Submersible Wastewater Pump Association

PRESS INFORMATION KIT

GRINDER PUMPS IN PRESSURE SEWERS

Prepared and Distributed By:

Submersible Wastewater Pump Association (SWPA)

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Submersible Wastewater Pump Association

FREQUENTLY ASKED QUESTIONS (FAQS) AND ANSWERS ABOUT GRINDER PUMPS IN PRESSURE SEWERS

Q. What is a grinder pump?
A. A submersible pump incorporating a grinding mechanism designed to reduce sewage particulate and pump the resulting slurry from a residential/commercial structure to a collection system.

Q. What is a pressure sewer?
A. A sanitary sewer system that utilizes a pump at each sewer connection to transport wastewater to the collection and treatment system.

Suggested replacement for what is a pressure sewer and the answer:
Q. What is a pressure sewer system?
A. A sanitary sewer

Q. Why use a grinder pump?
A. Due to geotechnical challenges (flat, wet, rocky, hilly terrains) and environmental sensitivity, using a grinder pump is often more practical for moving wastewater. These challenges often make gravity sewer systems impractical, if not impossible, for some locations.

Suggested Addition:
Q. How is a pressure sewer system different than a gravity system?
A. With a gravity system, pipelines are laid on a grade to pumping stations or large diameter trunk sewer mains. Minimum pipeline grades must be achieved to ensure that the wastewater velocities are sufficient that solids don't settle and odors don't occur, thus meaning deep trenches, harder environmental impact, and sometimes not economically viable when terrain becomes difficult.

Q. How do I/We maintain the system once it is installed?
A. Little or no user maintenance needs to be performed to keep the system in working order. Your system is designed to reduce in size; normal items found in sewage and pump these items along with water, to an appropriate treatment facility. By limiting the amount of foreign objects flushed to the tank, such as grease, wood, plastics, metal and glass, your system should provide years of trouble free service. Your grinder pump system is an electro-mechanical device that will eventually require service.

Q. What are the operating and maintenance costs?
A. Extremely low operating and maintenance (O&M) costs have been documented. Data is now available from many successful systems -- some in operation for more than 20 years. By taking advantage of the experience which these systems offer; a new system can be planned which will have good performance, high reliability, and reasonable O&M costs.

Q. What do I/We do with our grinder pump when the power goes out?
A. While it will normally not cause a problem, some care should be taken with regard to your sewage system when the power fails. First and foremost, try to limit the amount of water you send down the drain, whether through sinks or toilets. Typically, grinder tanks have some storage capacity for backup during power outages or large flow events. It is important to remember that with more public water systems becoming available, some may still have water even though the power is off in the home. In severe circumstances, a portable pump may be used to pump out the basin, or a gas-powered electrical generator may be used to operate critical appliances in your home, including your grinder pump.

Q. Why should I replace what I have?
A. Homeowners are required to replace their existing sewage disposal systems for various reasons, including: their existing system is not working properly (it's inefficient, failing or polluting the environment) and/or local government regulations require you to hook into the municipal sewer. Grinder pumps in pressure sewers often provide economical solutions to existing sewage disposal problems such as these.

Q. Who will fix it if it breaks?
A. The servicing of the system should be handled by an authorized service person or utility.

Q. Is a Grinder Pump in a Pressure Sewer System the same as a septic tank?
A. No. A grinder pump grinds waste from the home and pumps it to a public sewer system.

Q. What will clog a grinder pump?
A. Grinder pumps are designed for pumping raw, unscreened wastewater items including feminine hygiene products, diapers, rags, laundry lint, hair and paper products. Items such as strong chemicals, cooking grease, oils, flammables, metal and glass should be limited. As with gravity sewer systems, most clogs will occur when excessive amounts of these materials are flushed into the system.

Q. How much does it cost?
A. The cost of a completely installed system depends on the type of system required, the soil conditions of your lot and the distance from your grinder pump to the public sewer tap. Depending on the conditions, a typical residential simplex package could cost from $5,000 to $10,000 installed.

Q. How much does the electricity cost and who pays for it?
A. Ultimately, the homeowner pays for the power consumption either through his electric bill or local sewage fees. Average annual power consumption is about the same as two 75 watt light bulbs that burn for five hours per day -- typically less than $3.00 per month (based on 10 cents per kilowatt hour)

Q. Where is the grinder pump system located?
A. Generally speaking, these systems are installed outdoors, at or below grade. Indoor systems are also available.

Q. How long will the system last?
A. Information is available to support an installed life of 30-plus years.

Q. Does the basin require venting?
A. Yes. Check local codes.

Q. Does a grinder pump emit any unpleasant odors?
A. When sewage "sits", it becomes septic and produces a distinctive odor. Since your grinder pump will run occasionally to remove wastewater from the basin, you should never notice any odor.

Q. What is included in the typical grinder system?
A. A typical system includes a pump, basin with a sealed cover, controls, piping and valving.

Q. Will the system be noticeable from the street?
A. Installations should be done in such a manner as to blend with the local landscape. Most installations will not be noticed unless you know it's there. For outdoor installations, the only two components that may be seen are the basin cover and an electrical panel.

Q. How do I know that the system is operating properly?
A. It is recommended that each system has a high water alarm, visual/audio/both. As long as the alarm is not sounding and your indoor plumbing appliances are draining normally, your system should be operating properly.

Q. What happens to the wastewater in a grinder system?
A. As the wastewater leaves the residential/commercial structure, it travels by gravity through the building sewer to a basin, which contains the grinder pump. The grinder pump will transfer the home's wastewater through a small pipe to a pressurized sewer main.

Q. How expensive are maintenance and operating costs?
A. Extremely low operating and maintenance (O&M) costs have been documented. Data is now available from many successful systems -- some in operation for more than 20 years. By taking advantage of the experience which these systems offer; a new system can be planned which will have good performance, high reliability, and reasonable O&M costs.

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GRINDER PUMP DEFINITIONS, DRAWINGS AND COMMON TERMINOLOGY

GRINDER PUMP - A specialized submersible pump designed for reducing sewage particulate and pumping the resulting slurry.

DEFINITIONS AND COMMON TERMINOLOGY

The following are definitions of common terminology used in referring to Grinder Pumps in Pressure Sewers and are keyed to the accompanying drawings of typical Grinder Pumps

1) **Power Cable** – An electrical power cable that is used to transmit electricity to the submersible pump motor.

2) **Control Cable / Cord** – An electrical cable that is used to monitor critical performance elements such as motor temperature, moisture, etc.

3) **Cable Clamp** – Device used to compress the cord seal to form a reliable seal.

4) **Cable Seal** – Molded or 'donut' shaped rubber grommet on the cords that seal the submersible pump from the outside elements. Epoxy or urethane is also used in some cases.

5) **Lead wire Cap** – Cast iron housing where the cord enters the junction chamber.

6) **Motor Terminals or Terminal Board** – Electrical component in junction chamber where the cord to stator lead wire connections takes place.

7) **Motor Housing** – Cast iron component used to hold the stator in place. Some designs also use this housing for the upper bearing support.

8) **Fill Plug** – Plug used on submersible pumps for checking the sealing integrity of the pump. Also used to fill motor housing in an oil-filled design.

9) **Upper Bearing** – Bearing in the submersible pump that is farthest away from the impeller. This bearing usually controls radial forces with very little thrust loading.

10) **Temperature Limiter** – Temperature sensitive device(s) embedded in or attached to the stator windings used in conjunction with the motor starting device to control an overheating condition. Submersible pumps may contain more than one thermal sensor wired in series to give additional protection.

11) **Dielectric Oil** – Lubricant used in the motor chamber of some units to help dissipate the heat and permanently lubricate the bearings and seals.

12) **Stator** – Portion of the electric motor that contains the motor windings and is stationary in the motor housing. The windings are copper coils designed to create a rotating magnetic field when voltage is applied. The coils are wound in sets to set up a specific number of magnetic fields called poles. The number of poles determines the RPM of the motor.

13) **Rotor** – Portion of the electric motor that rotates inside the stator. The rotor is rigidly attached to the shaft such that the rotor and shaft both rotate at the same speed.

14) **Shaft** – Component of the submersible pump that connects the rotor to the bearings, seals, and impeller. The shaft is typically made from a non-corrosive material such as stainless steel.

15) **Lower Bearing** – Bearing in the submersible pump that is closest to the impeller. This bearing usually controls radial and thrust forces.

16) **Moisture Sensor** – Metallic probe used in conjunction with a circuit in the control panel to detect the entrance of water in lower seal area and/or motor compartment.

17) **Upper Seal** – Shaft seal used to protect the motor from entrance of water in to the motor cavity. This seal along with the lower seal provides a redundant sealing arrangement in some submersible pumps.

18) **Lower Seal** – Shaft seal used to protect the motor from entrance of water in to the seal cavity. This seal along with the upper seal provides a redundant sealing arrangement in some submersible pumps.

19) **Bearing Housing** – Cast iron component that provides structural support for the lower bearing and proper lineup for the motor and pump housings.

20) **Lower Seal Retainer** – Cast iron housing used to provide support and lineup for the lower seal to the rotor shaft. Used in conjunction with the bearing housing to form a sealed lower chamber that adds an extra barrier between the pumped liquid and the motor chamber.

21) **Seal Oil** – Lubricant used as a barrier fluid in the lower chamber of a double seal submersible pump. Also acts to lubricate the upper and lower seals.

22) **Impeller** – Rotating component of the hydraulic end. The impeller receives liquid from the suction, adds energy to the liquid by centrifugal action, and discharges the liquid into the volute. The impeller is made up of one or more rotation vanes mounted on a shroud or between two shrouds.

23) **Volute Case** – Stationary component of the hydraulic end. The volute case consists of: a) a suction inlet that directs the liquid into the eye of the impeller, b) a volute area around the impeller that collects the liquid discharged by the impeller, c) a discharge nozzle that converts the velocity head to pressure head, and d) the pump discharge connection.

24) **Discharge Connection** – A means for connecting a pipe to the submersible pump. The discharge connection may be horizontal or vertical / threaded or flanged.

25) **Legs** – Support brackets to allow the pump to be free standing if necessary. In a dry pit application the pump support will be provided by means of a support stand.

26) **Suction Inlet** – An opening in the pump housing the pumped liquid follows to enter the grinding mechanism properly.

27) **Stationary Grinding Ring** - Part of the grinding mechanism that is stationary on the pump inlet.

28) **Rotating Cutter -** Part of the grinding mechanism that is attached to the pump shaft and rotates at the pump speed. Particulate is mechanically ground up between the rotating cutter and stationary grinding ring for entrance into the pumping mechanism.

29) **Pump Rotor -** Rotating component of the hydraulic end on a progressing cavity style pump. Usually this is a stainless steel component that forms the inner boundary of the progressing cavity.

30) **Pump Stator -** Stationary component of the hydraulic end on a progressing cavity style pump. Usually this is a rubber component that forms the outer boundary of the progressing cavity.

31) **Pump Stator Housing -** A housing that contains the pump stator and acts as a means for directing the pump media from the cutter mechanism to the pump mechanism.

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