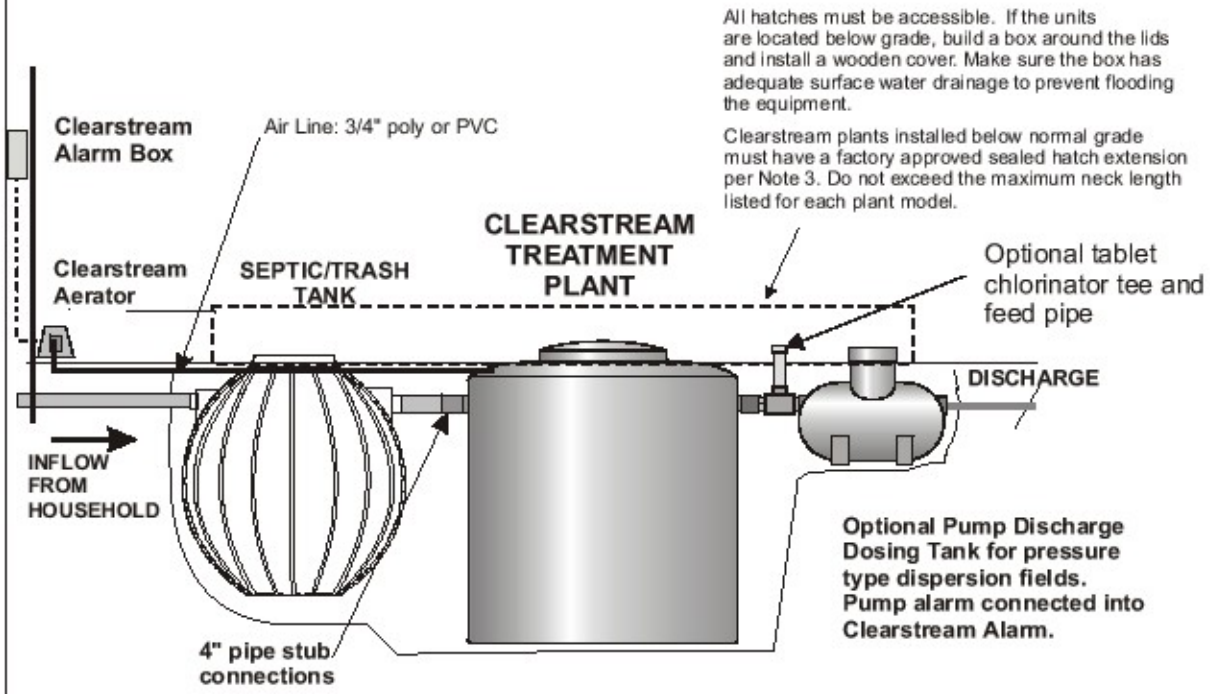




TYPICAL INSTALLATION PLAN

MODEL	500H	600H	750H	1000H	1500H
Capacity impgal/day	416	500	624	832	1248
Septic Tank gals	600	600	600	750	1,000
Aerator Model	CS-103E	CS-103E6	CS-103F	CS-103G	CS-103H
Power (Amps Max.)	3.8	3.8	4.7	4.7	6.5
Power (Watts)	151	157	195	220	425
Dimensions					
Height	7'-0"	6'-3"	7'-1"	9'-0"	8'-6"
Diameter	5'-3"	6'-4"	6'-4"	6'-4"	8'-0"
Inlet/Outlet Invert	5'-3"	4'-7"	5'-5"	7'-3"	6'-10"
Pipe Connections	4"sch40	4"sch40	4"sch40	4"sch40	4"sch40
Weight					
Shipping Weight lbs	375	450	480	580	875
Flooded Weight lbs	7,500	9,500	11,000	15,000	22,000

POWER SUPPLY 115v/60hz 15 amp



NOTES

1. All Clearstream systems must have a septic tank ahead of the unit.
2. The outlet of the Septic tank must be at the same level as the inlet pipe to the Clearsteam.
3. For below normal grade installations, a Clearstream CS-115 6" extension riser must be used. In no case should the riser be more than 18" on model 500H and 600H, or 12" on models 750H, 1000H, or 1500H. Riser joints must be sealed watertight.
4. Make the excavation at least 1 foot larger than the unit and place 4" of sand or other fine-grained material on the bottom. Tamp the material smooth and level.
5. The tank must be level to function properly. During water filling, check the level periodically.

NOTICE
ALL LIDS AND COVERS MUST HAVE SECURITY LOCKS TO PREVENT UNAUTHORIZED ACCESS AND TAMPERING.

Authorized Dealer

NPS WASTEWATER SYSTEMS LIMITED

Date: 941015		Scale:	Rev: 980417	

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