



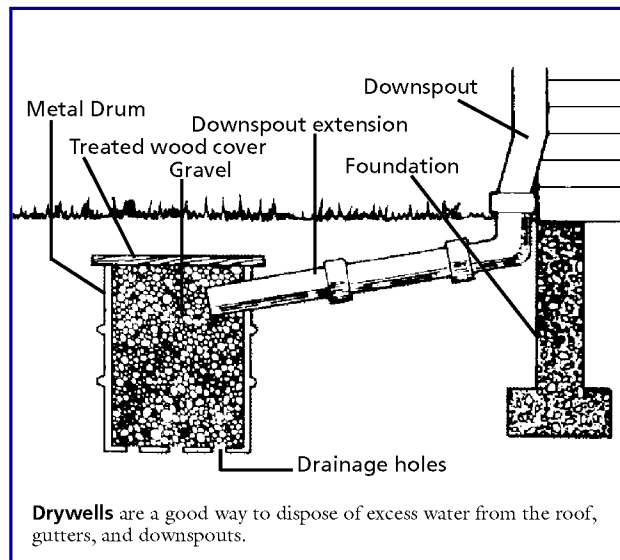
HOW-TO BOOKLET #3048 FOUNDATIONS



TOOL & MATERIAL CHECKLIST

- Cold Chisel
- Safety Glasses
- Pliers
- Screwdriver
- Hydraulic Cement
- Baby Sledge Hammer
- Heavy Gloves
- Pointing Trowel
- Gutter Parts
- Waterproofing Paint
- Polyethelene
- Jar
- Asphalt Felt

Read This Entire How-To Booklet for Specific Tools and Materials Not Noted in Basics Above.



Water is insidious. An underground spring may be blamed for your flooded basement; the water actually may have originated at a leaky gutter and funneled its way through the top of the foundation wall into the basement. Therefore, stopping a leak can involve more than pushing a wad of hydraulic cement into a concrete crack. The first step is to define the problem: is the basement or crawl space damp or wet? Is the dampness caused by humidity, or is it a water problem such as running water from the walls or floor? When does the wet condition occur? Always, during the summer months, during a rainstorm, after a rainstorm?

Please read this How-To Booklet before you buy any leak-fixing tools and materials. The time you spend up front can save you plenty later.

TREATING HUMIDITY

Humidity is a dampness problem, rather than an open running water situation, and it usually occurs during the summer months, except for some southern areas, such as Florida and the Texas Gulf, where humidity is more-or-less a year-round problem that results in a chronic case of mildew.

In existing basements. Moist air tends to move toward drier air, which can occur with air moving from a damp basement to the drier area upstairs. The simplest way to dry out a damp basement is to use a dehumidifier. However, this is assuming that there are no structural causes for the humidity.

If there is water leakage in the basement that is not serious, cracks must be cleaned with a cold chisel and sealed with hydraulic cement and then the walls and floor should be covered with a waterproofing compound that you can buy at most home centers and building material outlets and paint specialty stores.

All downspouts should be directed into plastic or concrete splash pans that direct the rainwater away from the foundation. Ordinary concrete and concrete blocks, if your home sets on this type foundation, are not waterproof. The best way to avoid water, which creates humidity, is to direct the water away from foundation walls.

Cover cold water pipes with pipe insulation to prevent condensation of water on the pipes. This condensation can cause a very high humidity problem.

Also, make sure that your washing machine in the basement is draining properly and that your clothes dryer is vented.

New basements. If your home is being built or it is a brand-new home, or a basement is built for a room addition, you can ensure a dry basement by applying a continuous layer of polyethylene sheeting on the outside of the foundation walls before backfilling. This is detailed on Page 4.

The same vapor barrier material should be placed on the ground before the basement floor is placed. The polyethylene comes in rolls 10 to 20 feet wide, and the strips applied to the foundation should overlap at least 4 inches. If the basement is built in an area where there is a high water table, tiling must be placed on the outside of the footing with a lead to a drain from the tile to a lower spot in the yard area.

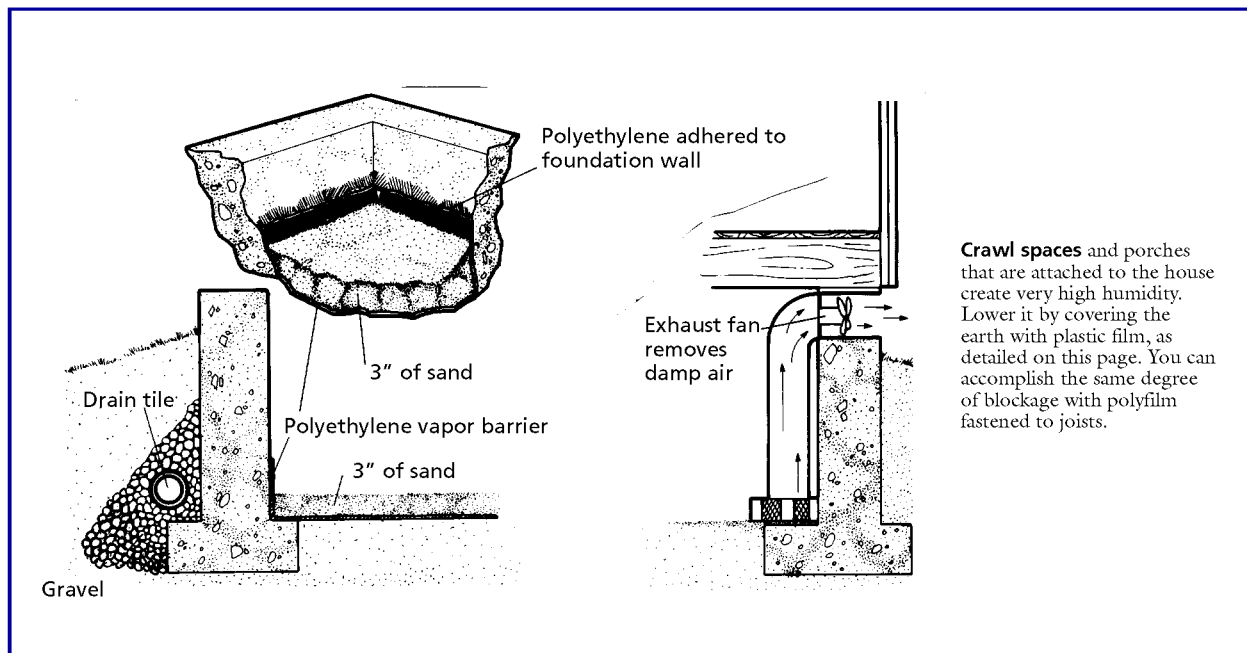
Crawl spaces. Where the soil frequently is wet, crawl spaces are subject to excessive humidity that can migrate up through the floor into the house. Another suspect area is where a porch is connected to the house and the bottom of the porch is enclosed. This creates a “crawl space” of sorts, and the humidity created here can get into your home causing trouble.

Generous ventilation sometimes will get rid of the moisture-laden air. Vents in the foundation, located to take advantage of a prevailing wind, is one method used. The area of all vents should be equal to 2 square feet for each 100 lineal feet of foundation perimeter plus one half percent of the crawl space area.

However, foundation vents alone sometimes are not large enough to provide the needed ventilation, so an exhaust fan is installed, see illustration. The lower end of the ducting is supported above the ground and the exhaust can be run to the outside through the floor joist or the header joist that runs at right angles to the floor joists.

To control ground moisture, place a layer of the sheet plastic on leveled soil. Over this, smooth a 3-inch layer of sand. Waterproof the outside of the foundation wall and install drain tile around the footing to drain away any water that might rise higher than the floor of the crawl space.

An alternative would be sealing the undersides of the floor joists with a vapor barrier if water lines and ducts for heating do not make this impractical. If any ducts or pipes do pass through the vapor barrier, they are sealed with duct tape to the barrier to assure a moisture-tight surface. Seams in the plastic sheeting are overlapped and stapled to the joists lengthwise, then further supported by nailing lath or other strips of wood to the joists over the seams of the plastic.



New home interiors. If you have just moved into a new home, expect to find humidity created by moisture in new building materials, especially plaster, that is released very gradually for at least a year—sometimes two years. To minimize this humidity, change the air frequently by using fans and opening windows. A dehumidifier will help eliminate moisture faster.

OPEN WATER TROUBLES

This is a major problem in basements. However, it may be easier and less expensive to correct than a humidity problem. First, determine where the water is originating.

Gutters/downspouts. All gutters, regardless of type, must be pitched toward downspouts so water can drain from the gutter into the downspout. If not, the water can overflow the gutter, run down the side of the house, through the foundation, and into the basement area. The right pitch is about 1/16-inch per running foot of gutter. Since this measurement is difficult to determine with a tape measure, try adjusting the gutter hangers, pour some water into the gutter, and watch the water flow out. Hangers can be adjusted accordingly.

Hangers should be spaced about every 3 feet along the gutter run. If not, water may have difficulty in flowing through the gutter. Worse, water may not flow at all, adding too much weight to the gutter and causing it to sag or break.

At the points where the water flows slowly, or stops completely, adjust the pitch by bending the gutter hangers a little up or down. If the water puddles in one spot, bend the hanger nearest to this spot upward. If the hangers are the spike type, use a hammer to reposition them. To adjust the pitch of wooden gutters, you will have to remove the nails that hold the gutter to the fascia. Then repitch and re nail the gutter to the fascia.

Downspout trouble usually can be found where the downspout connects to the gutter. This joint generally is loose if it has not slipped completely apart. Rejoin the downspout to the gutter by punching two or three holes through both the downspout and the tail of the gutter. Drive self-tapping metal screws into the holes.

Water must be funneled away from the bottom opening of the downspout so the water doesn't back up and drain down along the foundation and into the basement. A splashblock, properly sloped away from the foundation may be adequate. You may also need another length of downspout connected to the house downspout to move the water out into the lawn.

If the water problem is too much for a splashblock or extension pipe, consider a dry well, see illustration. To construct a drywell, dig a hole in the lawn about 10 feet out from the house foundation. The holes should be deep and large enough to accommodate a 55-gallon steel drum. The top of the drum should be about 15 inches under the surface of the lawn. Before you dig, check for underground utilities.

Punch lots of holes in the drum; a metal drill bit in a power drill works well. Also punch a hole in the drum to fit the diameter of a plastic or metal pipe that will run underground from the downspout opening to the inside of the drum.

Fill the drum with gravel, old brickbats, broken concrete, and/or masonry debris. Then cover the top of the drum with a piece of pressure-treated wood. Tightly pack the dirt shoveled out of the drum and pipe back around the drum and pipe.

Dry wells should be positioned at all four corners of a problem house, or where the main downspouts are located. Some downspouts are centered in the gutter run.

Sump pumps. If the house is built over an underground lake or river—or even near one—the open water problem most likely can be solved—or at least controlled—with a sump pump.

There are three types of sump pumps: pedestal and submersible, both of which fit into a pit or reservoir, and portable, which is more of a water vacuum cleaner than a pump. If you have frequent problems with basement flooding and the basement floor seems to be wet at all time, look into the possibility of adding a permanent pedestal/submersible sump pump. If your basement floods after a rain storm, a portable type sump pump is probably the answer.

Sump pumps are rated at GPM: gallons per minute. The more gallons per minute, the better the pump—usually. It is recommended that motors on pumps be 1/2-horsepower, although 1/3 hp are fairly standard. The larger motor will handle most flooding situations and provide that “extra margin” for little added cost.

The pits or wells that pumps go into are simply “sumps” or holes in a basement floor in which the pump is submerged. The liner for the sump can be a 24-inch-diameter drainage tile or pre-cast concrete drainage shell. The pump's suction head rests on a gravel base at the bottom of the sump.

The pump should have a check valve arrangement that prevents flow-back of water into the sump. It is recommended that the power to the pump be on a separate circuit. Use 12/3 wire and have the pump grounded to a receptacle box far above the “high water” mark in the basement. The sump usually is positioned at the lowest point in the basement.

Water from the sump often is piped into a sewer pipe or a dry well. Sump pumps sometimes are governed by local codes because of sewer restrictions. Check the local building authority on this.

A portable sump pump discharges water at about 20 feet in elevation. Therefore, the measurement should be made from the lowest part of the basement floor to the nearest discharge point.

FOUNDATION WATERPROOFING

If regular inside wall waterproofing and crack patching doesn't solve a leaky foundation wall problem, the very best way to tackle it is to waterproof the exterior of the foundation wall. It is costly to do this, and it is time-consuming. However, it is within a do-it-yourselfer's skills if the job is approached with lots of patience.

Dig a trench around the foundation wide enough for you to fit into the trench and deep enough to reach under the foundation footing, see illustration. Clean off the foundation wall: use a wide scraper for this such as an ice scraper or a flat tiling spade. Scrub the wall down with water from a garden hose and a stiff broom or brush.

Lay a 3-inch bed of medium-sized gravel in the trench. Then lay a row of field tile on the gravel around the bottom of the foundation. The tile should have a slight pitch.

At one corner of the house, where the tile comes together in the downward pitch, run a length of tile out into the lawn about 10 feet. You will need to dig a trench for this, too. Lay the tile on 3 inches of gravel.

Coat the foundation walls, from the footing to grade level, with a thick application of asphalt roofing cement. You can apply this with a trowel and brush. Make sure all areas are covered thoroughly.

Embed a vapor barrier of black emulsified tar solution and asphalt felt. Be sure to overlap the joints of the felt about 4 inches. To prevent water seepage, stick the joints together with asphalt roofing cement.

Let the job dry for a couple of days. Then backfill the earth into the trench. Make sure the fill slopes away from the house at a rate of about 1 inch per foot. Save any leftover dirt. The ground will settle for some time and you will need this dirt to fill depressions.

