



1



2



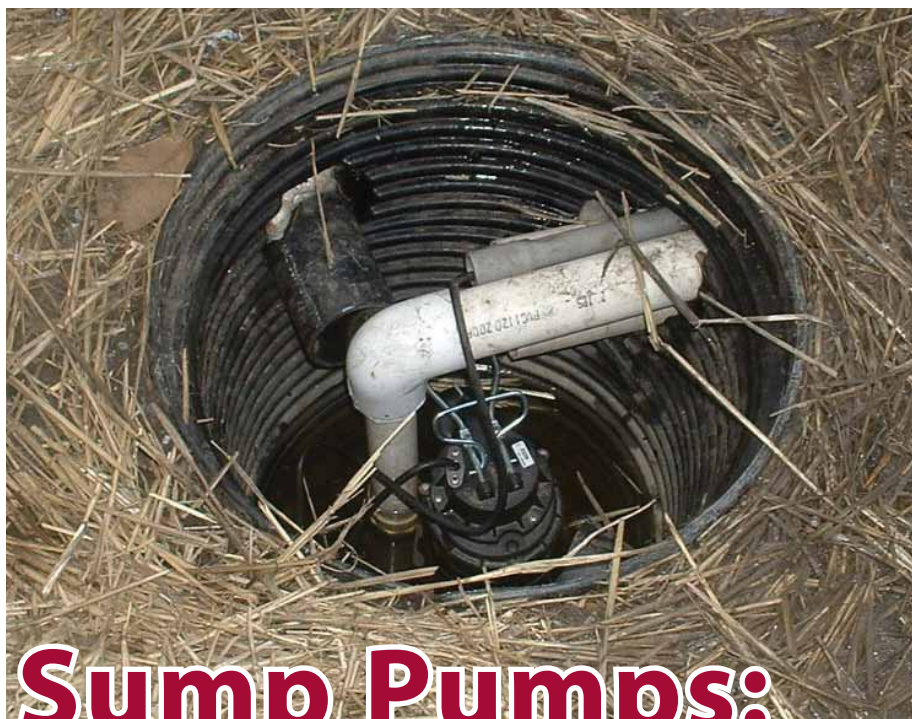
3



4



5



Sump Pumps: Advances and Installation

It's a nightmare every homeowner dreads: The basement flooded, belongings soaked. Carpeting and drywall ruined and waterlogged.

While a comprehensive waterproofing and drainage system has many components, sump pumps are considered the most crucial. Unlike the membranes, drainage sheets, and perforated pipe, which usually last for the life of the structure, sump pumps need to be replaced every few years.

But waiting for failure isn't an option, as it would inevitably lead to the nightmare described above.

Fortunately, new pump technologies and proper installation can ensure that this critical piece of the system is fail-safe and affordable.

Components

All sump pump systems have the same five components, although they vary in size based on the amount of water they are required to handle.

In the United States, components are fairly standardized. For residential applications, they consist of:

1. A plastic or metal sump liner, either 18 or 24 inches in diameter and 2 to 3 feet deep.
2. A pump, usually 1/3 or 1/2 horsepower and powered by either at 12-volt DC battery or standard 120-volt AC current.
3. A discharge pipe, typically 1 1/2 inch PVC.
4. A check valve to ensure the water in the discharge pipe doesn't flow backwards back into the sump;
5. A cover to keep vermin, pets, and debris out of the sump.

Sizing

Pump Size: A properly sized pump is critical. Too small and it won't be able to keep up with water flowing into the sump. Too large and it creates unnecessary expense. An oversized pump will also "short-cycle," turning on and off in rapid succession, which leads to premature pump failure. So getting the right pump is an important first step to ensuring basements stay dry.

"It's important that your pump can draw water out of the basin (or "sump

pit”) faster than water flows into it,” notes Duane Friend, at the University of Illinois Extension Office. “Therefore, the first thing you need to measure is the amount of water that drains into the basin during a high-flow period. During a heavy rain, stick a ruler in the basin and measure how many inches of water flow into the basin in 60 seconds.”

With an 18-inch sump, each inch of depth equals one gallon. In a 24-inch-diameter basin, each inch is roughly 2 gallons.

In a new construction situation, approximate flow rates can be calculated based on rainfall averages, soil type and the size of a home’s footprint.

Once the volume of water that will need to be removed has been calculated, the installer will need to figure out the “total dynamic head” of the discharge pipe. This is the sum of the “static head” (the height in feet between the pump and the end of the discharge pipe) and the “friction head.” Friction head is calculated based on the length, diameter and material of the discharge pipe, and the number of turns involved. A table to calculate friction head is available on the www.waterproofmag.com website.

Knowing the maximum flow rate figures, the total dynamic head pressure involved, and the budget, the contractor or designer can determine the best pump for the application.

Basin Size: The size of the sump pit is also important, as it plays a part in how long the pump runs and how long it takes to fill up. If the basin fills too quickly it may be best to install a larger one.

If the basement is already finished, a

also increases the chances the sump will overflow, so be careful.

Power Supply

Direct-Wired: Almost all sump pumps run on standard 120 volt AC current, but the pump must be supplied with its own line from the breaker box. It must also have a dedicated breaker. In most areas, the power supply must be installed by a licensed electrician unless the installer is also the homeowner. As always, check with local building codes and ordinances.

Pumps are usually hard wired into the electrical system, rather than plugged into a conventional outlet.

Battery-Powered: Sump pumps face their highest loads during



Photo Courtesy PeakFlow Pumps

The SmarHome sump pump (above) is a next-generation battery-operated sump pump. It is self-testing, self-diagnosing, and will immediately notify the homeowner by telephone and email if a component stops functioning.

thunderstorms, when rainwater pours into the sump pit from the foundation drainage system. Unfortunately, thunderstorms can also disrupt a home’s power supply, knocking the pump offline at the time it is needed most. That’s why

"New pump technologies and proper installation are a critical piece of the system"

cheaper option may be to raise the height of the pump switch, basically making the sump deeper. This method, however,

some homes—especially those with finished basements—have a second battery-powered sump pump in case

MER-KO

PAREX

Decking & Waterproofing Solutions
Engineered for Sustainable Protection



— Protect your investment

— Maximize property space



— Enhance aesthetic appeal



- Pedestrian Decking
- Vehicular Decking
- Flat Roof Decking
- Decorative Coatings
- Waterproofing Membranes
- Underlayments

Mer-Ko’s high-performance systems offer long-term solutions that protect your facility and transform unused areas into functional space. For commercial, industrial, institutional, recreational, and residential projects – new construction, renovation or maintenance – Mer-Ko offers cost-effective protection solutions.

Contact us today to find out more!

Mer-Ko Headquarters
ParexLahabra, Inc.
4125 E. LaPalma Ave., St. 250
Anaheim, CA 92807

Corporate: (714) 778-2266
Sales & Service: (323) 775-2461
Toll Free: (800) 851-6303

Visit us on the Internet at
www.parexmer-ko.com/wtrp08



The discharge pipe (black pipe on right) should end as far from the house as possible. Here, it has been routed to a dry well, with perforated pipe and gravel to improve drainage.

the first pump fails. In a few areas of the country, where the sump pit only fills occasionally, battery-operated pumps are used as the primary.

Setting up a battery-powered secondary pump involves purchasing and installing the following components in parallel with the others:

- A 12-volt DC sump pump matching the flow and discharge requirements of the primary pump.
- A 12-volt DC lead-acid battery. A typical automobile battery is adequate. Some use marine-grade deep cycle batteries which are more expensive, but lasts longer.
- A “trickle-charge” battery charger to keep the lead acid battery fully charged.
- A separate water level sensor, check valve, and other components. The discharge pipes usually connect downstream of the check valves.

“One of the problems with most backup sump systems is they are rarely used so a component failure will not be noticed and the system will fail to operate when needed,” says Friend.

A few battery-powered pump systems have an integral computer that tests the system periodically and sounds an alarm if something needs to be replaced—like a “check engine” light

on a car.

Regardless, Friend recommends that backup systems be tested monthly. “A good time to test is just after a rain storm,” he says. “Pull the plug on the sump pump so the sump well fills and verify the backup system activates and empties the well.”

Water-Driven: Recently, a few manufacturers have begun offering sump pumps that use the home’s culinary water supply to power the pump. The pressure in the home’s main water line turns an impellor, which drives the pump. These devices eliminate the need for electricity entirely. They do cost more than motor-driven pumps, but because they don’t need a back-up pump, they can be cost-effective.

Regardless of the type of pump installed, plan on also using a simple battery-powered water alarm. The water sensor is attached to the sump liner a few inches below floor level and will sound a shrill alarm if the water level rises that high.

Pump Type

Regardless of the type of power supply, sump pumps are generally divided into two classifications, pedestal and submersible.

Pedestal pumps are mounted above

the pit, where it is more easily serviced, but also more conspicuous. Submersible pumps sit inside the sump—usually near the bottom—and are completely immersed in the water.

The decision is usually based on whether the basement is finished, or will be, as the submersible pump is less obtrusive.

In commercial applications, submersible pumps are most common, as they function on a different principle. Unlike pedestal pumps that “suck” water up from the sump like soda through a straw, submersible pumps “push” water up the pipe.

Discharge Pipe

The discharge pipe should end as far from the house as possible, to prevent the water from finding its way back under the foundation.

In decades past, the pipe was often connected to the sanitary sewer system. This practice is now outlawed as it can overwhelm the water treatment facilities. Be aware that if you are retrofitting an older home, codes and ordinances may require you to also reroute the discharge line. ■



Because pedestal pumps sit above floor level, they are usually hidden from sight in finished basements. This can be a purpose-built enclosure, as shown in the before-and-after photos above, or by building the sump in a closet or furnace room.