Homeowner's Guide to
The Domestic Sump Pump

Sump & Sewage Pump Manufacturers Association

P.O. Box 647 • Northbrook, Illinois 60065-0647
847/559-9233 • Fax: 847/559-9235
Email: hdqtrs@sspma.org • Web Site: www.sspma.org

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Modern sump pumps provide today's homeowner with effective, economical and reliable insurance against occasional and potentially destructive basement and crawl-space flooding.

Automatic sump pumps are extremely useful in year-round and, vacation homes where owners are not always available to handle these emergencies.

Take a few minutes to inventory the household material and equipment in your own basement. The furnace, hot water heater, washing machine, clothes dryer, your home workshop tools, the paneled recreation room, the pool table, the freezer – all could sustain costly damage should your basement become flooded, even by a few inches of water. The loss could run into thousands of dollars if a foot or more of water were to collect on the basement floor.

Throughout the United States, millions of basements are protected against this type of water damage by a small pump called a sump pump. Originally, sump pump use was limited to the New England and middle Atlantic states and the Great Lakes regions, but with the continuing growth of cities, proliferation of highways, overloaded storm drains, and paved parking lots have come basement flooding problems in all but a few areas of the country.

The Sump & Sewage Pump Manufacturers Association (SSPMA) reports that over one million sump pumps are manufactured and sold annually. Many of these pumps are used in new homes, but a substantial number are installed in older homes now experiencing flooding due to the reduced area of soil for water absorption or new construction in the area. Many communities will not allow homes to be constructed without a basement sump pump.

While there are several types of sump pumps manufactured, the majority are powered by a 115-volt AC electric motor. The motor drives a small centrifugal pump and is automatically controlled by a liquid level device, which senses water level and turns the pump on and off at a predetermined fluid level. The sump pump is normally installed in a pit or receiver (sump) below the basement floor and located at the low spot of the basement. The pump discharges the water collected in the sump through a pipe or hose out of the basement to a suitable storm drain or natural drainage area.

Sump pumps are sold by plumbers, plumbing supply houses, hardware stores, home centers, discount stores, and some department stores. Many are installed by a plumber, but an increasing number are being installed by the do-it-yourself homeowner. Whether the homeowner hires the installation done or decides to handle the job himself, he should learn about the pumps, the proper installation and the simple maintenance required.

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Typical Pedestal Pumps

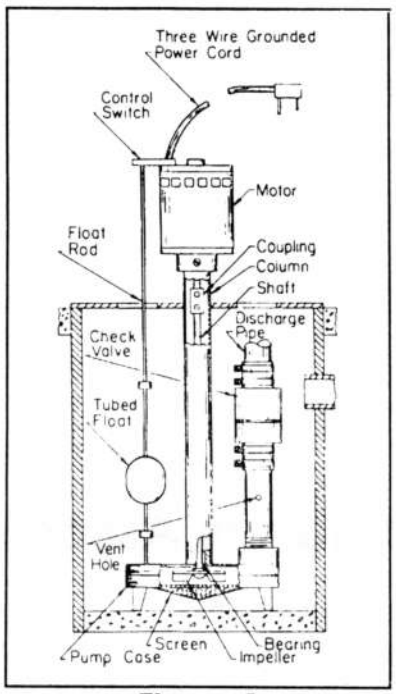

Figure 1

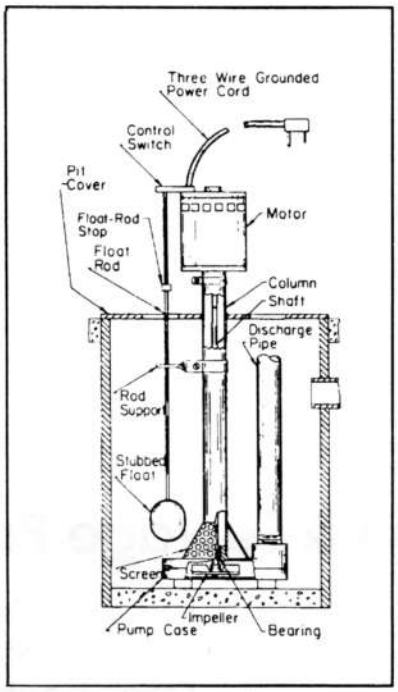

Figure 2

The Sump Pump... Five General Types

1. The ***pedestal*** (also referred to as column type or upright) sump pump is a unit furnished with an open motor supported by a column attached to the pump casing. When installed, the motor projects out of the sump and above the basement floor. See Figs. 1 & 2.

2. The ***submersible*** type employs a watertight submersible motor coupled directly to the pump casing and is designed to be completely hidden within the sump. See Figs. 3 - 6.

3. An ***emergency*** type unit is also available that employs a direct current motor and is furnished with a power pack, operating from the normal 115-volt AC household electric power. The sump pump provided is normally a pedestal type and includes a liquid level control for automatic operation.

4. ***Emergency DC (12 volt) battery back-up pumps*** are available. These are pumps that only work when there is a power failure or the primary sump pump does not remove the water fast enough, or it fails. These emergency systems can have alarms incorporated so you are informed that they are in use and any repairs can be made.

5. ***Water-powered*** sump pumps are available as primary or back-up pumps to protect the basement in the event of electric power failure. They utilize city water pressure instead of electric power to operate.

All five types described have their specific advantages. Before deciding upon a particular model, the homeowner must determine his requirements. The pump capacity (quantity of water pumped in gallons per minute or gallons per hour) and head (the vertical height the water is lifted, normally stated in feet of water) are measures of the pump performance. The pump capacity decreases as the lift increases. Performance data supplied by the manufacturer is an important aspect in pump selection. Motor horsepower normally ranges from 1/6 to 1/2 HP. Other special sump pump types available utilize a floor drain as the sump, or receiver. Such types are otherwise known as "sumpless" sump pumps.

Sump pumps are made to be both automatic (with liquid level control manufactured within the pump and manufactured with the switch as an extra float switch – see Fig. 3.) and non-automatic (manually controlled). In most domestic applications the automatic version is desirable, since it will operate even during the family's absence. Control types are float, diaphragm and electrode. Remember that long discharge lines, piping elbows and fittings tend to add friction head loss to the vertical lift of the pump, and thereby reduce pump output capacity. Always select a pump that will give you a little more pumping capacity and head than your installation requires.

The Sump & Sewage Pump Manufacturers Association has developed a set of engineering standards which provides a uniform method of testing and rating. SSPMA has also included a specification system covering basic materials for all major components. They detail minimum specifications, nameplate data, service cords and safety requirements. A certification and labeling program for sump pumps that meets or exceeds these standards is maintained by the association. A list of SSPMA–certified sump pumps is available from the association office.

The Sump and Installation

If your basement does not currently have a sump installed, it would be necessary to check local plumbing codes as to the acceptable type of sump that may be used. Materials commonly specified are: clay tile, fiberglass, steel, concrete and polyethylene. It may be necessary to cut a hole in the basement floor and excavate for the sump. Plumbing and electrical contractors could advise you on proper installations of drain tiles, sump, pump and electrical service. SSPMA recommends that a solid sump base be provided. The sump is fed by drain tile placed around the outside and/or inside basement walls at the footings. In applications where a gravel base must be used, to relieve hydraulic pressure under the basement floor, be sure to provide a permanent and solid base for the pump (bricks or a steel plate). A sump cover capable of supporting 200 pounds should be employed to contain odors and for obvious safety reasons.

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Typical Submersible Pumps

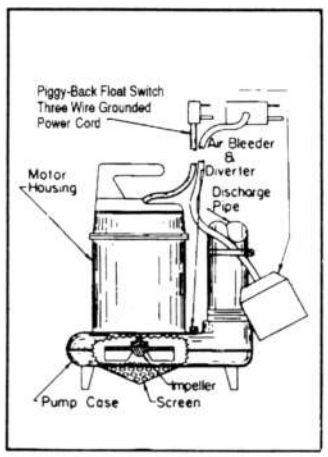


Figure 3

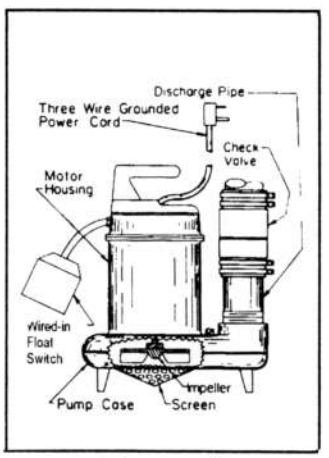


Figure 4

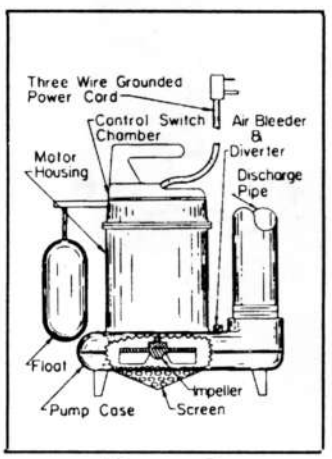


Figure 5

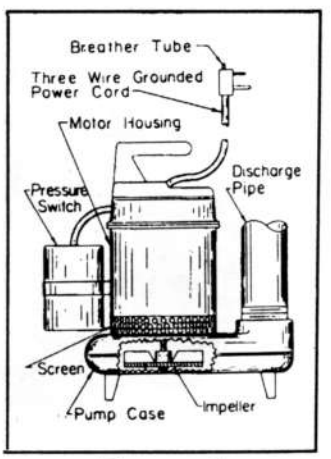


Figure 6

Electrical Installation

If you have selected an electric motor-powered sump pump, the National Electrical Code and local codes must be followed.

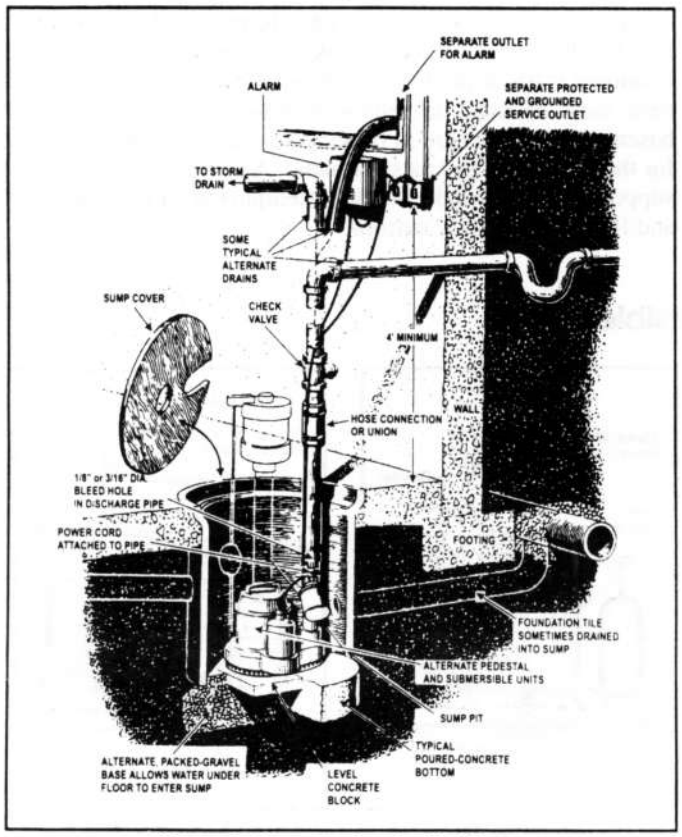
Electrical service for any sump pump installation must be grounded and separately fused or breakered directly from the entrance box with a single grounding type receptacle at the pump. (A Ground Fault Circuit Interrupter is recommended.) The receptacle should not be less than four feet above the basement floor for safety reasons. You should never touch a sump pump or discharge piping while the pump is connected to electrical power and water is present. The pump should be disconnected from the electrical source before handling in all cases.

Alarm Systems

A liquid level alarm connected to a circuit separate from the pump circuit would tell you that a problem exists in the sump that requires your attention. High-water alarms are available to provide visual or audible warning of any problem. If the water level continues to rise, the float will tip up, thus sounding the alarm.

Discharge Piping Installation

To assure the maximum performance from your sump pump, the discharge pipe size and piping fittings should not be smaller than the discharge port of the pump. Smaller pipe will add to friction losses and reduce the capacity of the pump. Normally accepted materials are galvanized pipe, rigid plastic pipe or acceptable flexible pipe or hose. A piece of flexible hose between the pump discharge and the discharge piping will provide for ease in alignment, reduce vibration and noise, and will act as a union when it is necessary to remove the pump. Where the discharge pipe is long, a check valve is often employed to prevent the water from flowing back into the sump when the pump turns off. If the discharge is directed into a sanitary sewer, a suitable anti-siphon device or a free flow check valve should be inserted in the line to prevent backflow into the pit. *Sump pumps are not designed to handle raw sewage.* Do not attempt to adapt one for this type of application. A sewage ejector pump especially designed to handle solids must be used.



Sump Pump Installation

Pump Installation

When the sump, electrical and discharge plumbing installation is complete and ready for the pump, clean all solid debris from the pit. Complete the plumbing connection to the pump and then plug the pump into the electrical outlet. A few extra minutes to test the sump pump installation are now in order. Fill the sump with water, note the turn on and turn off level of the pump, and the pumping cycle. This will allow you to calculate the approximate discharge flow of the pump system. Also check the float action and make sure the float or float switch is clear of the side walls or any other projection throughout the pump cycle. Check to assure that the alarm float is set properly to allow sufficient time to correct a problem in the sump. If everything is operating properly, install the sump cover.

Maintenance Tips

- **Every three or four months:**
  1) Clean the pump screen or inlet opening. If your sump collects the discharge from an automatic washing machine, cleaning will be required more often. ***Before removing the pump be sure to disconnect the unit from electrical power; and reconnect after completion of the cleaning.***
  2) Pour enough water into the sump to cycle the pump and assure its proper functioning.

- **Annually:**
  Remove and clean the pump. Clean the sump pit also. Unless your pump instruction manual specifies otherwise, no lubrication or other maintenance will have to be performed on the pump.

For further information on sizing, installation and maintenance of sump, sewage or effluent pumps contact:

Sump & Sewage Pump Manufacturers Ass'n.
P.O. Box 647
Northbrook, IL 60065-0647
847/559-9233 • Fax: 847/559-9235
Email: 103061.1063@compuserve.com
Web Site: www.sspma.org