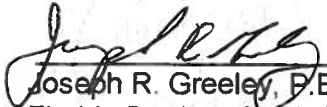


**Evaluation of Standards for
Low Pressure Sewer Systems
Sarasota County – ESBC Utilities**



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*gallons working capacity

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Evaluation of Standards for Low Pressure Sewer Systems Sarasota County – ESBC Utilities Section 1 - Introduction

Section 1 – Introduction

In 1997, the Sarasota County Board of County Commissioners (BOCC) directed County staff to initiate a program to replace septic systems and eliminate small package wastewater treatment plants in the Phillippi Creek area. The existing septic systems and small package wastewater treatment plants were identified as contributing to the pollution in Phillippi Creek. The program became a major part of the County Utilities CIP program and was named the Phillippi Creek Septic System Replacement Program (PCSSRP).

Alternative collection technologies were examined in the "*Phillippi Creek Septic System Replacement Program Final Report*" by Hazen and Sawyer and Ayres Associates, Dated September 2000. Among the collection technologies examined were gravity sewer systems, low pressure/grinder sewer systems, septic tank effluent pump systems (STEP), and vacuum sewer systems. The decision was made to replace approximately 84% of the existing systems in the Phillippi Creek area with vacuum sewer systems. The remaining areas would either be gravity sewer systems or low pressure systems.

Sarasota County has requested that the County's proposed design concept for specific components of the low pressure sewer system incorporated into the Phillippi Creek Septic System Replacement Program be evaluated. As our hurricane seasons have become more active in recent years, the citizens of Sarasota County have expressed concern over system storage and operation during extended power outages.

This report includes an evaluation of the adequacy of the storage volume in the proposed system, along with the means of allowing operation during emergencies such as prolonged power outages. The practices of other communities in Florida using low pressure systems, the evaluation of applicable EPA and FDEP guidelines and standards, and consideration of component manufacturer's practices and options have also been researched and the information provided in this report along with recommendations for modifications, where appropriate.

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Evaluation of Standards for Low Pressure Sewer Systems Sarasota County – ESBC Utilities Section 2 - Low Pressure Sewers

Section 2 – Low Pressure Sewers

Conventional wastewater collection systems transport sewage from homes or other sources by gravity flow through buried piping systems to a central treatment facility. Low pressure sewer systems differ from conventional gravity collection systems because they break down large solids in the pumping station before they are transported through the transmission system. Pressure sewer systems generally use smaller diameter pipes with a slight or no slope, which reduces excavation and construction costs. Since there are no manholes and the design is watertight, extraneous flows into the system are eliminated. There are two types of low pressure sewer systems; grinder pump systems and septic tank effluent pump systems (STEP). A description of both of these systems is provided so a comparison of each can be made regarding potential advantages in storage capacity and emergency operation. Sarasota County has selected the grinder pump system, therefore the majority of this evaluation is centered around grinder systems.

2.1 Grinder Pump Low Pressure Sewer Systems

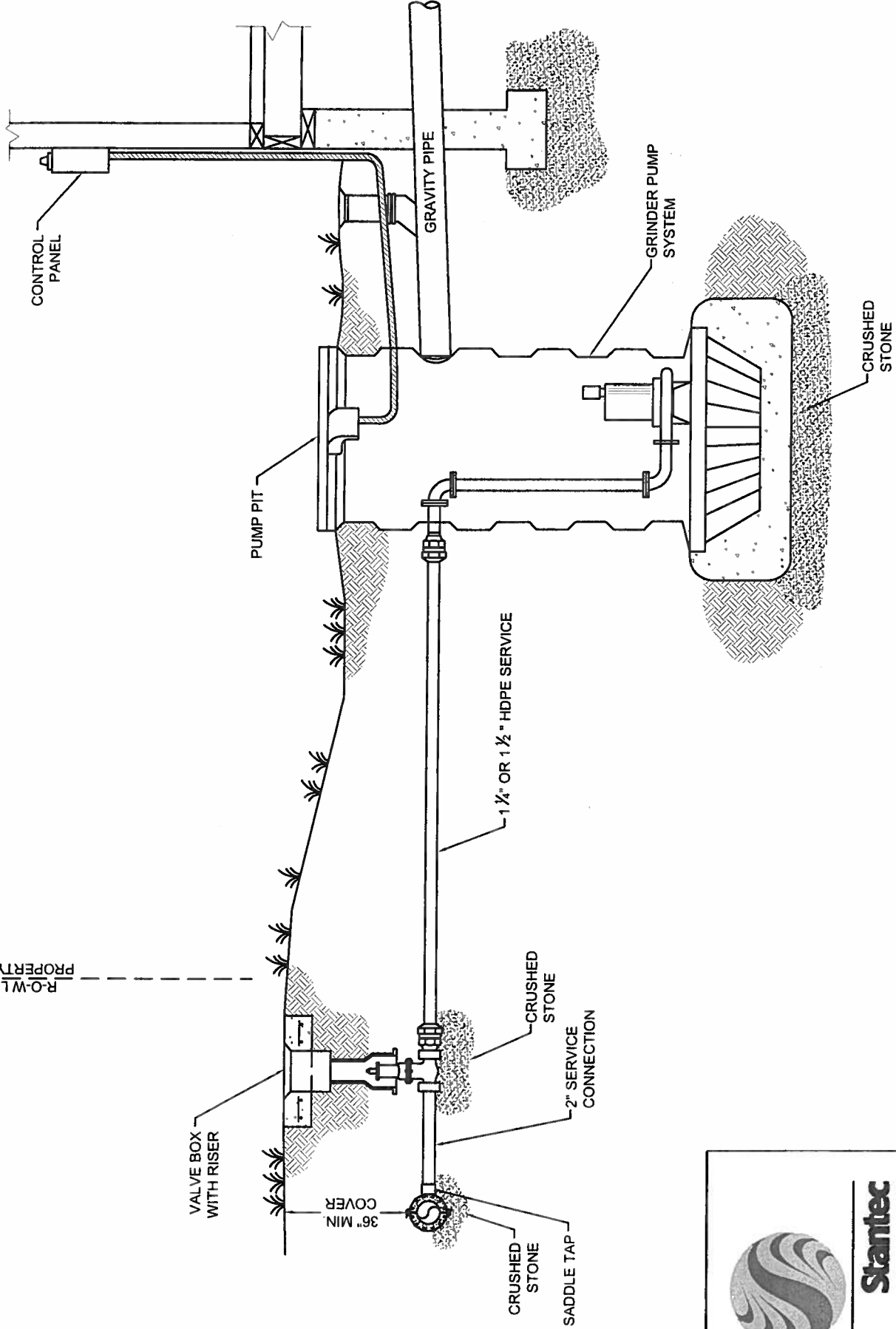
According to the USEPA Manual for Alternative Wastewater Collection Systems, EPA/625/1-91/024, the first Grinder Pump systems were installed in Albany, NY in 1970. In a grinder pump system, sewage flows to a vault where a grinder pump grinds the solids and discharges the sewage into a pressurized pipe system. Grinder pump systems do not require a septic tank but typically require a pump with more horsepower than the effluent pump used in a STEP system. Figure 2-1 shows a typical single family grinder pump system.

In Sarasota County, the grinder pump systems will utilize a pump with a cutting head installed in a small sump at each connection. The pump will grind the solids in the wastewater and force the slurry through small diameter pressure sewer pipe installed at a uniform depth. The wastewater will be pumped directly to the municipal sewer connection. The sumps will typically be located on private property. However, Sarasota County will be responsible for the installation and maintenance. The utility will need to obtain perpetual easements for access to repair and maintain the systems. Each user will pay the electrical costs associated with the pump unit. Each single-family residence will be served by a single grinder pump station. The use of single grinders eliminates any issues that would arise from sharing a system such as splitting the power cost for operating the unit.

2.2 Septic Tank Effluent Pump Systems (STEP)

The first STEP system was installed in Port Charlotte, FL in 1970 according to the EPA source referenced above. In a STEP system, wastewater flows into a conventional septic tank to capture solids. The liquid effluent flows to a small holding tank containing a pump and control devices. The effluent is then pumped and transferred into the

R-O-W LINE



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EVALUATION OF STANDARDS FOR LOW PRESSURE
SEWER SYSTEMS

LOW PRESSURE SEWER GRINDER PUMP (GP) SYSTEM

FIGURE 2-1

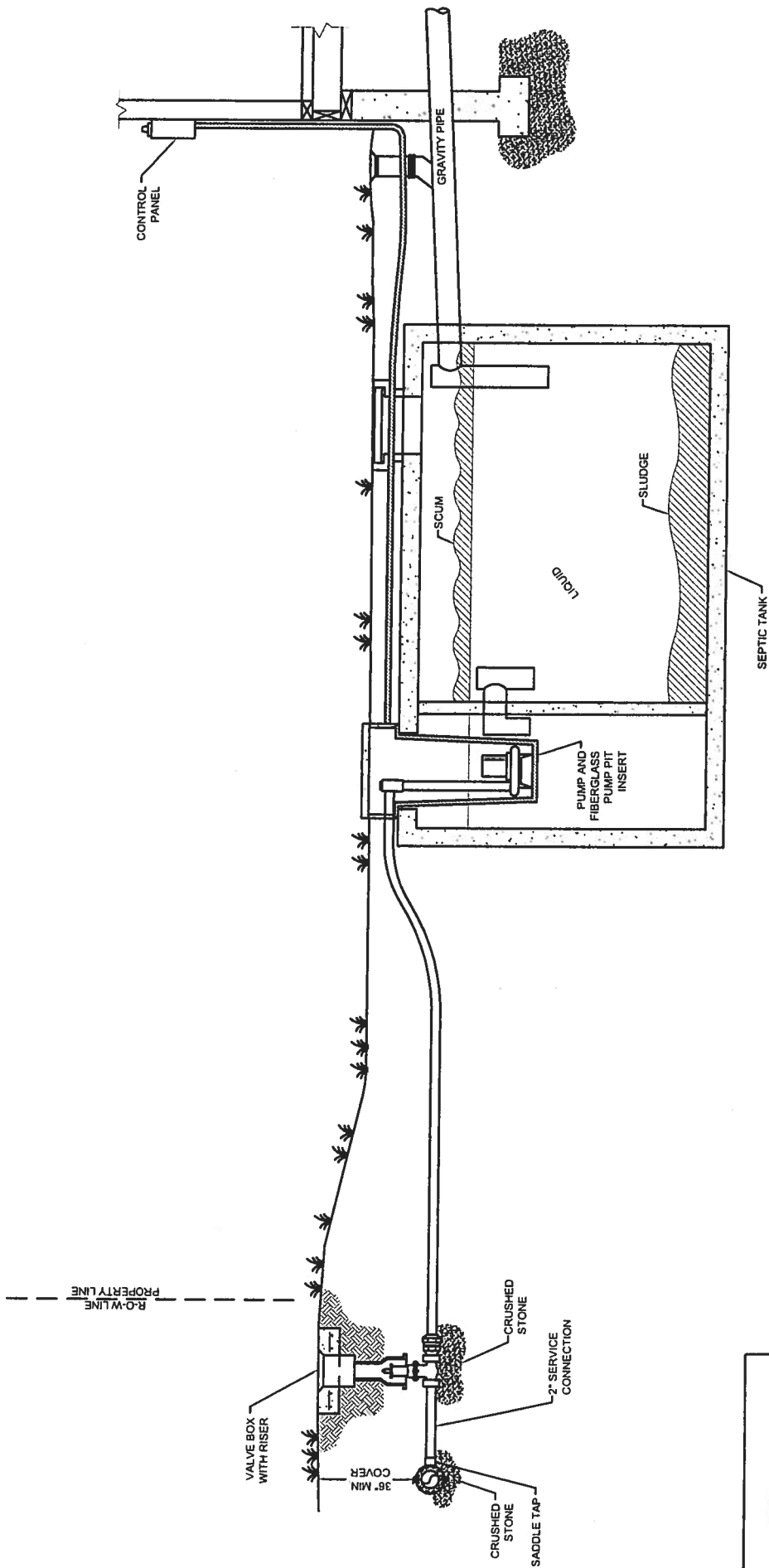
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Evaluation of Standards for Low Pressure Sewer Systems Sarasota County – ESBC Utilities Section 2 - Low Pressure Sewers

municipal sewer connection. It would seem that retrofitting septic tanks would be a great opportunity for cost savings. However, a majority of tanks must be replaced or repaired over the life of the system because of insufficient capacity, deterioration of concrete tanks, or leaks. The process of utilizing STEP systems in an existing community includes an inspection of the existing septic tank. The tank must be pumped down and the structural integrity of the tank determined. Old septic tanks generally require replacement due to potential for structural failure. Additionally, these older tanks may leak contaminants into local groundwaters and nearby surface waters or storm drainage swales. When septic tanks require replacement, the cost of these installations is far greater than the grinder system installation. Figure 2-2 shows a typical single family STEP system.

Charlotte County has the largest number of STEP systems in the country and has been installing and operating the systems for over 35 years. The standard in Charlotte County is to provide one day's storage in the system for emergency operation. Generally, emergency pump-outs using portable generators are not a service the County utility provides during an extended power outage. Residents are advised not to use the systems during extended outages.

In a typical STEP system the pumps and tanks are installed on private property. The installation may be provided by the resident's contractor through a permit system using standards provided by the Utility. Alternately, as in Charlotte County, the Utility may install the system and recover costs from the homeowner. Generally, the systems are maintained by the Utility and the resident is required to provide a perpetual easement for service and maintenance.



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TYPICAL SEPTIC TANK
 EFFLUENT PUMP SYSTEM
 (STEP)

FIGURE 2-2

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Evaluation of Standards for Low Pressure Sewer Systems Sarasota County – ESBC Utilities Section 3 - Regulatory Standards and Guidelines

Section 3 – Regulatory Standards And Guidelines

In reviewing regulatory standards for low pressure sewer systems, two references were found that provided the most relevant information. Both documents provided only guidelines for the design of these systems. These documents are: USEPA "Alternative Wastewater Collection Systems Manual" EPA/625/1-91/024, and FDEP "Design and Specifications Guideline for Low Pressure Sewer Systems" 1981. Discussions with both agencies revealed that there are no records compiled for low pressures systems regarding design standards or operational performance. The following is a summary of the relevant sections of the guidelines.

3.1 USEPA

The EPA manual on alternative systems discusses grinder pump systems and STEP systems. No guidance is provided on emergency storage however reference is made to the issue of extended power outages. It is noted that during power outages, water use and resulting wastewater production is significantly reduced. The EPA publication recommends that consideration be given to reserve storage as a "fail soft" measure, but no guidance is provided regarding the capacity of this storage. It is further noted that from the cases reviewed, generators and gasoline powered pumps have been provided in a few cases but are rarely if ever used.

3.2 FDEP

The FDEP guidance for low pressure sewer design references, in Chapter 1 Section A, subsection 3b, the fact that the typical storage provided by manufacturers in the single family size pumping system is 50 gallons. They then go on to indicate that the minimum required storage capacity is 50 gallons unless local authorities require additional storage.

In Chapter 1, Section A subsection 6, the FDEP guidance indicates that storage accommodation should be made for an average of one days flow. It also says that consideration should be made for enlarging the pump chamber to accommodate the additional storage in the event of emergency operating conditions. As such it can be assumed that FDEP recommends one days flow for storage. A discussion on what constitutes one days flow is presented in the following Section.

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**Evaluation of Standards for Low Pressure Sewer Systems
Sarasota County – ESBC Utilities
Section 4 - Low Pressure Sewers**

Section 4 – Emergency Operating Conditions

The most significant potential emergency condition in this region of the country is a power failure. While it is not practical to match the operational performance of a conventional on-lot septic system or the storage capacity of a gravity sewer, some consideration should be made for emergency storage in a grinder pumping system. This capacity should take into consideration economic impacts on the cost of the project and operational considerations such as the ability of the County staff to provide emergency services for pumping sewage from the most critical of areas to avoid adverse health impacts. Additionally, providing emergency power connections for these systems would allow rapid connection of the generator using a simple plug connection, instead of requiring a rewiring of the power feed, thereby saving time for the public utility or the resident to pump down the unit with a generator.

It should be noted that water consumption, and therefore wastewater generation, decreases during a power outage. Two manufacturers of the grinder pump systems (E-One and Barnes) have prepared estimates of wastewater generation during power outages based on fixture unit information from the Sump and Sewerage Pump Manufacturers Association and the Massachusetts State Plumbing Code. These estimates are shown in Table 1 which provides a list of the anticipated water consumption during normal and power failure periods. The resulting quantity of wastewater generation has been estimated to be approximately 21% of normal average daily flow. In considering the manufacturers' data, a modification is recommended to reflect the climate conditions in Florida. The wastewater generated by showers (bathing) should be added into the calculation. This would increase the water generation numbers to about 33.33% of normal use.

Appliance	Number	Fixture Units	Gallons Usage	
			Normal	Emergency
Automatic Clothes Washer	1	2	15	0
Water Closet	2	3	45	22.5
Bathtub	2	2	30	0
Dishwasher	1	2	15	0
Kitchen Sink	1	2	15	7.5
Shower Stall	2	3	45	22.5
Lavatory	2	1	15	7.5
Total	11	15	180	60
% of Normal Use			100%	33.33%

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Evaluation of Standards for Low Pressure Sewer Systems Sarasota County – ESBC Utilities Section 4 - Low Pressure Sewers

The following is a discussion of the storage capacities of STEP systems and grinder pump systems.

4.1 STEP Systems

In general, the septic tank of a STEP system provides only a small amount of emergency storage. For example, a 900-gal tank would provide approximately 50 to 100 gallons of storage. The remaining 800 to 850 gallon volume in the septic tank is taken up by a layer of sludge, a clear layer of effluent, and a layer of scum. Emergency storage volume is only available in the top 6 inches of the tank. There are a number of variations in STEP system configurations and capacities and the pumping chambers can be sized to provide additional storage capacity. The majority of surplus storage in a STEP system would need to be designed into the pumping chamber as it is not available in the septic tank.

4.2 Grinder Pump Systems

The grinder pump chamber can be designed to provide the same or more storage than the STEP system. Several manufacturers have products that allow the users to increase their storage capacity through larger tanks. Most standard pump units for a single family residence are approximately 70 gallons. By choosing a 150-gallon storage tank, emergency storage is increased dramatically. Emergency power receptacles are offered as an option on most grinder pump systems. If that option is not selected by the utility, the system can still be hard wired for an emergency pump down. However, if there is an emergency power receptacle with a universal plug, the property owner has the capability to pump down his own unit with a generator in an emergency.

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Evaluation of Standards for Low Pressure Sewer Systems Sarasota County – ESBC Utilities Section 5 - Sarasota County Design Standards for Low Pressure Sewers

Section 5 – Sarasota County Design Standards for Low Pressure Sewers

Sarasota County is reviewing a standard for low pressure sewer installations that involves the installation of a simplex low pressure pumping system. The pumping system utilizes the ABS Piranha 09 model grinder pump. This unit has a 2 horsepower pump motor and is capable of pumping 32 gallons per minute of flow at a total dynamic head of 69.9 feet. Appendix A provides manufacturer information on this equipment. The unit is complete with a stand alone pump control panel and a fiberglass pump chamber or pit. Graphical depictions of the systems under review by the County are presented in Figures 5-1, 5-2 and 5-3. The main difference between these figures is the capacity of the pump chamber being offered. Figure 5.1 shows a 2 foot diameter by 4 foot deep pump pit with a working capacity of 50 gallons. Figure 5.2 shows a 3 foot diameter by 5 foot deep pump pit with a working capacity of 158 gallons. Figure 5-3 shows a 4 foot diameter by 6 foot deep pump pit with a working capacity of 375 gallons.

The following subsections discuss the relevant issues of the program and also the main factors under consideration in determining the standard that the County will adopt.

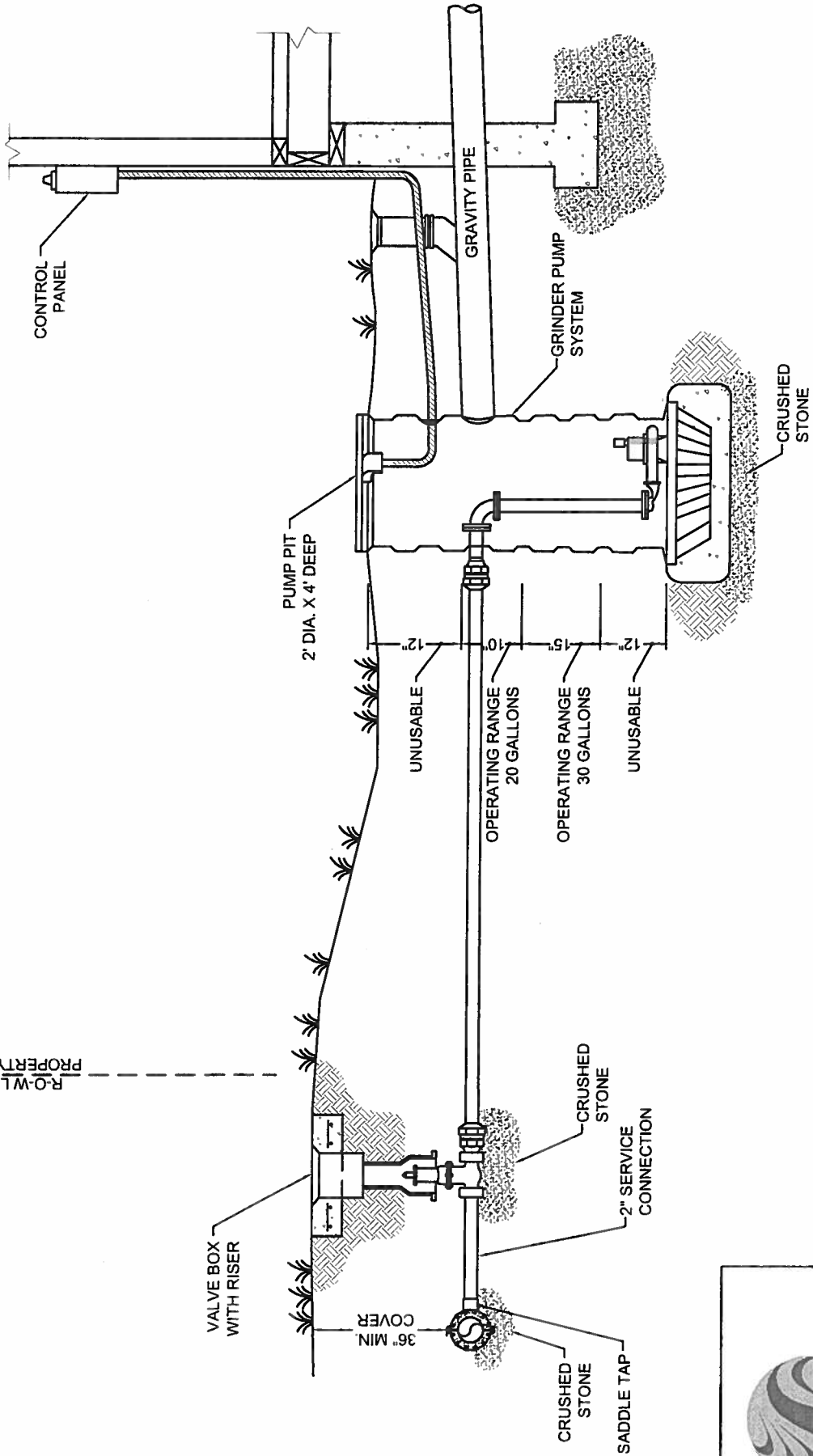
5.1 Installation and Maintenance

The proposed program in development by Sarasota County will include the County furnishing the pump, pump chamber and pump panel with controls. The County will also install the pump and pump chamber as well as the off-lot low pressure sewer system and service connection up to the property line. The home owner is provided the pump control panel and is required to have an electrician install the electrical control panel including all associated on-lot electrical upgrades, components (including owner provided disconnect switch), and connections necessary to meet the electrical needs of the panel. The owner is also responsible to have a licensed plumber furnish and install all necessary gravity pipe from the house to the pump pit and discharge pipe from the pump pit to the sewer service connection at the property line. The owner is responsible for securing all electrical and plumbing permits. The County will own and maintain the system and system components provided originally by the County. A copy of the proposed County installation and maintenance agreement is provided in Appendix B.

5.2 Emergency Storage Capacity Options

The size of the pump chamber was carefully reviewed for adequacy of storage capacity in the event of power outages. The 50 gallon working capacity unit has a total of 50 gallons of storage between the level the pump turns off and the invert or bottom of the house sewer pipe entering the pump pit. The normal operating volume between the pump “on” control and the pump “off” control is 30 gallons. In the event of a power failure under the worst case conditions with the operating range being just before the pump was to turn on, there would be approximately 20 gallons of additional storage before the

R-O-W LINE
PROPERTY LINE

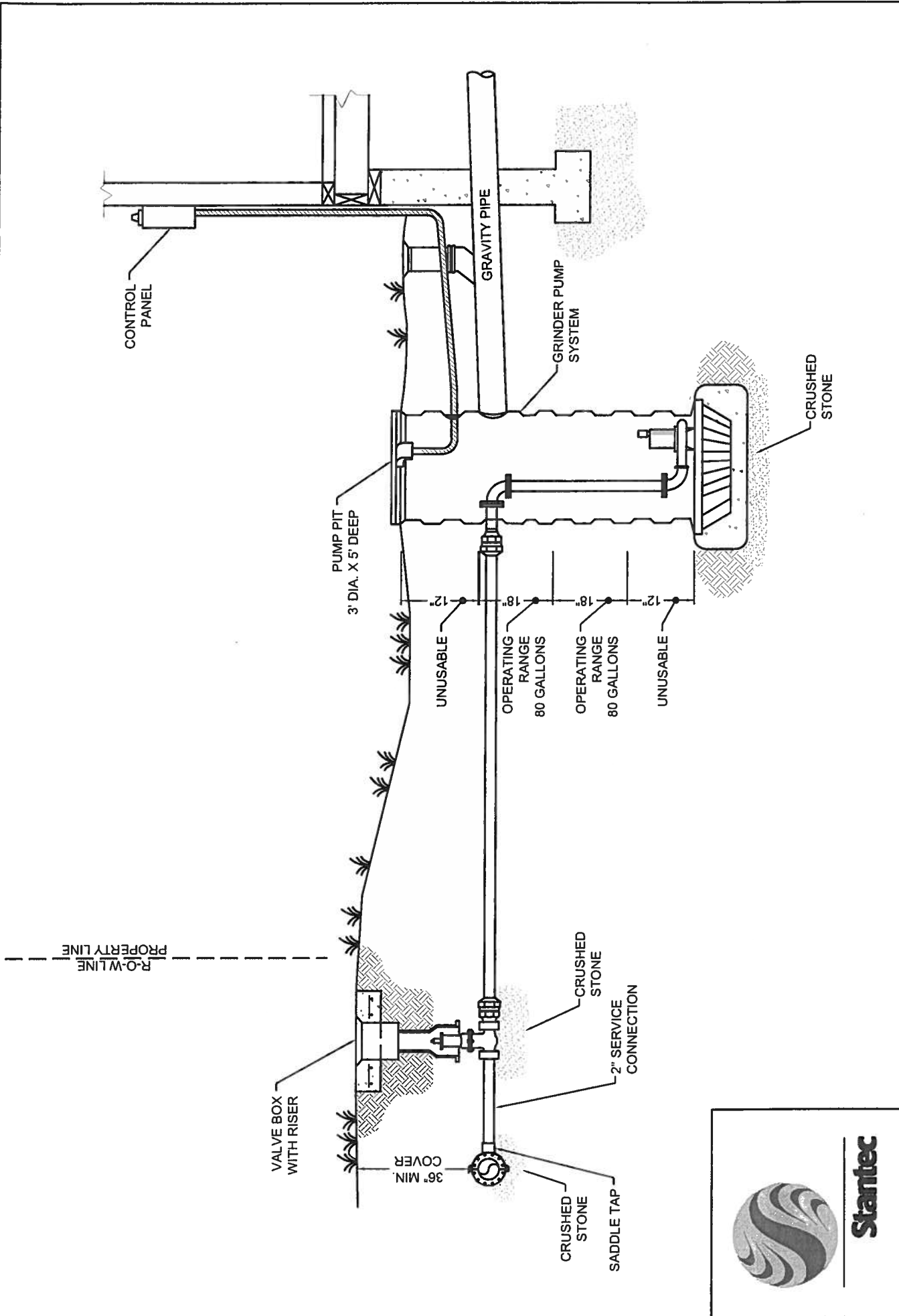


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EVALUATION OF STANDARDS FOR LOW PRESSURE
SEWER SYSTEMS

**LOW PRESSURE SEWER
INSTALLATION STANDARD**
50 GALLON WORK CAPACITY

FIGURE 5-1

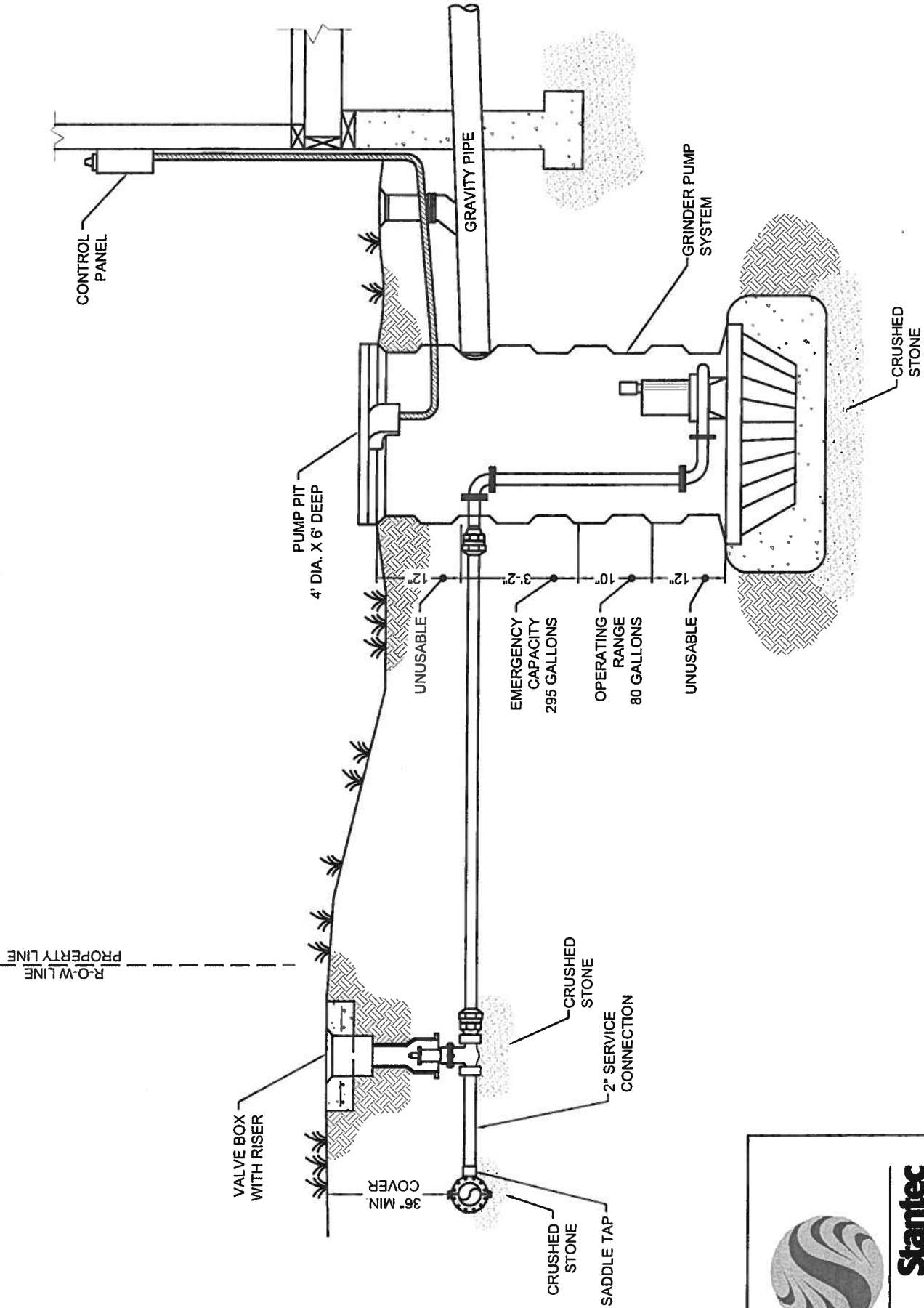


SARASOTA COUNTY
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 EVALUATION OF STANDARDS FOR LOW PRESSURE
 SEWER SYSTEMS

**LOW PRESSURE SEWER
 INSTALLATION STANDARD**
 158 GALLON WORK CAPACITY

FIGURE 5-2





SARASOTA COUNTY
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 EVALUATION OF STANDARDS FOR LOW PRESSURE
 SEWER SYSTEMS

**LOW PRESSURE SEWER
 INSTALLATION STANDARD**
 375 GALLON WORK CAPACITY

FIGURE 5-3



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Evaluation of Standards for Low Pressure Sewer Systems Sarasota County – ESBC Utilities Section 5 - Sarasota County Design Standards for Low Pressure Sewers

wastewater would reach the bottom of the house sewer pipe. At the reduced wastewater generation rate of 60 gallons per day in a power failure, the storage time would be approximately 0.33 days or approximately 8 hours.

The 158 gallon working capacity unit would have approximately 80 gallons of additional storage before the wastewater would reach the bottom of the house sewer pipe. At the reduced wastewater generation rate of 60 gallons per day in a power failure, the storage time would be approximately 1.3 days.

The 375 gallon working capacity unit would have approximately 295 gallons of additional storage before the wastewater would reach the bottom of the house sewer pipe. At the reduced wastewater generation rate of 60 gallons per day in a power failure, the storage time would be approximately 4.9 days.

In reviewing the regulatory guidance described in Section 3, it would appear the intent of the FDEP guidance is that the system should provide one day of storage in the event of a power outage. The 158 gallon working capacity system meets and exceeds that requirement. It is recommended that the smaller 50 gallon working capacity system be removed from consideration based on the FDEP guidance. Following is Section 6 where grinder systems in other Florida communities are reviewed and the issue of storage capacity is further identified.

5.3 System Serviceability

A major component of the County program is the ability to service and maintain these systems in an efficient and economical manner. This requires that the selected system be easily serviceable and that spare parts be readily available for quick repairs. It also requires that the system installations be as uniform as possible allowing service technicians to be able to quickly determine the locations of critical components regardless of system location. To accomplish these goals it is recommended that the purchase of these system components be through a single supplier using one manufacturer.

The County has researched existing grinder installations in other communities in Florida to identify a system that provides reliable service and can be maintained by existing County maintenance staff. This research was verified through efforts undertaken in the preparation of this report. In reviewing the available equipment the ABS Piranha 09 grinder pump provided the best combination of qualities to suit the County's needs. The pump manufacturer's references for installations in other Florida communities confirmed their performance as further discussed in Section 6 of this report. Additionally, the Piranha 09 pump weighs approximately 51 pounds allowing use of a single maintenance worker to remove the pump for repair. The next competitor had a pump that weighed 82 pounds requiring a two man crew for service.

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**Evaluation of Standards for Low Pressure Sewer Systems
Sarasota County – ESBC Utilities
Section 5 - Sarasota County Design Standards for Low Pressure Sewers**

5.4 Cost

An important factor in any public funded project is the cost of the improvement. The two systems being considered for the county standard are the 158 gallon and the 375 gallon working capacity installations. The cost of these systems includes two main components, the materials cost of the equipment and the installation cost. Table 5-1 is a summary of these costs.

TABLE 5-1 GRINDER SYSTEM COSTS			
Unit Size	Component Cost	Installation Cost	Total Cost
158 Gal. Working Cap.	\$3,000	\$6,000	\$ 9,000
375 Gal. Working Cap.	\$4,600	\$9,800	\$14,400

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Evaluation of Standards for Low Pressure Sewer Systems

Sarasota County – ESBC Utilities

Section 6 - Survey of Florida Communities Using Low Pressure Grinder Pumps Systems

Section 6 – Survey of Florida Communities Using Low Pressure Grinder Pump Systems

As a part of this evaluation a number of communities in Florida that have low pressure grinder type sewer installations were contacted to obtain information on the design and operation of their systems. The telephone logs from these discussions are provided in Appendix C. A summary of the relevant information is provided in the subsections below.

6.1 Astor, FL

The City of Astor, FL uses the E-one 150-gallon Model GP 2012 pumps for each single family residence, and 500-gallon capacity models for restaurants. The units they have installed do not have the emergency power connections. However, during the hurricanes in the past few years, power was lost in some areas for up to a week. The City Utility technicians were able to hard wire the systems so that they could bypass the control panel and plug the generator in right at the wet well. They were able to do this connection in about one minute, and then it took about 7-10 minutes to pump down each unit.

A representative of St. Johns River Utilities in Astor said that they felt that their system design had adequate storage capacity with pumping the units down on an as needed basis. During this power outage there were no reports of overflows. It was the St. Johns River Utilities responsibility to pump down the units as they reached the high water alarm level. They had three technicians pumping down over 1400 units. They felt that they had an adequate number of technicians as there were no instances of overflow. These technicians had to work some overtime hours during that event. The St. Johns River Utilities also was able to instruct those residents with generators how to pump it down themselves.

Overall, the Utility reported that the E-one grinder pump systems are the most costly, but they performed well. They did report some instances of pump failure but considered it to a reasonable failure rate for a system of 1400+ grinder pumps.

6.2 Hillsborough County

Beginning in 1988, Hillsborough County installed approximately 80 low pressure grinder pump units in Ruskin and Wimauma. They initially installed the ABS Piranha 08 model pump and later upgraded to the Piranha 09 as they became available. In addition to the Piranha pumps some E-one grinder pumps were included. The County also installed some STEP systems that use the Peabody Barnes effluent pumps. Citizens were educated on the do's and don'ts for low pressure sewer systems at public meetings.

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Evaluation of Standards for Low Pressure Sewer Systems

Sarasota County – ESBC Utilities

Section 6 - Survey of Florida Communities Using Low Pressure Grinder Pumps Systems

Their units do not have an emergency power receptacle. In the event of a power outage, if they need to perform an emergency pump down, they would hardwire the system.

During the last three hurricane seasons, there were instances where the power was out for up to three days. For the commercial properties, it was the property owner's responsibility to pump down their own system. For the single family homeowners, it was the County's responsibility to pump down the systems. However, the County advised the residents to pop the top on the clean out and let the sewage flow in the yard so that it would not back up into the house. The county did not go out to pump down the units with a generator.

The pumps had some maintenance issues as well. After about 6-8 years, the pumps began to have problems. They found that the ABS Piranha 09 model had fewer problems than the E-one. The E-one pumps had some manufacturer defects that the manufacturer replaced. The source of the problem was a defect that allowed water to enter the section of the station lid where the electrical components were housed, resulting in electrical failures.

6.3 Indian River County

Indian River County also uses ABS Piranha 2-horsepower grinder pumps in their low pressure sewer systems. They began installing their low pressure sewer systems in 1988. They currently have about 413 units installed. In early installations they used the Piranha 08 model with a 24" X 48" basin (48-gallon working capacity). They have upgraded in some areas to the 36" X 60" (158-gallon working capacity). They are happier with the additional storage it provides.

The issue of emergency power outages was really tested in Indian River County in the past 3 hurricanes. There was a point where they lost power for 17 days. The County employed the help of 6 technicians with 3 generators working 12-hour shifts. In one particular subdivision the loss of power for that amount of time resulted in sewage backing up into the house. A representative with Indian River County felt that there was some design issues involved with this failure. The low pressure systems in this subdivision were located in the back yard easements, which made emergency access difficult. The system was designed with up to 10 houses being fed from one electrical control panel for a total of 58 panels. The panels were located in back yard easements. In theory, this would allow the utility technicians to plug in at one panel and pump down up to 10 houses at the same time. In practice the Utility reported that the concept ailed during the 17-day power outage. Indian River County is now going to be replacing the low pressure systems in the subdivision that had severe back up problems with a vacuum sewer system. Except for the extensive power outages, there were no other significant problems encountered with their low pressure sewer systems.

6.4 City of Sanibel

The City of Sanibel is currently in the permitting process for a change order for a design that was originally for a gravity system. The existing pavement in the roadway under

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**Evaluation of Standards for Low Pressure Sewer Systems
Sarasota County – ESBC Utilities**

Section 6 - Survey of Florida Communities Using Low Pressure Grinder Pumps Systems

which the gravity system was to be placed was 2-4' thick. The high cost associated with making the gravity system as deep as it needed to be to serve the homes, combined with some bridge issues, and led the City toward a low pressure sewer system design. The City evaluated E-one, ABS, and Delta Environmental pumps. The City has issued a purchase order to the Contractor to install the Delta Environmental pumps. The City is

proposing 2.5' diameter wet wells (150 gallon working capacity) for single pump units and 3' diameter wet wells (210 gallon working capacity) for double pump units. In some cases these wet wells will be 10' deep. The double pump units will service two houses, and the single pump units will service one house. The City anticipates that the design will provide adequate storage capacity in the event of an extended power failure.

Currently the City is proposing to install 36 low pressure grinder pump units. They will wire 6 pumps together in one panel located in the public ROW to facilitate quick emergency pump down. Therefore, there will be 36 units with 6 panels. Eventually, the City will be adding another 40 low pressure grinder pump units to the system, for a total of 76 units.

6.5 SUMMARY OF SURVEY

The following table is a summary of the technical information from the survey discussed above.

Community	No. of Units	Manufacturer	Model	Working Capacity	Emergency Reserve Capacity
Astor, FL	1400	E-one	2012	150- gallons	98-gallons
Hillsborough County, FL	80	E-one and ABS	E-one 2010, Piranha 09	97-gallons (E-one); 30-gallons (ABS)	74-gallons (E-one); 18-gallons (ABS)
Indian River County, FL	413	ABS	Piranha 08 / Piranha 09	48-gallons for 24"x48" wet well; 158-gallons for 36"x60" wet well	30-55 gallons for 24"x48"; 53-80 gallons for 36"x60" wet well
City of Sanibel, FL	36 current w/ 40 proposed	Delta Environmental	DGF 12- LPS	150 gallons minimum	98- gallons
Sarasota County	To be determined	ABS	Piranha 09	158 gallons	80 gallons

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Evaluation of Standards for Low Pressure Sewer Systems Sarasota County – ESBC Utilities Section 7 - Component Manufacturers Overview

Section 7 – Component Manufacturers Overview

Component manufacturers for the grinder pump systems were contacted to discuss options available to address the issues of emergency operation under extended power outages. The manufacturers contacted were E-One, Barnes Pumps and ABS.

7.1 E-one

E-one low pressure systems address the issue of power outages through the use of storage capacity and ease of electrical generator connection inherent in their design. Use of Model GP 2012 would provide greater holding capacity than that of the GP 2010. The Model GP 2010 has a 70-gallon tank capacity and can accommodate flows of 700 GPD, and Model GP 2012 has a 150-gallon tank capacity and can accommodate flow up to 1500 GPD. Another alternative would be the new "Squat Tank" which provides even more storage than the other models. The Squat Tank has an optimum capacity of 261 gallons and can accommodate flows of 1500 GPD.

The low pressure system also has the option to have an emergency power receptacle. The E-one stations come with an EQD plug which connects the motor cable to the panel cable and replaces the need for a junction box. The EQD is a simple male-female plug with a gasket between the two connections which makes it a NEMA 6P plug (submersible). By removing three bolts from the top of the station and unscrewing the two ends of the plug, a female cable can be inserted, and the generator turned on. This enables a generator to be hooked up to the station if needed for pump down in the event of an extended power outage. A 5,000-watt generator would be needed to start one pump at a time. Manufacturer information is provided in Appendix D.

7.2 Barnes

Barnes Grinder Pump Stations addresses emergency operation through pump pit capacity and emergency generators plugs. The most common OmniGrind Model unit used for a single family home is comparable to the E-one Model 2010. It has a 70-gallon capacity. Skip Dorton, the Barnes sales representative said that they also sell STEP systems. He said that the STEP systems with a 900-gallon septic tank would provide about the same amount of storage as the 70-gallon grinder pump basin. Barnes also has an option for a "C" channel guide rail system that slightly increases the storage capacity of the pump basin.

The generator receptacle is also an option for the Barnes low pressure grinder system. A 5,000 watt generator would be needed for pumping down one unit. Additionally, it would only take 5-10 minutes to access, connect, and pump down each unit. Manufacturer information is provided in appendix E.

Stantec

Evaluation of Standards for Low Pressure Sewer Systems Sarasota County – ESBC Utilities Section 7 - Component Manufacturers Overview

7.3 ABS

ABS Piranha 09 pumps are the pumps that Sarasota County is seeking to use for the low pressure grinder pump systems. ABS addresses the emergency operation issue through the use of additional capacity in the pump pit, optional provisions for an emergency power connection, and an option for quick connection fittings and valves to allow pumping out the pit using a portable pump. These options are shown in Appendix A along with other manufacturer's information on the pump system.

The pump pits recommended include a 158 gallon working capacity and a 375 gallon working capacity unit. These units provide 1.3 day and 4.9 day reserve capacity respectively during extended emergency power outage events. These capacities are over the normal operating capacity of each unit.

Stantec

Evaluation of Standards for Low Pressure Sewer Systems Sarasota County – ESBC Utilities Section 8 - Conclusions and Recommendations

Section 8 – Conclusions And Recommendations

8.1 Conclusions

The use of low pressure grinder pump systems is an established practice with generally good performance reported for installations in Florida. There is a lack of specific design standards from federal and state regulatory agencies but it appears that good practice dictates the use of at least one day of storage in the design of the pumping chambers for these systems. There is a concern on the part of citizens and the utility community relative to operation of these systems during extended power outage periods. The main design response to address this issue is to; provide excess wastewater storage in the pump system, and provide for quick connection at the grinder pump site for portable generator connections for power outage conditions.

A review of STEP systems versus Grinder Systems indicates that there is no real advantage in terms of storage capacity of one over the other. Either system can be designed to provide similar amounts of emergency storage. The perception that STEP systems have significant quantities of reserve storage comes from a misunderstanding of the operation of the septic tanks. These tanks operate in a mostly full condition leaving only a small amount of head space in the tank to serve as extra capacity. A small increase in the grinder system pump chamber can easily offset that capacity. The perceived advantage of maintaining old septic tanks for that small amount of capacity is offset by the disadvantage of potential structural problems that could cause collapse of the tank, potential for continued leakage of the wastewater constituents into the environment and the cost of cleaning and repairing the tanks to allow them to be kept safely in service for the occasional emergency use.

The ABS Piranha 09 system was demonstrated in other communities to have a history of reliable performance. The use of this low weight pump system permits the servicing of the individual systems by one maintenance worker rather than a two person crew. By using a single manufacturer through a strong local supplier, stocking of replacement parts is reduced and repair times and costs can be kept to a minimum.

Stantec

Evaluation of Standards for Low Pressure Sewer Systems Sarasota County – ESBC Utilities Section 8 - Conclusions and Recommendations

8.2 Recommendations

The following are the recommendations based on the findings of this evaluation and in consideration of the concerns for good practice in the normal and emergency operation of the low pressure sewer system:

1. Adopt the ABS installation that provides the 158 gallon working capacity pump chamber as a minimum. Allow the homeowner the ability to purchase the 375 gallon working capacity unit at the additional cost.
2. Select a single supplier for all grinder system components. This would include the initial component parts and future repair parts. Supplier should be able to demonstrate a history of providing rapid local service.
3. Consider provisions for a universal emergency power connection at each grinder system control panel. The power connection should be designed to prevent the back-feed of electricity to public power supply while the portable generator is connected and operating the pump.
4. Provide information and training to the homeowners on proper use of the low pressure systems and water conservation practices to implement during extended power outage periods.

APPENDIX A
FLORIDA COMMUNITIES
SURVEY

TELEPHONE CORRESPONDENCE LOG

CONTACT	DATE	DESCRIPTION
Astor, FL Randy Myers (St. John's River Utilities) 352- 759-3122 (office) 352- 455-3449 (cell)	4/13/06	<ul style="list-style-type: none"> • Low Pressure sewer system using E-one model 2012 with a single unit for each home. • There are 150-gallon units for homes, and 500-gallon units for restaurants. • There is no emergency power connection on their units. E-one now has this available on the new models. During an emergency they hardwired the system and bypassed the control panel. • They have experience extended power outages, where they lost power from 1-2 days to a week. They did have adequate storage capacity. • There are no delay timers on the pumps. This was not necessary because they were pumping down. Also, power was not restored everywhere simultaneously. • All of the units are independently wired, there is no wiring of multiple units together. • It is the City's responsibility to pump down units during the power outage. They have three technicians doing pump downs of 1400+ units. They had to pay overtime to that staff. They also educated owners with generators how to do it themselves. • To pump down a single unit, it takes 1 minute to hook up and 7-10 minutes to pump it down all the way. A 220 V, 20-30 Amp, 5,000 kW generator was used. They are pumped down one at a time. • No other problems were encountered. E-one was the most costly, but good pumps. A small number of pump failures occurred. These failures were not considered significant. Pumps are not maintenance free. • The City maintains pump stations in the yards and the control panels. • The citizens were educated on do's and don'ts at an annual meeting for citizens. • The pumps have a 5-year warranty. The City does their own warranty work. E-one pays \$60/hr + parts back to the City for any warranty work the City does themselves. • \$5/month/pump is a good budget for maintenance • Astor-the only place in FL that went with the larger tanks—costs more but the City felt this really paid off with the last 3 hurricanes.

TELEPHONE CORRESPONDENCE LOG

CONTACT	DATE	DESCRIPTION
Hillsborough County – Frank Ferlita 813-276-8331; Rich Cummings 813-272-5977; knightrr@hillsboroughcounty.org	4/13/06	<ul style="list-style-type: none"> • Low Pressure sewer system started in 1988. • ABS Piranha 09 pumps are 2hp, 230V grinder pumps. • They also have STEP systems. • There are 80 low pressure grinder units, with average storage of about 2 ½ days for the ABS, and about 1-hr (he said sarcastically for the E-one pumps) • The units do not have an emergency power receptacle. The system can be hardwired to receive emergency power. • They have had instances in the past where they lost power for 2-3 days. • There are no delay timers on the pumps so that when the power goes back on, all the pumps don't go on at the same time. • During a power outage, the county pumps down the units for the single family homes. However, businesses must do this themselves. • In the past, the county was not able to keep up with this, so the customers popped tops on the cleanouts and let it flow so that the waste did not back up into their houses. • Typical problems with the grinder pumps that occurred were that the pumps did not last. Also there were maintenance issues. Problems started approximately 6-8 years after installation. The E-one pumps had manufacturer's defects where the lids were leaking into the electric components. The manufacturer replaced these, but it was still a hassle. • Frank felt that the Piranha model was better.

TELEPHONE CORRESPONDENCE LOG

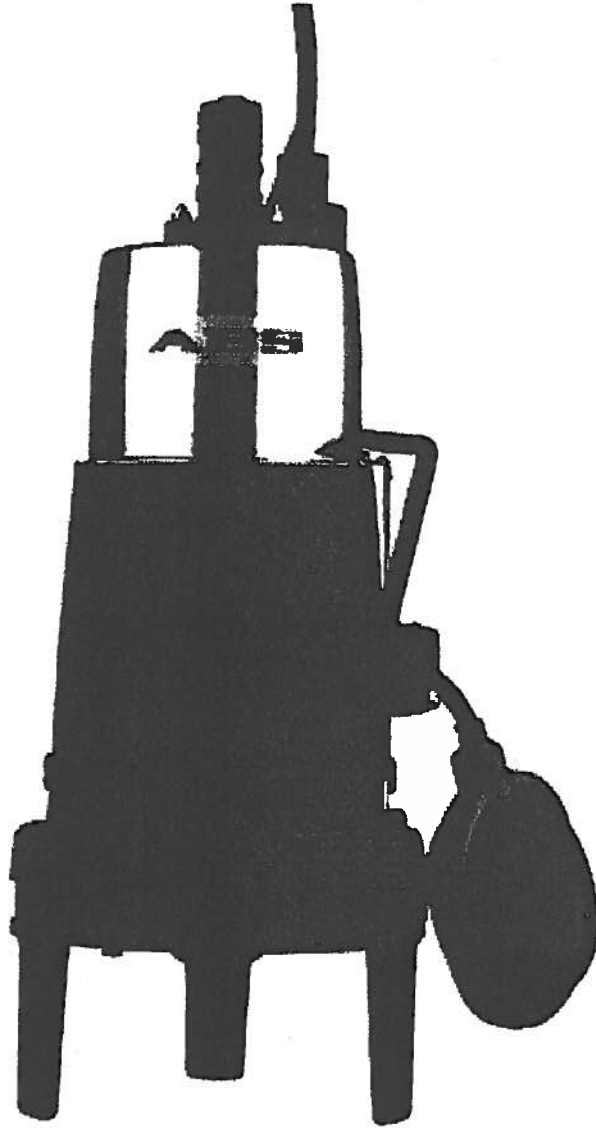
CONTACT	DATE	DESCRIPTION
Indian River County-Terry Southard 727-567-8000 x 1831; Gerry 727-532-7475	4/13/06	<ul style="list-style-type: none"> • Low Pressure sewer system started in 1988. • ABS pumps are 2hp, 230V grinder pumps. • There are 413 units, with average storage of about 55-gal. • Pumps are located in the back easements. This makes it tough and has made it tough to access. • They have 10 houses fed from one panel and feel that this is poor design. They have 58 panels. • For the past 3 hurricanes where they sustained substantially long power outages (such as 17-days), they had serious problems with sewage backing up in the showers. • They decided to go with a vacuum system in the subdivisions where the Low Pressure system has failed. • During a power outage the city goes and pumps down each unit. <p>The city has 3 generators, 6 technicians, and they were working 12-hour shifts to keep up with the problems during the past 3 hurricanes.</p>

TELEPHONE CORRESPONDENCE LOG

CONTACT	DATE	DESCRIPTION
Sanibel Island, FL- Sandy Larson 239-472- 4135	4/13/06	<ul style="list-style-type: none"> • Low Pressure sewer system using Delta Environmental pumps. • They are proposing to use 3' wet wells for double systems and 2' wells for single systems. This will yield more storage in an emergency situation. • Sandy is working with Barney's Pumps on this. They also looked at E-one and ABS pumps. • Their design has 6 pumps wired to one panel, with a total of 12hp for the 6 pumps. The panel would be located in the public right of way. • They are at the permitting phase right now. The original design started out as gravity, but the 2-4' thick asphalt and bridge issues make gravity not a viable option. • Looking at fiberglass 2' and 3' wet wells/ • The local DEP recommends for every 2 house you need 2 pumps. • They are currently proposing 36 units with 6 control panels. • Later they will construct another 40 units, for a total of approximately 80 units. • They like the Delta Environmental pumps because there are only four bolts to remove to pull it out.

APPENDIX B
PROPOSED SARASOTA COUNTY
STANDARD ABS PIRANHA 09

Product Release Letter



PIRANHA[®] 09

1. Introduction

ABS is pleased to announce the addition of the PIRANHA® 09 to the PIRANHA® pump family. Based on the highly successful PIRANHA® 08, the new PIRANHA® 09 offers increased performance, a heavier shredding system and cast iron impeller.

This model uses the motor from the MF range, and a major advantage from an installation and cost point of view, is that the capacitor in the case of single phase pumps, and the relay in the case of three phase pumps, is located in the upper lid. This means that a control box is not necessary. Simply plug in the pump and it can run automatically with start and stop controlled by a float switch wired into the upper lid. The PIRANHA® 09 is among the most competitive pumps available in the market.

2. Product Aim

The PIRANHA® 09 is designed to complement the PIRANHA® range of pumps, and bridges the gap between the PIRANHA® 08 and the PIRANHA® S12 series

3. Product Programme

3.1 Standard Program

The PIRANHA® 09 is available in both single and three phase versions in 50Hz and 60Hz.

3.2 Spares

Spare parts are available for all new models. Copies of the relevant Spare Part Lists are attached with this PRL.

3.3 Service

Similar to existing PIRANHA® models

4. Sales Strategy

4.1 Sales Arguments

Same as existing PIRANHA® 08, with comment on bigger shredding system, cast iron impeller and higher pumping performance.

4.2 Application Priorities

Same as existing PIRANHA® range, but mainly for single house domestic applications.

4.3 Customer Priorities

Same as existing PIRANHA® range. Both PIRANHA® 08 and PIRANHA® 09 are very competitive

units and are ideal for single house domestic applications

4.4 Market Priorities

Same as existing PIRANHA® range, but with emphasis on low cost and simple installation.

4.5 Competitors

Same as existing PIRANHA® range.

5. References

N/a

6. Training

There is no specific training needed, but please ensure that all sales personnel, both internal and external, are familiar with this new model.

7. Sales Promotion

7.1 Web

The appropriate information will be added to all relevant documents currently available from the Internet (see ABS Document Bank). All information in this PRL is available on the Intranet. Please check under Documents/Building Services/PRL - Product Release Letter.

7.2 Product Data Sheet

A copy of the English and German language Product Data Sheets is attached with this PRL. Other languages will be made available shortly. For further information please contact heike.goes@abspumps.com

7.3 Technical Documentation

The following documentation is attached;
Hydraulic Performance Curve
Motor Performance Curve
Dimension Drawing
Installation Drawing
Spare Parts List

7.4 Software

The new models will be included in the next issue of ABSEL.

ABS launches new pump in PIRANHA® family.

PIRANHA® 09

ABS is pleased to announce the addition of the PIRANHA® 09 to the PIRANHA® pump family. Based on the highly successful PIRANHA® 08, the new PIRANHA® 09 offers increased performance, by incorporating a hardened steel shredding system and cast iron impeller.

The PIRANHA® 09 is available in both single and three phase versions in 50Hz and 60Hz. The unit incorporates the existing well proven PIRANHA® technology and is ideal for the pumping of domestic sewage and effluent. A control box is not necessary because of a capacitor in the case of single phase pumps, and a relay in the case of three phase pumps located in the upper lid. Simply plug in the pump and it can run automatically with start and stop controlled by a float switch wired into the upper lid.

The PIRANHA® 09 is among the most competitive pumps available in the market.

Key benefits of PIRANHA® 09 include

- Maximum pumping head of 22m for 50Hz models, or 32m / 105 ft for 60Hz models
- Greater flow
- Increased shredding capability
- Compact design
- Compatible with existing installations
- Proven technology
- Simple installation

The PIRANHA® submersible pumps have been designed for effective and economical dewatering tasks using discharge lines of small diameter in private areas.

For further information, please contact Jenny Nilsson at ABS Marketing Communications, tel +46 31 83 64 08, fax +46 31 18 49 06 or mail jenny.nilsson@abspumps.com

PIRANHA® 08 to 110

CE

DIN/EN 12050-1

ABS submersible pumps for problem-free pumping of sewage containing faecal matter in pipe lines from 1½" (DN 32)

Applications

The PIRANHA® submersible pumps have been designed for effective and economical dewatering tasks using discharge lines of small diameter in private, municipal and industrial areas.

- For sewage removal from living units and houses in scattered settlements where the laying of a conventional sewer would be too expensive, or where large ground undulations are present or where it is only possible to lay pipe lines of small diameter.
- For sewage removal from motorway resting sites, communal buildings and for renovation of buildings or parts of a city.
- For use in slaughter houses, food processing plants, paper factories, agriculture and similar areas.
- PIRANHA® 08 and 09 are specially designed for private and domestic applications.

Medium Pumped

Faecal matter and heavily polluted sewage, max. medium temperature: continuous operation = 40° C or if unit is submerged, short term to 60° C (max. 5 min).

Construction

The water pressure tight encapsulated fully flood proof motor and the pump section form a compact robust unit construction.

Motor

Three phase 400 V 3 or single phase 220-240 V, 50 Hz, 2-pole (2900 min⁻¹) or 4-pole (1450 min⁻¹), insulation class F, protection type IP 68, cooled by amply dimensioned cooling areas. Other voltages and units suitable for 60 Hz operation are also available. Motor in explosive proof version type EEXd IIB T4 and FM/CSA.

Bearings

The motor shaft is supported in lubricated-for-life ball-bearings.

Shaft sealing

Between motor and hydraulic section by means of high quality sealing unit using a silicon carbide mechanical seal, independent of direction of rotation and resistant to temperature shock, motor side: Lip seal oil lubricated.

Discharge

PIRANHA® 08 and 09 = G 1½" internal thread
PIRANHA® S10 to S26 and M30 = G 1½" with oval flange
PIRANHA® M55 to M110 = DN 50 with DIN-flange

Shredding System consisting of spiral bottom plate with stationary cutter ring with culling edges and a shredding rotor located before the impeller for optimum blockage-free running.

TCS-Thermo-Control-System

By means of thermal sensors in the stator to give a warning and to switch off the motor in the event of excessive temperatures occurring [PIRANHA® 30 to 110 and 12 Ex to 110 Ex].

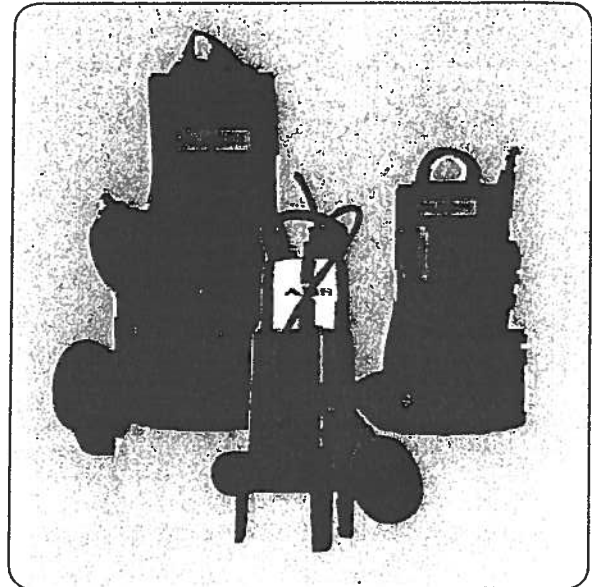
Q-System

For seal monitoring consisting of an electrode in the motor and oil chamber (motor housing only - Ex) and an optical and/or acousical inspection indication should leakage at the shaft sealing occur [optional].

Materials

Motor housing _____ Cast Iron GG-25
Rotor shaft _____ Stainless Steel 1.4021 (AISI 420)
Volute, impeller* _____ Cast Iron GG-25
Fasteners _____ Stainless Steel 1.4401 (AISI 316)

*Polyamide for PIRANHA® 08



- Unique ABS PIRANHA® shredding system capable of shredding cloths and plastic bags
- For the pumping of wastewater containing sewage, ofal, organic and industrial effluent
- PIRANHA® 10/4 to 110/2 fitted with modular AS and AFP motors
- Low installation costs
- Advantage of small discharge lines from 1½" (DN 32)
- Installations are possible where large ground undulations are present
- PIRANHA® 08 and 09 use modular MF motor
- Standard and Ex-versions available (PIRANHA® 10 to 110)
- PIRANHA® 08 and 09 do not need a control box as capacitor or relay in upper lid

PIRANHA® 08 to 110

Technical Data

Type Std. and Ex. Version***	Discharge KS Internal thread DN	Motor power* Speed		Rated voltage V _r	Rated current A	Cable type**	Weight***		
		P ₁ kW	P ₂ kW				at 50 Hz min ⁻¹	std	ex
PIRANHA® 08 W (no ex version)	G 1 1/4" 32	1.4	1.0	2900	220-240 single phase	6.4	(4)	-	18
PIRANHA® 08 D (no ex version)	G 1 1/4" 32	1.34	1.0	2900	400 three phase	2.7	(5)	-	18
PIRANHA® 09 W (no ex version)	G 1 1/4" 32	2.6	1.8	2900	220-240 single phase	11.6	(4)	-	23
PIRANHA® 09 D (no ex version)	G 1 1/4" 32	2.6	2.0	2900	400 three phase	4.4	(5)	-	23
PIRANHA® S10/A W	G 1 1/4" 32	1.7	1.0	1450	220-240 single phase	7.5	(1)	(2)	32
PIRANHA® S12/2 W	G 1 1/4" 32	1.8	1.2	2900	220-240 single phase	8.2	(1)	(2)	32
PIRANHA® S12/2 D	G 1 1/4" 32	1.7	1.2	2900	400 three phase	3.9	(1)	(2)	32
PIRANHA® S18/4 D	G 1 1/4" 32	1.9	1.3	1450	400 three phase	3.6	(1)	(2)	32
PIRANHA® S17/2 W	G 1 1/4" 32	2.4	1.7	2900	220-240 single phase	10.6	(1)	(2)	32
PIRANHA® S17/2 D	G 1 1/4" 32	2.3	1.7	2900	400 three phase	4.0	(1)	(2)	32
PIRANHA® S21/2 D	G 1 1/4" 32	2.8	2.1	2900	400 three phase	4.6	(1)	(2)	37
PIRANHA® S26/2 D	G 1 1/4" 32	3.4	2.6	2900	400 three phase	5.6	(1)	(2)	40
PIRANHA® M30/2 D	G 1 1/4" 32	3.7	3.0	2900	400 three phase	6.2	(2)	(2)	53
PIRANHA® M55/2 D	50 DIN-Flange	6.5	5.5	2900	400 three phase	10.4	(3)	(3)	76
PIRANHA® M70/2 D	50 DIN-Flange	8.3	7.0	2900	400 three phase	13.6	(3)	(3)	77
PIRANHA® M85/2 D	50 DIN-Flange	10.1	8.5	2900	400 three phase	17.2	(3)	(3)	78
PIRANHA® M110/2 D	50 DIN-Flange	13.3	11.0	2900	400 three phase	21.1	(3)	(3)	80

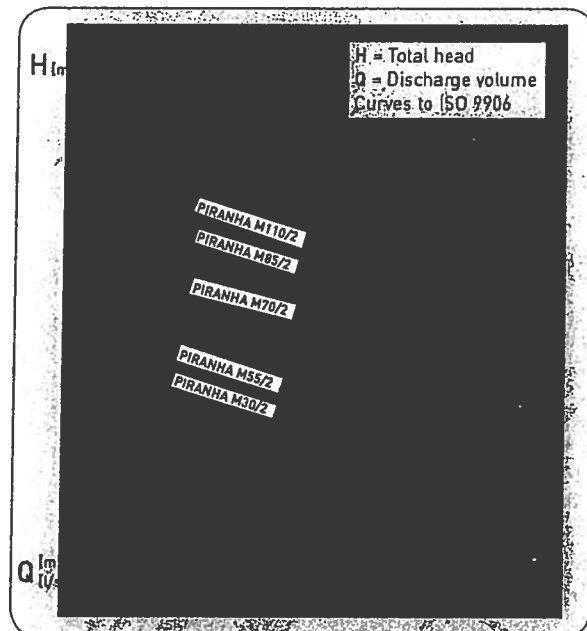
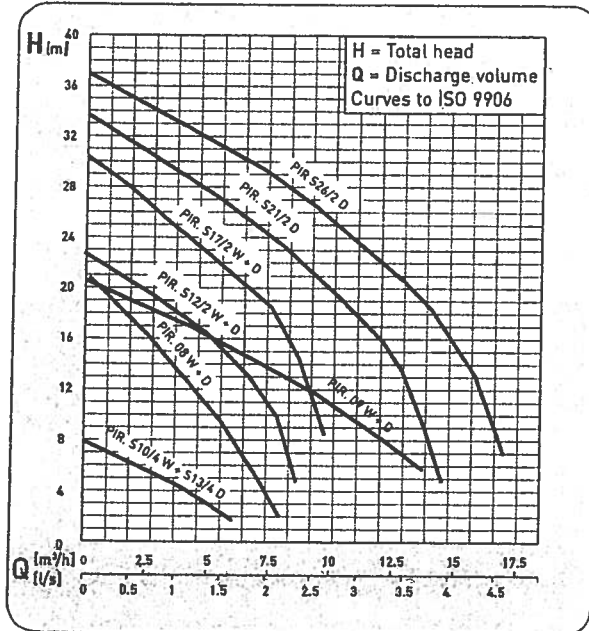
*P₁ = Power taken from the mains; P₂ = Power at the motor shaft

**Special rubber compound cable with free cable ends:
(1) 461.5; (2) 761.5; (3) 1061.5; (4) 361.0; (5) 461.0

***Weight with 10 m of cable

****For single phase versions start & run capacitor required in addition unless purchased with control panel

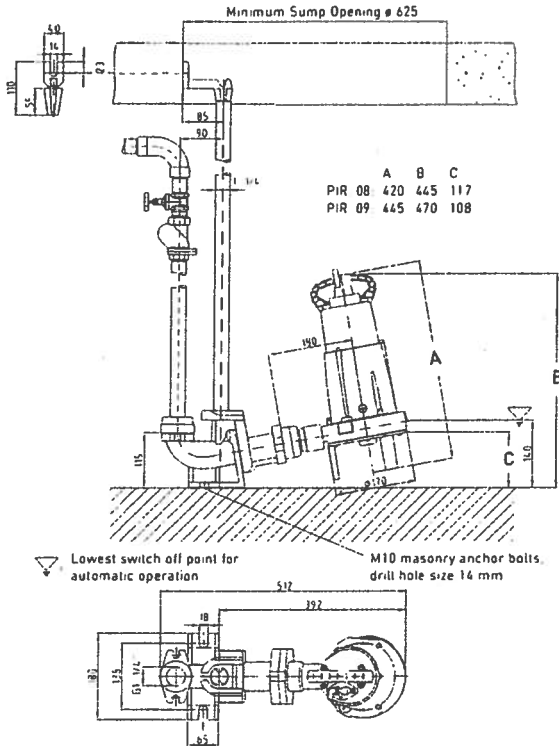
Performance Curves 50 Hz



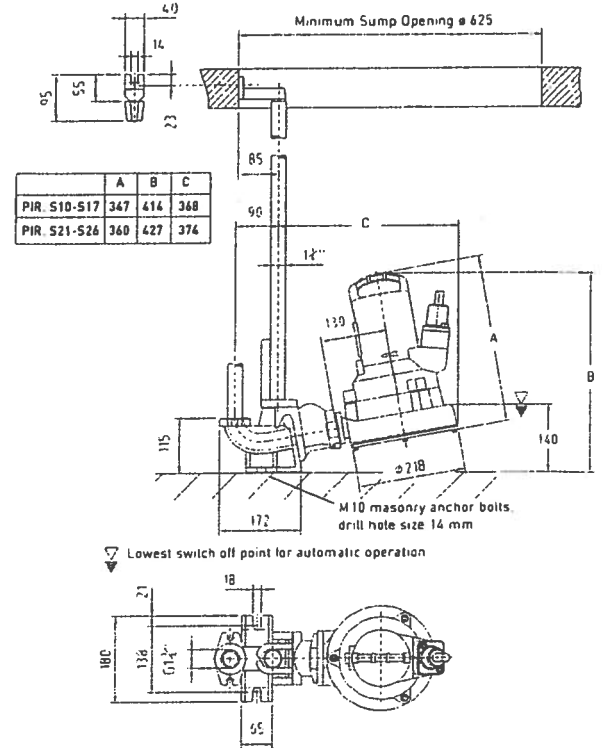
Performance curves for 60 Hz are available on request

Dimensions and Installation Examples (with pedestal)

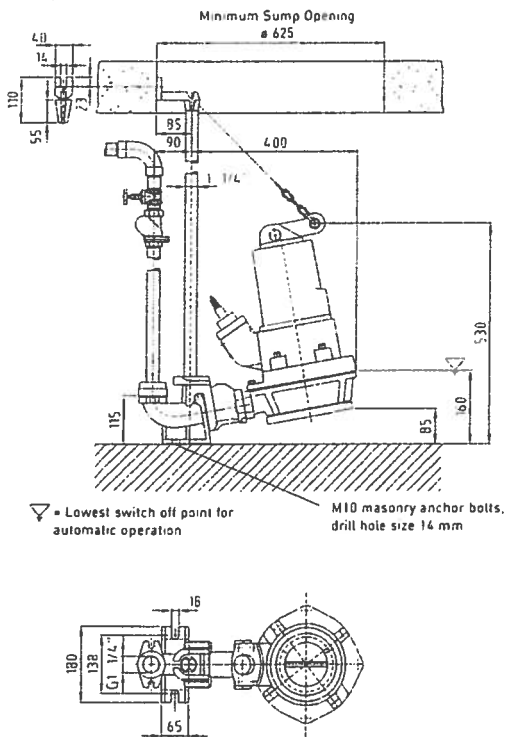
PIRANHA® 08 and 09



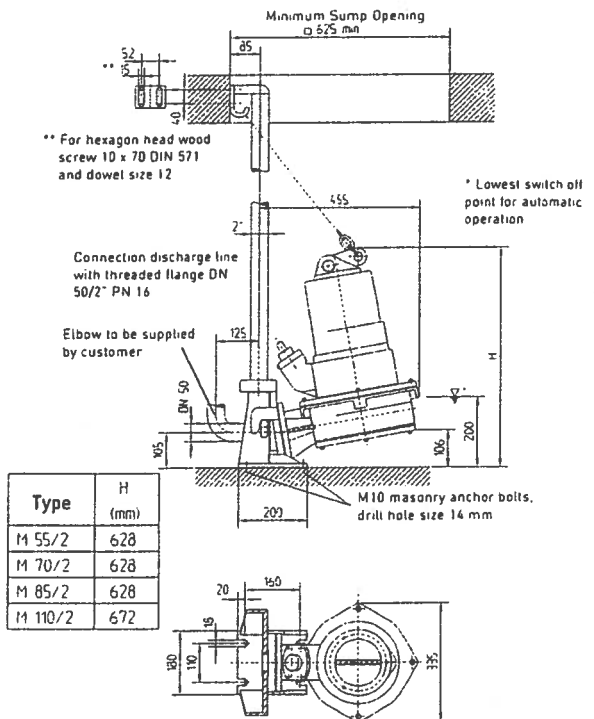
PIRANHA® S10 to S26



PIRANHA® M30



PIRANHA® M55 to M110



Dimension in mm

PIRANHA® 08 to 110

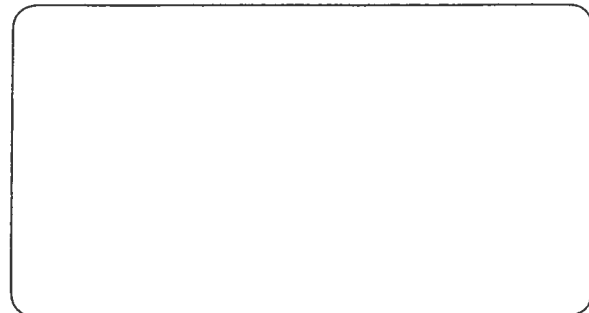
Accessories

Fixed Installation with Pedestal

Description (Material)	Size	Part No.
■ PIRANHA® 08 and 09		
<input type="radio"/> Pedestal [GG-25] G 1½" supplied complete with fixing bolts	G 1½"	62325007
<input type="radio"/> Adapter		13770011
■ PIRANHA® S10 to S26 and M30		
<input type="radio"/> Pedestal [GG-20] G 1½" supplied complete with fixing bolts	G 1½"	62320536
<input type="radio"/> Guide tube [steel, galv.] also for PIRANHA® 08 and 09	1½"	1 m 31380007 2 m 31380008 3 m 31380009 4 m 31380010 5 m 31380011
■ PIRANHA® M55 to M110		
<input type="radio"/> Pedestal [GG-25] G 2" supplied complete with fixing bolts	DN 50 (2")	62320660
<input type="radio"/> Guide tube [steel, galv.]	2"	1 m 31380001 2 m 31380002 3 m 31380003 4 m 31380004 5 m 31380005 6 m 31380006
<input type="radio"/> Chain kit [steel, galv.] including shackle	3 m 4 m 6 m 7 m	61265065 61265093 61265069 61265096
<input type="radio"/> Ball type non-return valve [GG-20] with 2 x internal thread	G 1½" G 1½" G 2"	61400525 61400526 61400527
<input type="radio"/> Shut off valve [brass] with internal thread	G 1½" G 1½" G 2"	14040005 14040006 14040007

Transportable Applications and Connection to Tank

Description (Material)	Size	Part No.
■ PIRANHA® S10 to S26 and M30		
<input type="radio"/> Threaded flange [GG-20], oval	G 1½"	61180512
<input type="radio"/> Ground support ring [St 37] supplied complete with fixing bolts	PIRANHA 12/26	61900013
<input type="radio"/> Fixed coupling [brass] GEKA with external thread	G 1½"	15020003
<input type="radio"/> Hose coupling with nozzle, outer dia. = 34 mm	G 1½"	15020018
<input type="radio"/> Ball-type non-return valve [GG-20] with 2 x internal thread	G 1½" G 1½" G 2"	61400525 61400526 61400527
■ Horizontal Tank Connection [PIRANHA® S10 to S26]		
<input type="radio"/> Pump with built-on flange on the suction side DN 150/PN 16 to DIN 2633		Request when ordering
<input type="radio"/> Head support [GG-20] with vibration damping	PIRANHA® S12/S26 PIRANHA® M30-M110	61820078 61820041



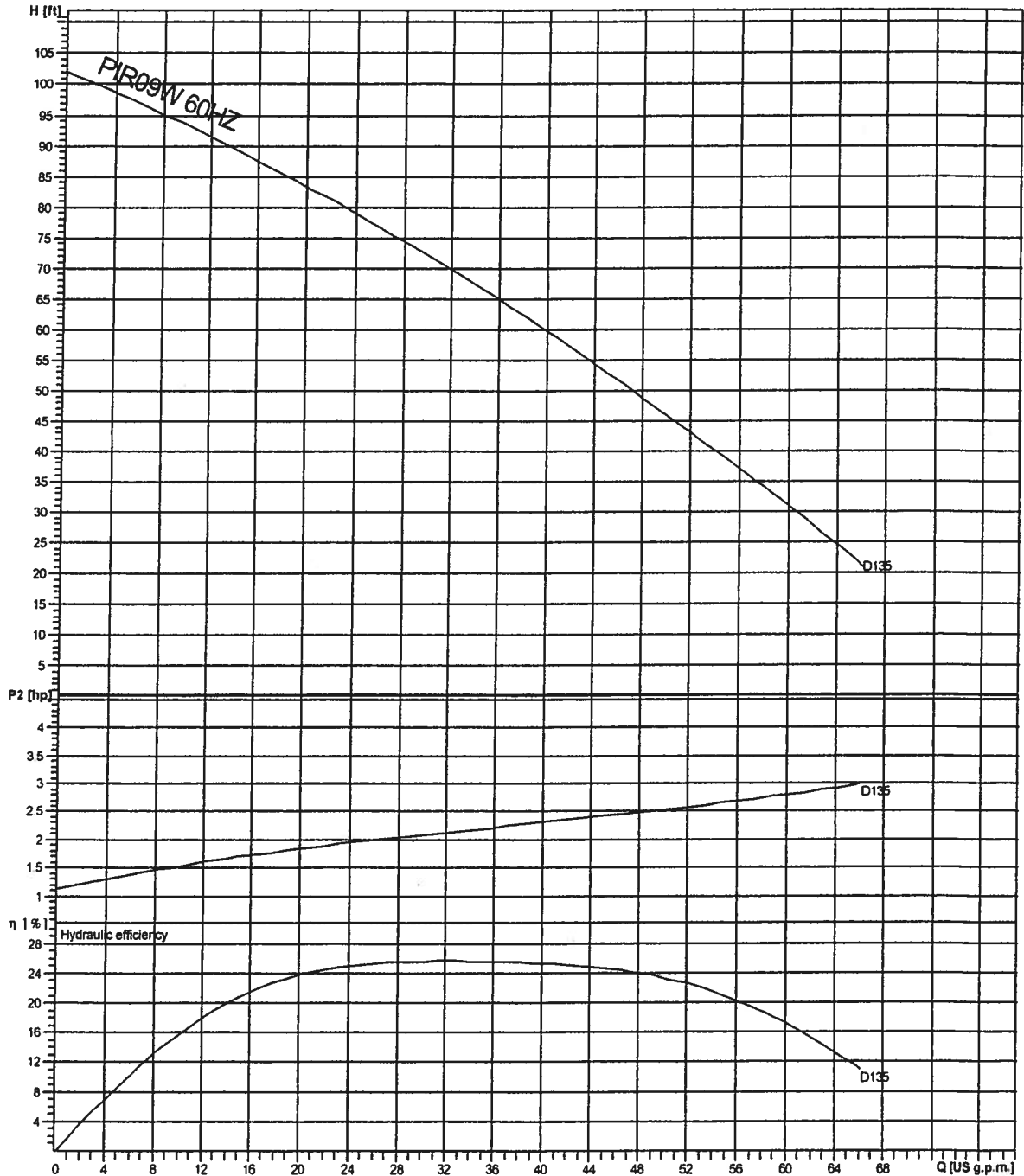
ABS
COST-EFFECTIVE PUMPING



**Pump performance curves
PIRANHA 09 W 60 HZ**

Curve number
Reference curve PIR09W

SARASOTA COUNTY GRINDER PROJECT			Discharge G1½"	Frequency 60 Hz
Density 62.428 lb/ft³	Viscosity 0.000016813 ft²/s	Testnorm Hydraulic Institute	Rated speed 3395 rpm	Date 2005-03-23
Flow 32 US g.p.m.	Head 69.7 ft	Rated power 2.14 hp	Hydraulic efficiency 25.6 %	NPSH



Impeller size 135 mm	N° of vanes 5	Impeller Macerator	Solid size	Revision 2004-09-01
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ABS reserves the right to change any data and dimensions without prior notice and can not be held responsible for the use of information contained in this software.

ABSEPRO 1.7.1 / 2003-07-09

ABS
COST-EFFECTIVE PUMPING

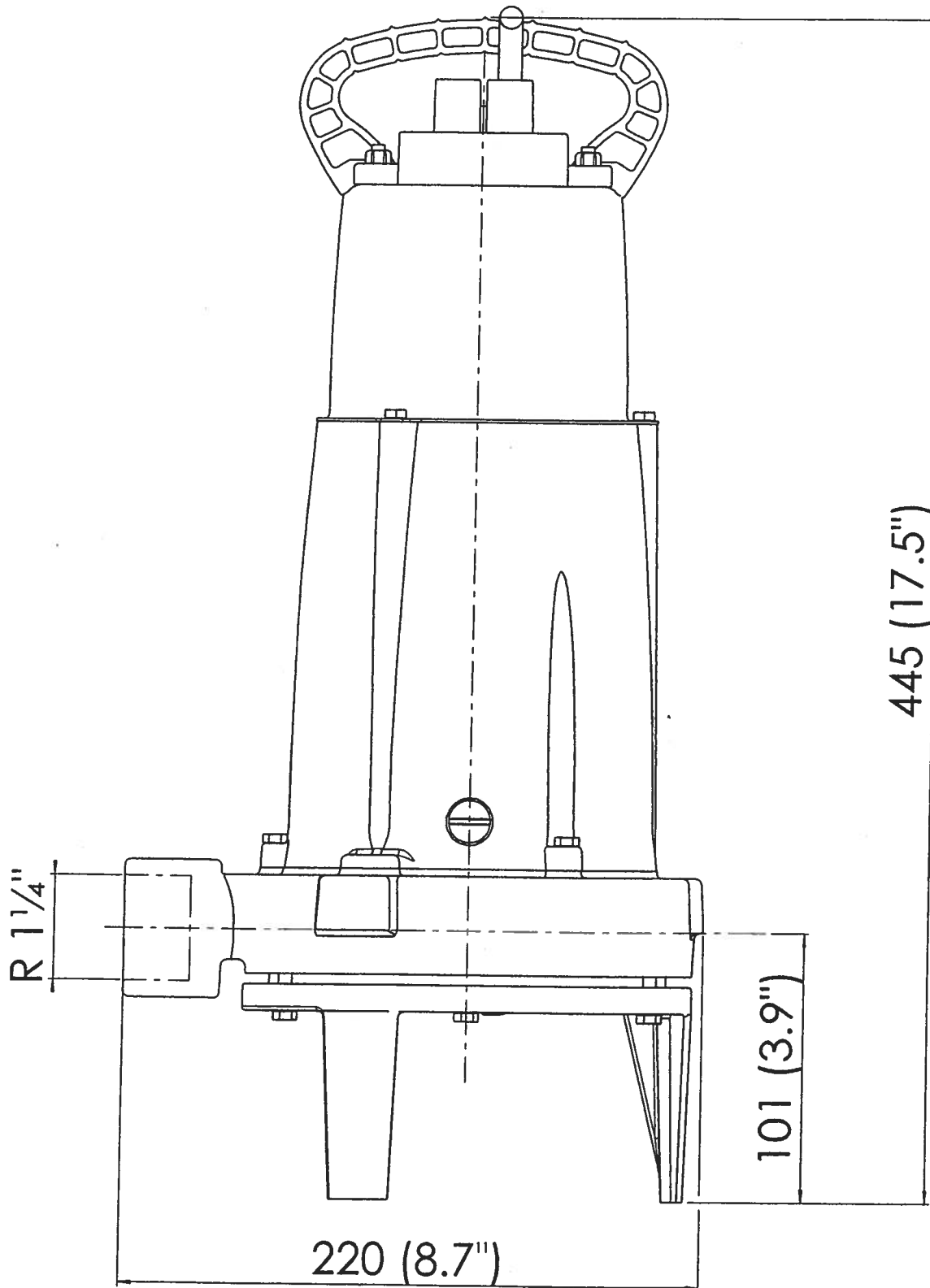
Maßblatt/Dimension sheet
Plan d'encombrement
PIRANHA 09

No: AN-M 13.191 -00

Drawn: B.McDonald

Issue Date: 12/11/03

Änderungen vorbehalten
Technical changes reserved
Con reserva di modifiche
Con reserva de modificaciones
Sous réserve de modification



**APPENDIX C
SARASOTA COUNTY**

**1. PHILLIPPI CREEK SEPTIC SYSTEM
REPLACEMENT PROGRAM – LOW
PRESSURE STATION COORDINATION /
INSTALLATION**

**2. INSTALLATION AND MAINTENANCE
AGREEMENT FOR LOW PRESSURE
WASTEWATER COLLECTION SYSTEM**



PHILLIPPI CREEK SEPTIC SYSTEM REPLACEMENT PROGRAM LOW PRESSURE STATION COORDINATION/INSTALLATION

The COUNTY will purchase the pump station packages from Mader Electric Motors of Fort Meyers, and take delivery of the equipment at its warehouse at 1001 Sarasota Center Boulevard, east of I-75 and north of Fruitville Road. The INSTALLER will be asked to install these system as soon as possible, once receiving word that the pump station packages has arrived.

The OWNER will hire a plumber and electrician. Once the OWNER pays the sewer fees, the OWNER's Plumber will pull the Plumbing permit.

Scope of Work includes the following:

- * Pick up the Pump Package at 1001 Sarasota Center Boulevard, by making arrangements with Ralph Ward (861-0552).
- * Deliver and install the 3' Diameter by 5' deep fiberglass Pump Pit, pump, and accessories. Pump is an ABS Model Piranha 09. Accessories have been agreed upon between the COUNTY and Mader Electric per proposal dated July 3, 2006, and include a three (3) float system, float bracket/cable holder, a 50' power/float switch cable, a simplex control panel, and pre-plumbed pit complete with a 1-1/2" ball valve and check valve.
- * The Control Panel is to be provided to the OWNER for their installation.
- * COUNTY's Installer will coordinate with OWNER's Plumber and Electrician on permitting, locating, and scheduling of the work. This is the most critical element of this work. The control panel must be located on the building, in an area accessible to the COUNTY's Operation Staff. The pump comes with a 50' power cord and pump control cables, and must be located no more than 30' from the control panel.
- * OWNER's Plumber installs the gravity line from the house to the pit.
- * COUNTY's INSTALLER is to install the pit and pump assembly and accessories in the pit, including 18 cubic feet of cast-in-place concrete ballast. The pit shall be set level and plumb, and to the proper grade matching the surrounding ground elevation.
- * The connection of the 4" gravity line to the pit will be with a COUNTY provided 4" grommet. OWNER's Plumber will cut a hole in the fiberglass tank for the incoming gravity line using a 5" hole saw, install the COUNTY provided grommet, and make the final connection..
- * OWNER's Plumber installs the 1-1/2" HDPE force main from the pit to the Street connection.
- * OWNER's Electrician installs the control panel on the exterior of the structure and within 30' of the pit, wires the panel to the home's electrical panel, installs an OWNER provided disconnect switch ahead of the panel, and installs conduit from the panel to the pump pit, pulls the power wiring and pump control cables from the pit to the panel, and makes the final connections.
- * The COUNTY's INSTALLER shall schedule Jeremy Mader (239) 731-5455 to be present for pump start-up. COUNTY's INSTALLER shall also attend start-up, provide the test water, and make any adjustments necessary.

Attached is the "Installation and Maintenance Agreement", which will be signed by the OWNER prior to this installation work, a graphic of the low pressure installation, and pump and accessory details.



**INSTALLATION AND MAINTENANCE AGREEMENT
LOW PRESSURE WASTEWATER COLLECTION SYSTEM**

This Installation and Maintenance Agreement (hereinafter called the "Agreement") is entered into this _____ day of _____ (month) _____ (year) by and between _____ the owner(s), (hereinafter called "Owner") of the property at the address of _____ with legal description attached as Exhibit "A" (hereinafter called "Property") whose mailing address is _____, and Sarasota County, a political subdivision of the State of Florida (hereinafter called "County").

County will furnish and install for use on the Property a simplex low-pressure pumping unit (pump and tank with internal electrical and plumbing equipment, including level controls – hereinafter called "PUMP PIT") and furnish to Owner for use on the Property a pump electrical control panel (hereinafter called "PUMP PANEL") to be installed by Owner. The PUMP PIT and PUMP PANEL together are hereinafter called "SYSTEM COMPONENTS", which shall be owned and operated by the County. Owner agrees to keep SYSTEM COMPONENTS accessible and unobstructed at all times and hereby grants the County access onto the Property to install the PUMP PIT, and perform necessary service, inspections, operations, maintenance, repair and replacement of SYSTEM COMPONENTS and the ON-LOT FORCE MAIN, as described below. "Accessible and unobstructed" shall mean that, other than the structure that the PUMP PANEL is fastened to, sodding and unattached/readily movable objects, no structures, plantings, fencing or fixed objects shall be placed within five (5) feet of SYSTEM COMPONENTS or the ON-LOT FORCE MAIN.

The undersigned Owner agrees that in consideration for the installation and use of the PUMP PIT and the use of the PUMP PANEL, Owner shall hold harmless Sarasota County, its officers, agents, and employees, from any damage of any type whatsoever to the Property or to persons situated thereon related to the use of the SYSTEM COMPONENTS.

At Owner's expense, Owner shall: (1) have a licensed electrician permit and install the PUMP PANEL, including all associated on-lot electrical upgrades, components (including Owner provided disconnect switch adjacent to the control panel), and connections from the PUMP PANEL to the PUMP PIT, all as necessary to meet the electrical needs of the PUMP PANEL, and conforming to the National Electric Code (N.E.C.) and Sarasota County Code; and (2) have a licensed plumber furnish, install, and test an ON-LOT GRAVITY PIPE between Property dwelling and PUMP PIT and a 1-1/2" HDPE (High Density Polyethelene) CTS (Copper Tube Size) ON-LOT FORCE MAIN between PUMP PIT and County-supplied service connection located at road right-of-way. Owner shall obtain the following Permits: plumbing, electrical, Sarasota County Utilities Construction and Department of Health septic tank crush and fill permit. THE ON-LOT GRAVITY PIPE identified above is the sole responsibility of the Owner to maintain, repair and replace as necessary.

The County shall maintain, repair and replace SYSTEM COMPONENTS and the ON-LOT FORCE MAIN; provided, however, service, inspection, maintenance, repair/replacement of the PUMP PANEL is limited to the physical PUMP PANEL provided by the County and does not include any electrical wiring, circuitry, components and connections necessary to operate the PUMP PANEL. County's liability is limited to the replacement of the SYSTEM COMPONENTS only. In the event SYSTEM COMPONENTS are damaged as a result of Owner's negligence or fault, Owner agrees to pay for the necessary repair and/or replacement, restoration and installation of SYSTEM COMPONENTS.

With the exception of the SYSTEM COMPONENTS, restoration of the Property necessary as a result of any on-lot installation work is the sole responsibility and expense of the Owner. Owner shall provide electrical service to the connection point on the PUMP PANEL at the PUMP PANEL's circuit breaker. Following installation, inspection and approval by County, Owner shall not make any changes or modifications to the SYSTEM COMPONENTS without the County's approval. All expenses associated with Owner requested or directed modifications to the SYSTEM COMPONENTS will be paid exclusively by Owner. All expenses associated with restoring SYSTEM COMPONENTS to their original condition as a result of unauthorized Owner modifications shall be paid exclusively by the Owner. Such expenses may include: material and labor costs; legal, engineering and administration costs; capacity fees, assessments, rate surcharges and monthly rate surcharges for illegal connections to the County utility system.

The County may record this Agreement in the public records; however, this Agreement does not create a lien or mortgage on the Property.

This Agreement is binding on Owner, his (their) heirs, successors, grantees and assigns.

Applicable sections of Sarasota County Utilities Department Rules & Regulations, Resolution Number No. 89-372, adopted by the Board of County Commissioners of Sarasota County, Florida, include, but are not limited to: Section 3.44, Inspection of Customer's Installation; Section 3.46, Protection of Department Property; Section 3.48, Access to Premises; and Section 3.50, Right-of-Way or Easements.

OWNER(S):

WITNESS SIGNATURE
Print Name: _____

BY: _____
Print Name: _____

WITNESS SIGNATURE
Print Name: _____

BY: _____
Print Name: _____

STATE OF FLORIDA
COUNTY OF _____

The foregoing instrument was acknowledged before me this _____ day of _____,
_____, by _____, who are personally known to me or have produced
_____ as identification.

[NOTARY SEAL]

Notary Public, State of Florida

SARASOTA COUNTY, Environmental Services Business Center, Utilities, General Manager or designee:

WITNESS SIGNATURE
Print Name: _____

BY: _____
Print Name: _____

STATE OF FLORIDA
COUNTY OF _____

The foregoing instrument was acknowledged before me this _____ day of _____,
_____, by _____, who are personally known to me or have produced
_____ as identification.

[NOTARY SEAL]

Notary Public, State of Florida

**APPENDIX D
E-ONE GRINDER SYSTEM
MANUFACTURER INFORMATION**

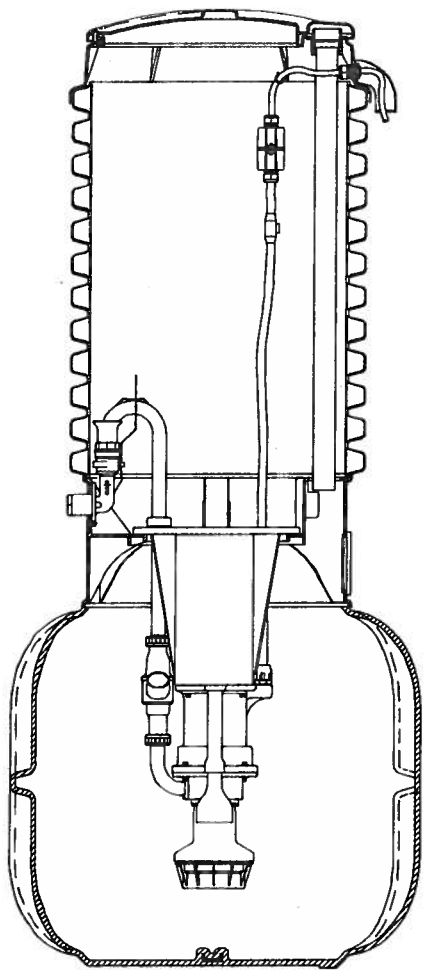
Telephone Log

E-One

Contact: Glenn Stahl 904-287-3654; gstahl@eone.com

- During a hurricane water flow drops to extreme minimum.
- Pump out time is 14 gal/min
- Volume of the tank = 70 gallons – 25 gallons (pump) = 35 gal storage on the standard unit (2010 model)
- The 150-gallon storage tank has 3-4 days of storage
- The DEP in Everglades City requires 50 gal of storage after the pump on level
- They have a new product called a SQUAT tank. It is a tank inside a septic tank. Holes are poked in the existing septic tank so you don't have to destroy the person's yard to get rid of the existing septic tank. This makes installation easier. For a 275-gallon tank, the pump will fit in the top half.
- Astor, FL – They use tanks with 150 gallon capacity. The 2012 model pumps 20 gallons and has 5 fluid changes per day. This is compared to the norm of 20-25 fluid changes per day with most systems.
- Big tanks usually correlate to big odor problems. This is not the case though with SQUAT tanks.
- Detailed information on case studies can be found in “white papers” online.

GP2012



General Applications

The size, efficiency and operating economy of the GP 2012 make it your best choice for duplex dwellings, waterfront property, subdivision developments and marinas. The GP 2012 is ideally suited for both new and existing communities.

General Features

The GP 2012 Grinder Pump is a complete unit that includes: the grinder pump, check valve, HDPE (high density polyethylene) tank and controls. The GP 2012 is packaged into a single complete unit, ready for installation.

All solids are ground into fine particles, allowing them to pass easily through the pump, check valve and small-diameter pipelines. Even objects not normally found in sewage, such as plastic, rubber, fiber, wood, etc., are ground into fine particles.

The 1 1/4-inch discharge connection is adaptable to any piping materials, thereby allowing us to meet local code requirements.

The tank is made of tough corrosion-resistant HDPE. The optimum tank capacity of 150 gallons is based on computer studies of water usage patterns. A single GP 2012 is ideal for up to two average, single-family homes and can also be used for up to six average single-family homes where codes allow and with the consent of the factory. This model can accommodate flows of 1500 GPD.

The internal check valve assembly, located in the grinder pump, is custom-

designed for non-clog, trouble-free operation.

The grinder pump is automatically activated and runs infrequently for very short periods. The annual energy consumption is typically that of a 40-watt light bulb.

Units are available for indoor and outdoor installations. Outdoor units are designed to accommodate a wide range of burial depths.

Operation Information

Motor

1 hp, 1,725 rpm, high torque, capacitor start, thermally protected, 120/240V, 60 Hz, 1 phase

Inlet Connections

4-inch inlet grommet standard for DWV pipe. Other inlet configurations available from the factory.

Discharge Connections

Pump discharge terminates in 1 1/4-inch NPT female thread. Can easily be adapted to 1 1/4-inch PVC pipe or any other material required by local codes.

Discharge*

15 gpm at 0 psig

11 gpm at 40 psig

9 gpm at 60 psig

Overload Capacity

The maximum pressure that the pump can generate is limited by the motor characteristics. The motor generates a pressure well below the rating of the piping and appurtenances. The automatic reset feature does not require manual operation following overload.

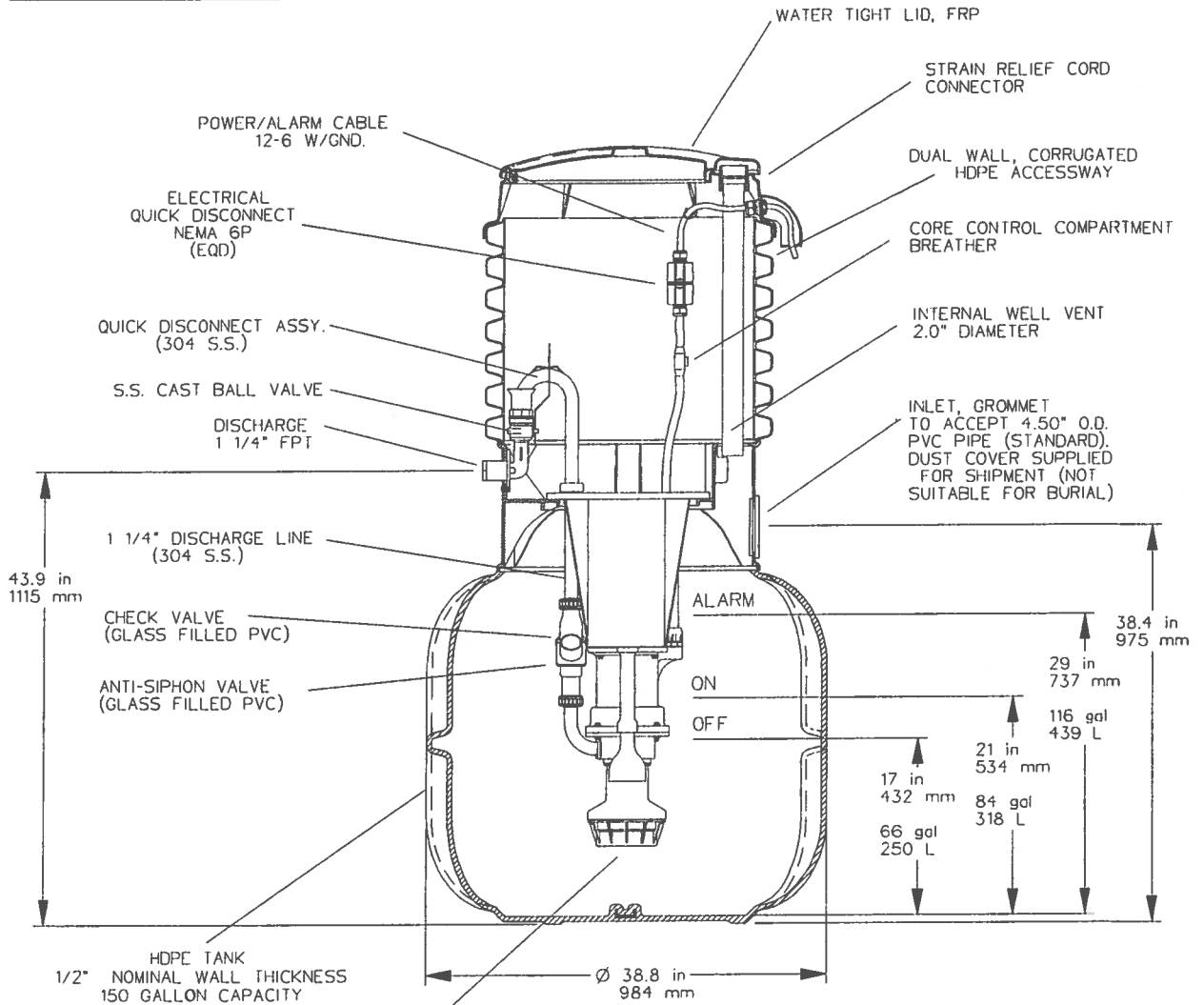
Patent Numbers: 5,752,315 5,562,254
5,439,180

* Discharge data includes loss through check valve, which is minimal.

PA1347P01 Rev. B, 1/02

FIELD JOINT REQUIRED
FOR MODELS
2012-129 & 2012-160

2012



SEMI-POSITIVE DISPLACEMENT TYPE PUMP
DIRECTLY DRIVEN BY A 1 HP MOTOR
CAPABLE OF DELIVERING 9 gpm AT 138' T.D.H.
(34 lpm AT 42m T.D.H.)



SGS	CAH	08/13/01	G	1/16
DR BY	CHK'D	DATE	ISSUE	SCALE



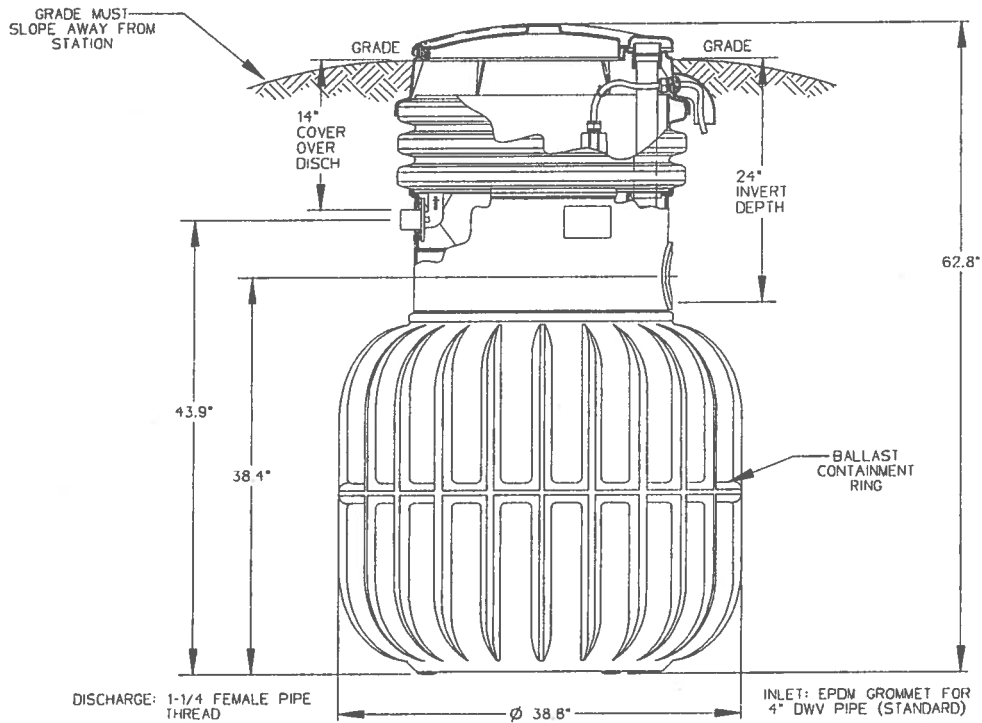
MODEL 2012, DETAIL SHEET

PA0909P01

BALLAST REQUIREMENTS

A CONCRETE ANCHOR IS REQUIRED
ON ALL OUTDOOR MODEL 2012 STATIONS
SPECIFIC CONCRETE DIMENSIONS ARE REQUIRED
TO ACHIEVE NECESSARY BALLAST EFFECT
SEE INSTALLATION INSTRUCTIONS FOR FURTHER DETAILS

2012-63



SGS	CAH	01/10/02	C	1/16
DR BY	CHK'D	DATE	ISSUE	SCALE

BALLAST REQUIREMENTS

A CONCRETE ANCHOR IS REQUIRED ON ALL MODEL 2012-63 STATIONS

SPECIFIC CONCRETE DIMENSIONS ARE REQUIRED TO ACHIEVE NECESSARY BALLAST EFFECT

SEE INSTALLATION INSTRUCTIONS FOR FURTHER DETAILS



MODEL 2012-63

PA1336P02

**APPENDIX E
BARNES GRINDER SYSTEM
MANUFACTURER INFORMATION**

Telephone Log

Barnes

Contact: Skip Dorton 863-701-0571

- STEP System – 900 gallon tank, pump chamber, cost not much different between STEP and Low Pressure System, installation costs for STEP system may be greater, STEP provides about same storage as LPS
- Low Pressure System – grinder pump, smaller chamber, treatment process may be slowed down, about 70 gallons of temporary storage, DEP requires 50 gallons of storage (average peak cycle)
- Units have the option for a plug receptacle to plug a generator in, can pump down with a generator in 5-10 minutes
- For a severe or serious emergency people's water consumption decreases after 8 hours without power. Additionally, a lot of people leave their homes.
- Eco trend system- "C" Channel guide rail systems increases the size of the tank.

CRANE

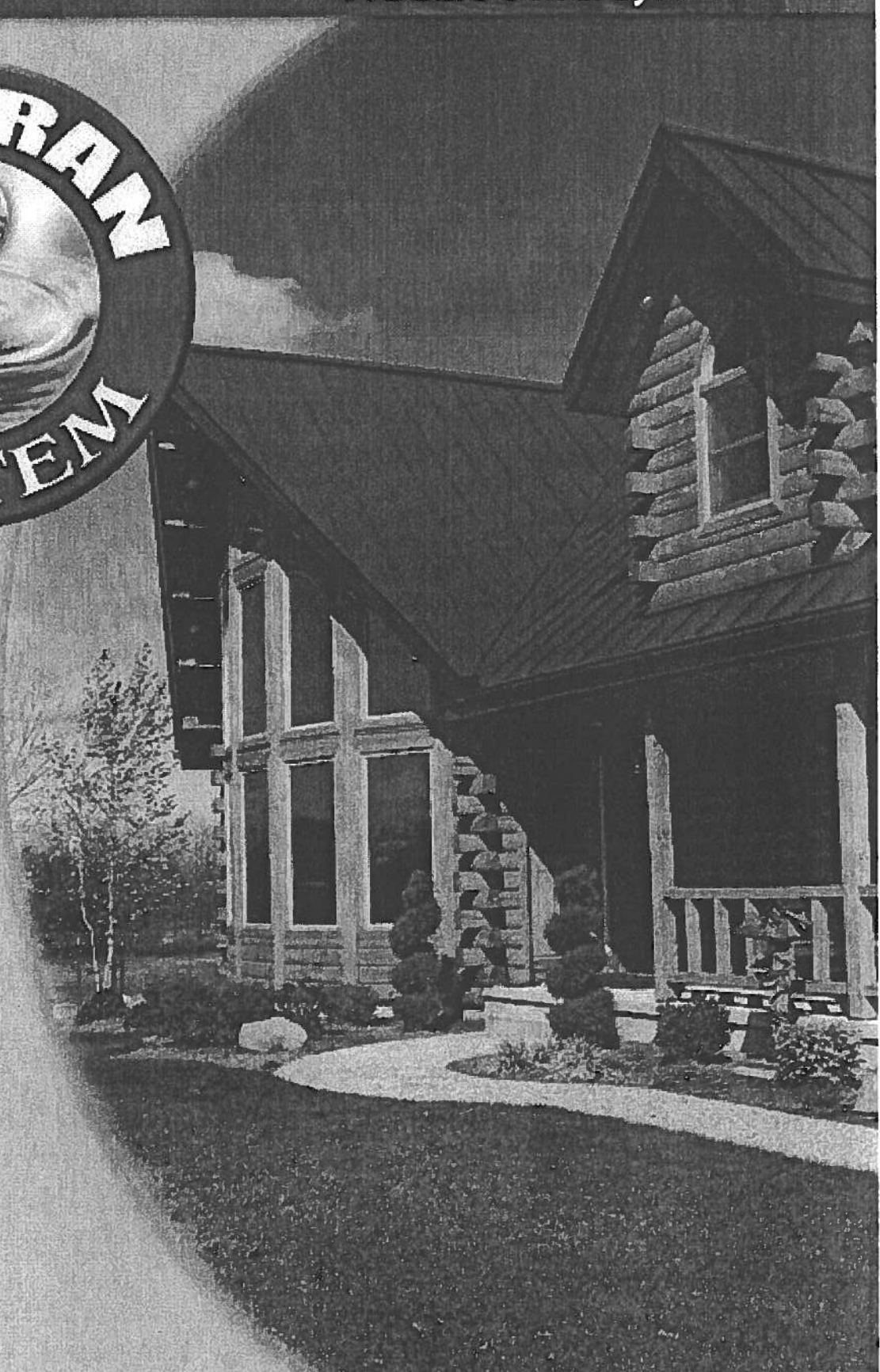
PUMPS & SYSTEMS

BARNES

Pressure Sewer Systems



The EcoTRAN™ System
preserves groundwater
*eco*logy by collecting and
grinding residential sewage
in an underground basin
and *tran*smitting the
waste under pressure to a
remote private or municipal
waste treatment plant.



Why Use a Pressure Sewer System?

Pressure sewer systems are an effective method to move residential wastewater through small diameter pipes to collection facilities where other methods are less economical or less feasible. The primary differences between conventional gravity sewer systems and pressure sewer systems are in the piping network and the reduction of solids size in the wastewater. Pressure sewer systems use specialized submersible grinder pumps, which are designed to reduce sewage particulate size to easily move the sewage through small diameter pipes.

Adapted from SFRPA White Paper, "A Pressure Sewer Overview"

The application of grinder pumps and pressure sewer systems is a cost-effective, long life answer to allow more home sites, both existing and new, access to a public sewer system or regional private waste water treatment system.

The Heart of the System is the Grinder Pump

The Omni Grind Plus™ provides heads up to 200' and flows to 270gpm. With the high head capabilities of a progressive cavity pump and the long life of Barnes® centrifugal grinder pumps, the Omni Grind Plus™ is truly a universal grinder pump for single family residences.

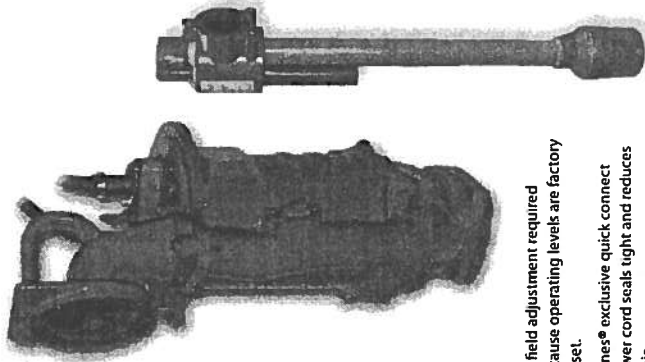
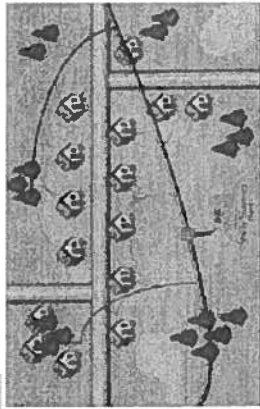
Superior Performance

- Two stage pump design provides high head capability
- Installed with the Barnes® ESPSW (Environmentally Sealed Pressure Switch) problems with grease build up are nonexistent.
- Start and run capacitors are located in the motor housing so no expensive control panel required
- UL and CSA listed to assure quality and electrical safety

Dependable Activation Depends on a Reliable Level Control

The Environmentally Sealed Pressure Switch, or ESPSW, is a highly dependable level control designed specifically for use with standardized low pressure sewer packaged systems.

- Pressure switch parts are protected from the basin environment with a Barnes® exclusive sealed design.
- Slim, rigid column width, NO external moving parts.
- Unit is unaffected by solids, grease build up, or liquid swirling in basin.



NO field adjustment required because operating levels are factory preset.

Barnes® exclusive quick connect power cord seals tight and reduces strain.

Overflow protection with separate air bells for operating control and high-level alarm.

CRANE

PUMPS & SYSTEMS

BARNES

Pressure Sewer Systems

Frequently Asked Questions

- Q. Barnes® offers a choice of two different grinder pumps with an EcoTRAN™ System. Which pump should I choose?**
- A. The Omni Grind™ (OGV) is rated for low to medium heads, up to 95 feet or 41 PSIG, while the Omni Grind Plus™ (OGP) is designed for higher heads, up to 180 feet or 78 PSIG at 10GPM. The Project Engineer or a Barnes Pressure Sewer specialist can advise the expected head based on the system piping design, or you can simply select the OGP for any head up to 180 feet.
- Q. Are progressive cavity grinder pumps available with the EcoTRAN™ System?**
- A. No, in order to provide the best possible grinder pump life, we have chosen to use grinder pumps with the proven centrifugal vortex design. Progressive cavity pumps continuously wear, and the wear is accelerated under certain operating conditions; centrifugal pumps by their nature are not affected by pressure extremes or high flow rates.
- Q. The Barnes® EcoTRAN™ System is fairly compact. What do I do if additional retention capacity is required?**
- A. Barnes® offers an extensive line of engineered pressure sewer systems with available depths up to 20 feet and diameters up to 6 feet. Larger capacity stations are readily available for your specific needs.
- Q. Many specifications call for a minimum 24" diameter basin. Why was the riser on the EcoTRAN™ System selected with an 18" diameter?**
- A. The size of the external cover (effective diameter) depends primarily on the riser diameter; an 18" diameter was chosen to reduce the visual impact of the cover in the homeowner's yard. The specifications calling for a 24" diameter assume that a (very thin!) worker must be able to enter the basin to perform shut-off valve maintenance. With the removable POD design, all maintenance is performed from topside eliminating the need for confined space entry.
- Q. How are children prevented from gaining access to the basin or the alarm box?**
- A. The EcoTRAN™ is provided with brass padlocks for both the basin cover and the alarm box.
- Q. What happens if solid materials or drain cleaners enter the system from house?**
- A. The EcoTRAN™ has been thoroughly tested and qualified to NSF/ANSI 46, a specification that requires successful operation despite the occasional entry of a wide range of challenging materials, including cloth, plastic, paper, acidic and caustic cleaners, laundry bleach, broken glass, etc.
- Q. What if, after installation, I want a different rock color?**
- A. Please contact your local Barnes Pressure Sewer distributor for replacement covers.

CRANE

A Crane Co. Company

PUMPS & SYSTEMS

For more information contact your Barnes Pressure Sewer Representative

Crane Pumps & Systems

420 Third Street
Piqua, Ohio 45356
(937) 778-8947
Fax (937) 773-7157

Crane Pumps & Systems

1485 Levington Avenue
Mansfield, Ohio 44907
(937) 778-8947
Fax (419) 774-1530

Crane Pumps & Systems Canada

83 West Drive
Brampton, Ont. Canada L6T 2J6
(905) 457-6223
Fax (905) 457-2650

BSC/CSMO
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Printed in U.S.A.
04/2005

Engineer /Specifier

The Barnes® EcoTRAN™ System has been designed, tested, and certified to ensure long term, trouble-free operation. The system components and basin package as a whole, were tested and certified to UL and CSA electrical standards and NSF/ANSI 46 grinder pump and station requirements.

All non-metallic components in polypropylene, polyethylene and thermoset vinyl ester provide outstanding corrosion resistance and high strength. All metallic components in cast iron, stainless steel or bronze offer proven resistance to corrosion in sewage applications.

Two grinder pump alternatives; the OGP or OGV, provide system design flexibility and "universal" residential hydraulic coverage. The OGP high-head grinder pumps can be used universally, while the medium-head OGV grinder pumps can be used as a cost-savings measure for lower system heads.

Factory pre-set Environmentally Sealed Pressure Switch, or ESPS™, is immune to the effects of grease build-up and requires no field adjustment.

Additionally both vented and "flood plain" covers are available.

Simple Installation

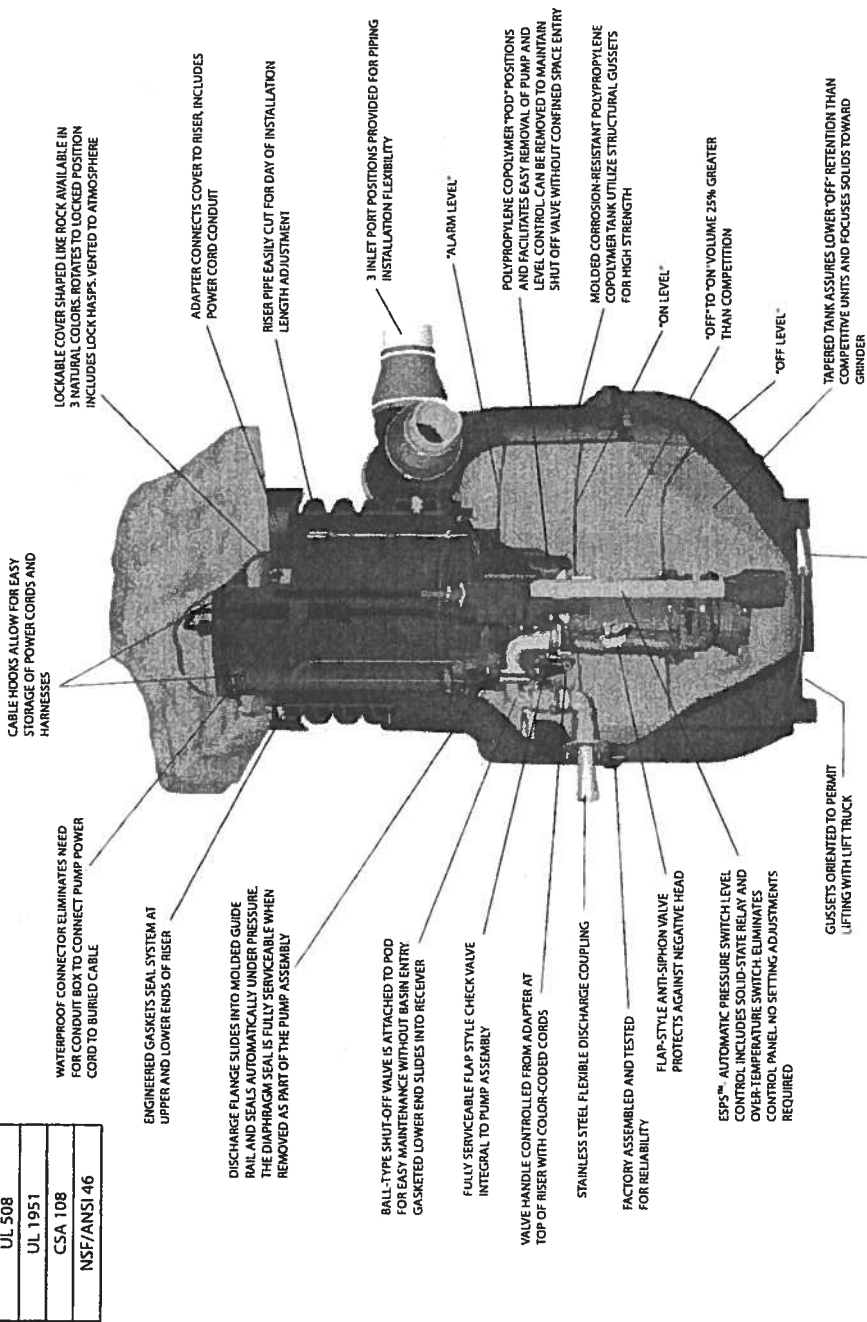
The Barnes® EcoTRAN™ System is easy to install and designed to eliminate time consuming callbacks.

Direct burial cable alarm box, additional redundant check valve and all needed parts and gaskets are supplied with the EcoTRAN™ unit. Wiring and lifting harnesses stow neatly with cable hooks at top of the riser.

To install the system, a 36" auger or backhoe can be used for excavation; pre-installed epoxy-coated rebar allows simple anti-floation ballasting with poured concrete. Only 1/3 yard of concrete is required for any installation depth. Additionally, the riser design permits day-of-installation depth setting.

Three inlet positions provide piping local on flexibility and a flexible outlet connector prevents potential misalignment due to settling. Pre-wired waterproof power connectors dramatically simplify electrical wiring and the alarm box readily attaches to a residence or post.

All components are easily installed, including the level control and pump. The level control drops in to factory pre-set position with no adjustments required. The pump then slides easily into position and does not need to be powered up until system start-up.



CABLE HOOKS ALLOW FOR EASY STORAGE OF POWER CORDS AND HARNESSES

LOCKABLE COVER SHAVED LIKE ROCK AVAILABLE IN 3 NATURAL COLORS ROTATES TO LOCKED POSITION INCLUDES LOCK HASPS, VENTED TO ATMOSPHERE

ADAPTER CONNECTS COVER TO RISER, INCLUDES POWER CORD CONDUIT

RISER PIPE EASILY CUT FOR DAY OF INSTALLATION LENGTH ADJUSTMENT

3 INLET PORT POSITIONS PROVIDED FOR PIPING INSTALLATION FLEXIBILITY

"ALARM LEVEL"

POLYPROPYLENE COPOLYMER "POD" POSITIONS AND FACILITATES EASY REMOVAL OF PUMP AND LEVEL CONTROL CAN BE REMOVED TO MAINTAIN SHUT OFF VALVE WITHOUT CONFINED SPACE ENTRY

MOLDED CORROSION-RESISTANT POLYPROPYLENE COPOLYMER TANK UTILIZES STRUCTURAL GUSSETS FOR HIGH STRENGTH

"ON LEVEL"

"OFF" TO "ON" VOLUME 25% GREATER THAN COMPETITION

"OFF LEVEL"

TAPERED TANK ASSURES LOWER "OFF" RETENTION THAN COMPETITIVE UNITS AND FOCUSES SOLIDS TOWARD GRINDER

WATERPROOF CONNECTOR ELIMINATES NEED FOR CONDUIT BOX TO CONNECT PUMP POWER CORD TO BURIED CABLE

ENGINEERED GASKETS SEAL SYSTEM AT UPPER AND LOWER ENDS OF RISER

DISCHARGE FLANGE SLIDES INTO MOLDED GUIDE RAIL AND SEALS AUTOMATICALLY UNDER PRESSURE THE DIAPHRAGM SEAL IS FULLY SERVICEABLE WHEN REMOVED AS PART OF THE PUMP ASSEMBLY

BALL-TYPE SHUT-OFF VALVE IS ATTACHED TO POD FOR EASY MAINTENANCE WITHOUT BASIN ENTRY GASKETED LOWER END SLIDES INTO RECEIVER

FULLY SERVICEABLE FLAP STYLE CHECK VALVE INTEGRAL TO PUMP ASSEMBLY

VALVE HANDLE CONTROLLED FROM ADAPTER AT TOP OF RISER WITH COLOR-CODED CORDS

STAINLESS STEEL FLEXIBLE DISCHARGE COUPLING

FACTORY ASSEMBLED AND TESTED FOR RELIABILITY

FLAP-STYLE ANTI-SIPHON VALVE PROTECTS AGAINST NEGATIVE HEAD

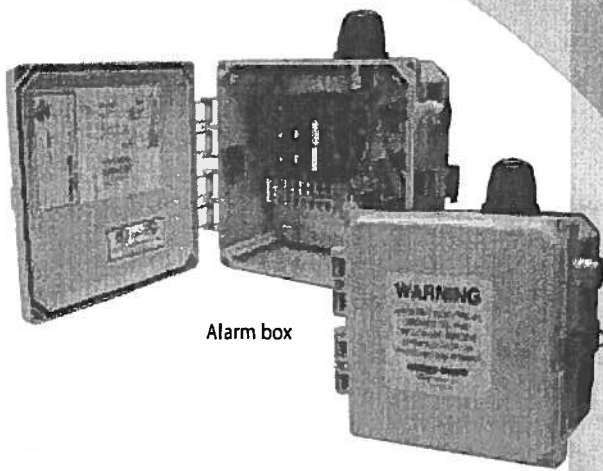
ESPS™ AUTOMATIC PRESSURE SWITCH LEVEL CONTROL INCLUDES SOLID-STATE RELAY AND OVER-TEMPERATURE SWITCH ELIMINATES CONTROL PANEL NO SETTING ADJUSTMENTS REQUIRED

GUSSETS ORIENTED TO PERMIT LIFTING WITH LIFT TRUCK

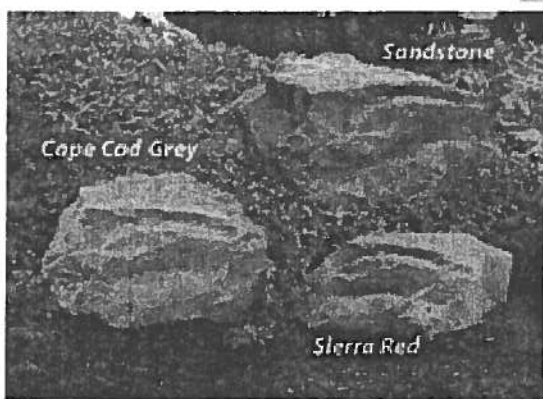
EPOXY-COATED REBAR FACTORY-INSTALLED FOR SIMPLE CONCRETE ANTI-FLOATATION BALLAST

Certifications/Listings
UL 778
UL 508
UL 1951
CSA 108
NSF/ANSI 46

Retention Volumes	BARNES®
"Inlet" to "Alarm"	15.5 Gal.
"Alarm" to "On"	18.5 Gal.
"On" to "Off"	20.0 Gal.
Residual Volume Below "Off"	10.5 Gal.



Alarm box



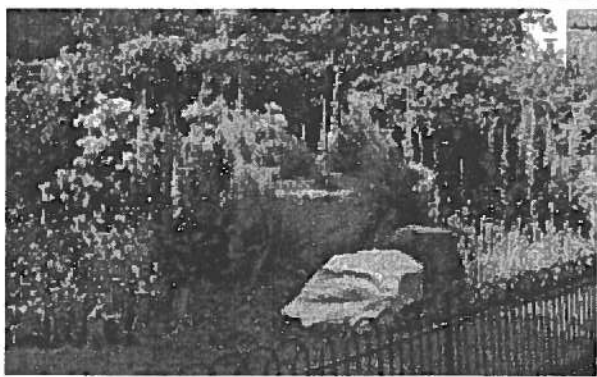
Cape Cod Grey

Sandstone

Sierra Red



Rock Cover



Homeowner Features

Barnes® EcoTRAN™ System is dependable, safe and aesthetically pleasing to homeowners.

The EcoTRAN™ is equipped with a sealed pressure switch, eliminating costly maintenance frequently required of float systems where grease is present or in areas where mercury float switches are banned or restricted. Additionally, a highly dependable centrifugal grinder pump eliminates wearing components for trouble-free operation.

Equipped with a low profile, non-rusting alarm box with silence button, the EcoTRAN™ provides both light and horn notification in the event of pump malfunction. Additionally, a lockable cover feature makes the system completely childproof.

The EcoTRAN™ system comes with a choice of rock shaped covers offered in three color options (Cape Cod Grey, Sierra Red and Sandstone), providing the homeowner with an option that matches their individual landscape design. These rock covers readily blend with surroundings, reducing visual impact.

Maintenance

Barnes® EcoTRAN™ System is easy to maintain. All system maintenance is performed from topside so confined space entry is NEVER required.

The cover is easily removed by unlocking the padlock, twisting the cover to unlock and lift off. The level control can be readily removed without handling the pump. The pump-mounted check valve, discharge diaphragm and anti-siphon valve are all easily serviced. A pre-attached two-point lifting harness allows quick and easy removal of the pump with no un-bolting necessary.

To facilitate repair, the pump motor is bolted to frame components, rather than press- or shrink-fit to the housing. The shutoff valve, connected to the pod, is easily removed from above. The isolation valve is also operated from above with a color-coded actuation cord.

Quick-connect cords were designed to simplify pump and level control connection, allowing for rapid component swapping if needed. All systems are equipped with standard alarm boxes with circuit breakers, eliminating the need to decipher through complicated, customized control panels, or optional boxes with generator receptacles.

PS-025

Basin Assemblies

Specifications:

Inches
(mm)

BASIN	Fiberglass w/ 3" (76) Ballast Support Flange
DISCHARGE	Stainless Steel.
<i>Size</i>	1½" or 2" NPT, Female
INLET	4" (102) sch. 40 Flexible Inlet Flange (for Field Installation)
COVER	
<i>Polyethylene</i>	Molded, Green, 24" (610) Dia. Basins shown
JUNCTION BOX	NEMA 6 with cord grips for incoming cables
CONTROL PANEL	STEALTH Series Control Panel
DIRECT BURIAL CABLE	12/3, 12/4 or 12/5 and 18/6 for SSRS 10/4 and 18/10 for LSSRS. Type TC, THHN, THWN Round U.L. Listed. 50ft. (15m) STD
RAIL SYSTEM	300 Series Stainless Steel "C" Channel
STATIONARY DISCHARGE FITTING:	
<i>Stationary</i>	Powder Coated Cast Iron
<i>Diaphragm</i>	Fiber Reinforced Neoprene
BALL VALVE:	
<i>Design</i>	Full Port True Union
<i>Material</i>	PVC
<i>Size</i>	1½" or 2" NPT
EXTENSION HANDLE	3/8" Dia. (9.5) Stainless Steel
LIFTING DEVICE	1/2" Dia. knotted polypropylene rope with a breaking strength of 3,750 lbs.
HARDWARE	300 Series Stainless Steel
DISCHARGE PIPING	Stainless Steel, Supplied with 1.25" NPT (for SSRS) and 2" NPT (for LSSRS) Female PVC Redundant Flap Check Valve.
LEVEL CONTROLS:	
<i>ESPS</i>	Environmentally sealed pressure switch with CPVC housing, Buna diaphragm, Custom molded quick connect for sealing and strain relief
MOVABLE SUB-ASSEMBLY	(Ordered with Pump)
FLAPPER/ANTI-SIPHON CHECK VALVE:	
<i>Housing</i>	Cast Iron, powder coated with integrated anti-siphon
<i>Flapper</i>	Fiber reinforce Nitrile
PUMP BRACKETS	300 Series Stainless Steel
DISCHARGE PIPING	Stainless Steel, Supplied with 1.25" NPT Female PVC Redundant Flap Check Valve.

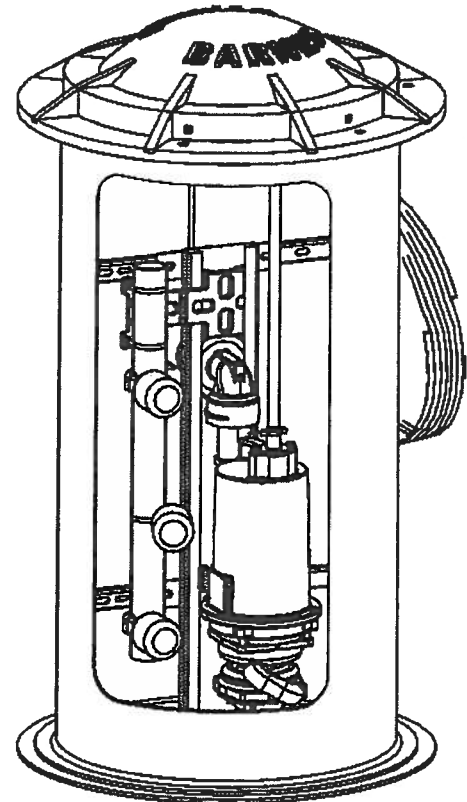


ILLUSTRATION SHOWN WITH MOLDED POLYCOVER & FloatTREE

Series: SSRS, 1½" NPT Discharge or LSSRS, 2" NPT Discharge

For use with OGP, OGVF, OGVH, SGVF, SGVH, SGPC or SGV pumps



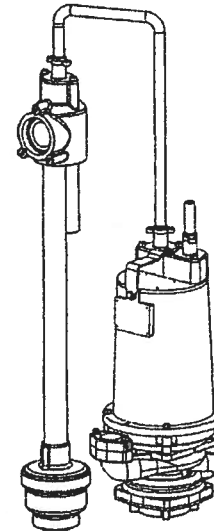
File No. LR151564

PS-095

Submersible Grinder Pumps

Specifications:

DISCHARGE	1¼" NPT, Vertical, Bolt-on Flange
LIQUID TEMPERATURE	104°F (40°C) Continuous
VOLUTE	Cast Iron ASTM A-48, Class 30
MOTOR HOUSING	Cast Iron ASTM A-48, Class 30
SEAL PLATE	Cast Iron ASTM A-48, Class 30
IMPELLERS:	
<i>Design</i>	12 Vane, Vortex, With Pump Out Vanes On Back Side. Dynamically Balanced, ISO G6.3.
<i>Material</i>	85-5-5-5 Bronze
IMPELLER SPACER	300 Series Stainless Steel
SHREDDING RING	Hardened 440C Stainless Steel Rockwell® C-55.
CUTTER	Hardened 440C Stainless Steel, Rockwell® C-55.
SHAFT	416 Stainless Steel
SQUARE RINGS	Buna-N
HARDWARE	300 Series Stainless Steel
PAINT	Air Dry Enamel.
SEAL:	
<i>Design</i>	Single Mechanical
<i>Material</i>	Rotating Faces - Silicon-Carbide Stationary Faces - Silicon-Carbide Elastomer - Buna-N Hardware -300 Series Stainless
CORD ENTRY	15 ft. (4.5m) Std. Cord. Custom Molded Quick Connect, for Sealing and Strain Relief
CORD	
<i>Automatic</i>	CSA/UL Approved 12/5 Type SOW
UPPER BEARING:	
<i>Design</i>	Single Row, Angular contact Ball
<i>Lubrication</i>	Oil
<i>Load</i>	Radial & Thrust
LOWER BEARING:	
<i>Design</i>	Single Row, Angular contact Ball
<i>Lubrication</i>	Oil
<i>Load</i>	Radial & Thrust
MOTOR:	
<i>Design</i>	NEMA L-Single Phase Torque Curve, Oil-Filled, Squirrel Cage Induction
<i>Insulation</i>	Class F
SINGLE PHASE	Capacitor Start/Capacitor Run.
LEVEL CONTROL:	
<i>AUE Series</i>	SOLD SEPARATELY (See Accessory Section F page 23) Model ESPS-150, Environmentally sealed pressure switch with CPVC housing, Buna diaphragm, Custom molded quick connect for sealing and strain relief



Series: OGP-AU
2HP, 3450RPM, 60Hz
with Level Control



CSA 108 - File No. LR16567
UL 778

DESCRIPTION:

THE GRINDER PUMP IS DESIGNED TO
REDUCE DOMESTIC SEWAGE TO A FINELY
GROUND SLURRY.

Model OGP-AU

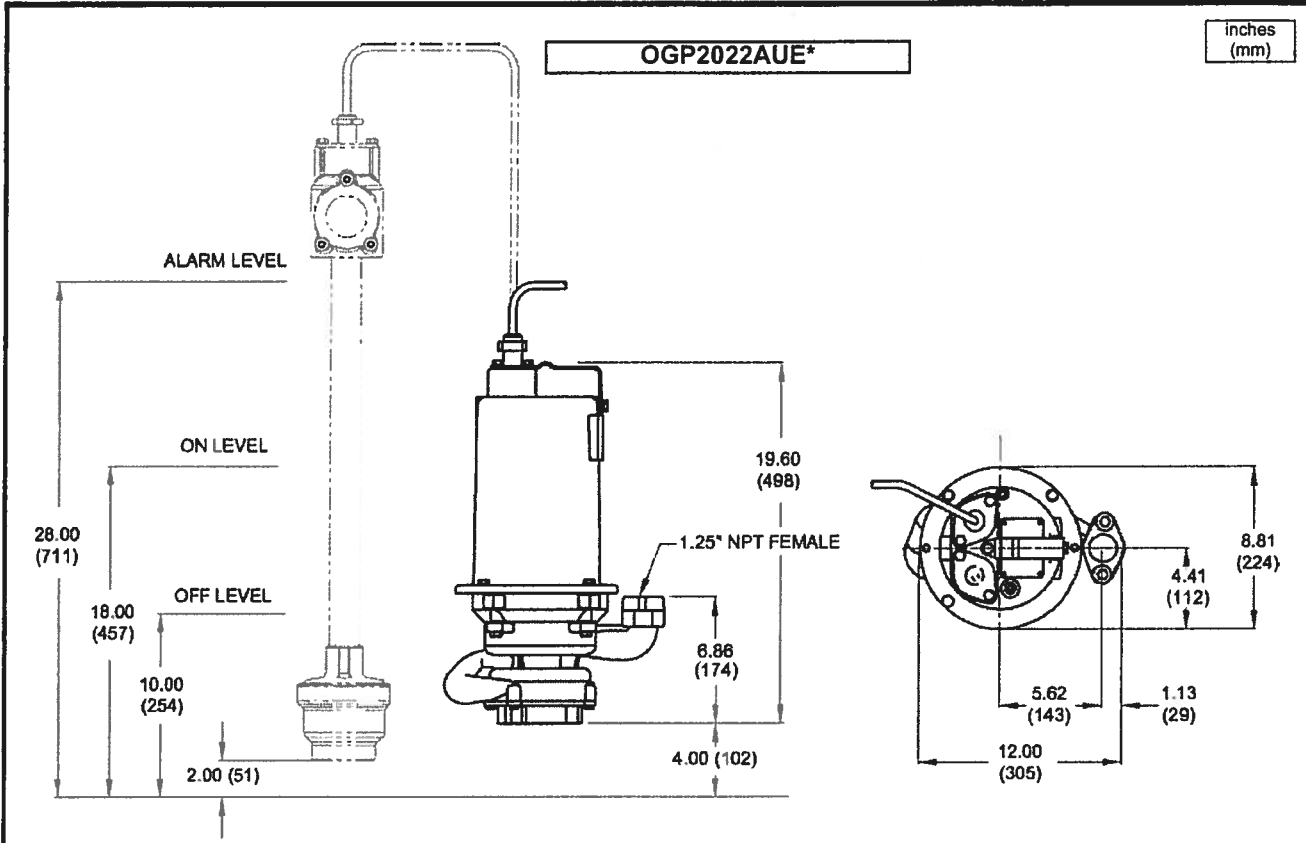
Recessed Vortex
with Level Control



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Submersible Grinder Pumps

PS-096



MODEL NO	PART NO	HP	VOLT	PH/Hz	RPM (Nom)	NEMA START CODE	FULL LOAD AMPS	LOCKED ROTOR AMPS	CORD SIZE	CORD TYPE	CORD O.D. ± .02 (.5) in (mm)
OGP2022AUE*	115329ENC	2	240	1 / 60	3450	H	16.5	53.8	12/5	SOW	.71 (18)

(* ESPS Level Control Sold Separately, See Accessory Section F page 23.

IMPORTANT !

- 1.) PUMP MAY BE OPERATED "DRY" FOR EXTENDED PERIODS WITHOUT DAMAGE TO MOTOR AND/OR SEALS.
- 2.) THIS PUMP IS APPROPRIATE FOR THOSE APPLICATIONS SPECIFIED AS CLASS I DIVISION II HAZARDOUS LOCATIONS.
- 3.) THIS PUMP IS NOT APPROPRIATE FOR THOSE APPLICATIONS SPECIFIED AS CLASS I DIVISION I HAZARDOUS LOCATIONS.
- 4.) INSTALLATIONS SUCH AS DECORATIVE FOUNTAINS OR WATER FEATURES PROVIDED FOR VISUAL ENJOYMENT MUST BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE ANSI/NFPA 70 AND/OR THE AUTHORITY HAVING JURISDICTION. THIS PUMP IS NOT INTENDED FOR USE IN SWIMMING POOLS, RECREATIONAL WATER PARKS, OR INSTALLATIONS IN WHICH HUMAN CONTACT WITH PUMPED MEDIA IS A COMMON OCCURRENCE.

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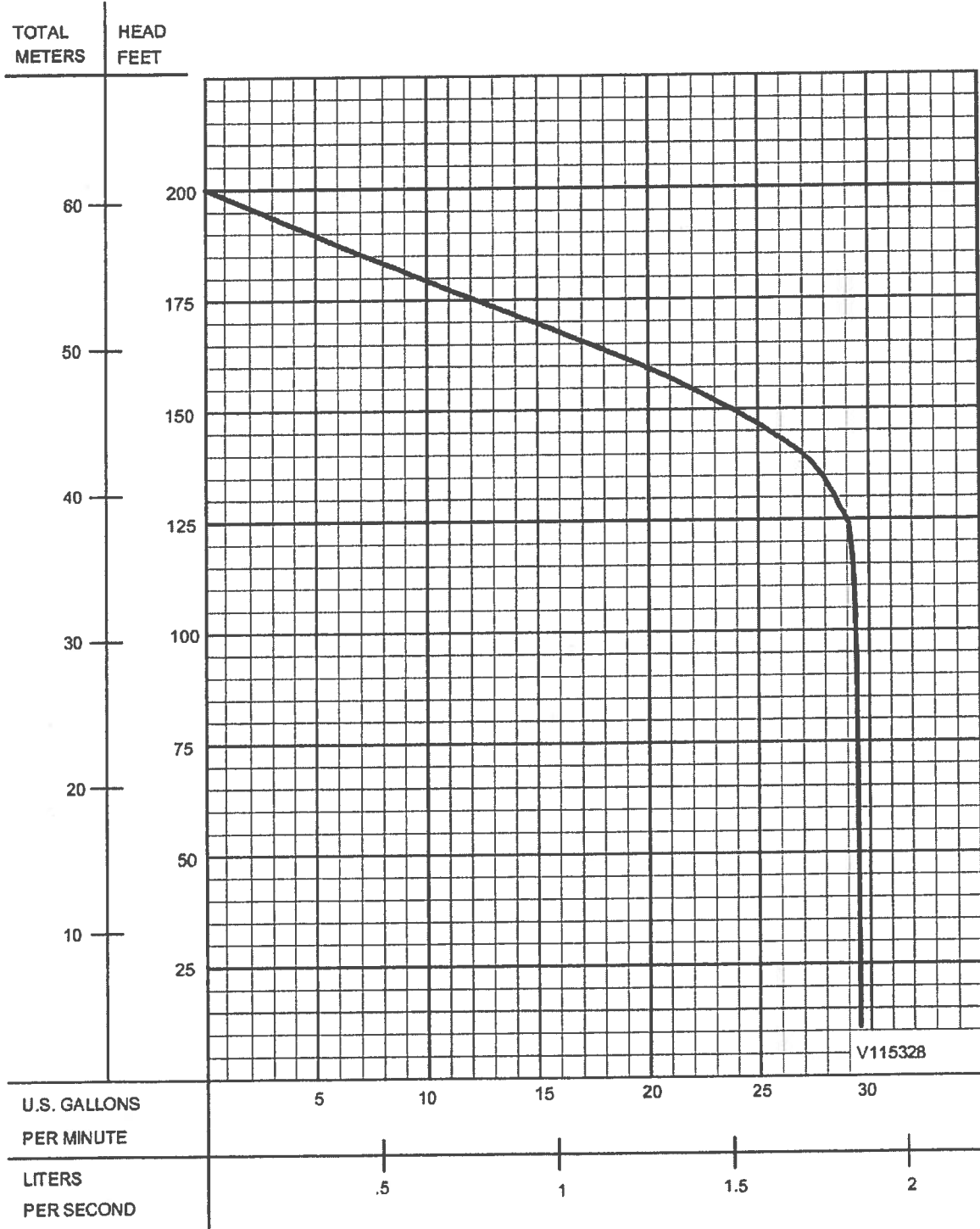
A Crane Co. Company

PUMPS & SYSTEMS

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Submersible Grinder Pumps

PS-097



V115328

Testing is performed with water, specific gravity 1.0 @ 68° F @ (20°C), other fluids may vary performance



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