

Home

[Home](#) > [Walls](#) > [Water Leaks Through Walls](#)

Roofs

Water Leaks Through Walls

Windows, Doors, & Shutters

[Back to Main Walls Page](#), [Caulks and Sealants](#)

Walls

Holes, Cracks, Gaps and Penetrations in walls:

- [Wood Frame Walls](#)
- [Masonry Walls](#)
- [Narrow Garage Walls](#)
- [Water Leaks Through Walls](#)

Porches & Attached Structures

Equipment & Loose Objects

Before a Hurricane

After a Hurricane

Priorities & Incentives

Understanding the Risks

Links to Other Resources

Ask the Expert

FAQs

The Risks:

Water is likely to find its way into your house through any holes, cracks, gaps or wherever a pipe or cable pierces the wall. Answer the questions in the checklist assuming that a hose with a nozzle is applying water and that the water can enter the house from the top, sides, bottom, and underneath. However, even water applied with a nozzle may not adequately represent how well wind driven rain of a hurricane can penetrate into houses. Hurricanes drive rain from all directions, not just the direction one may aim a nozzle. When you are looking for 'gaps,' be sure to include cracks of any size no matter how small. The question is whether the opening for these devices is really water tight.



Sealing gaps and cracks around an outdoor hose bib

[\(click image for larger version\)](#)

Evaluation of Risks:



[Click here to download a PDF version of this checklist.](#)

Checklist of Leak Sources on Walls

When looking for leaks look very carefully for even the smallest hole or crack and look at the undersides of things even if means you have to get down on your knees.

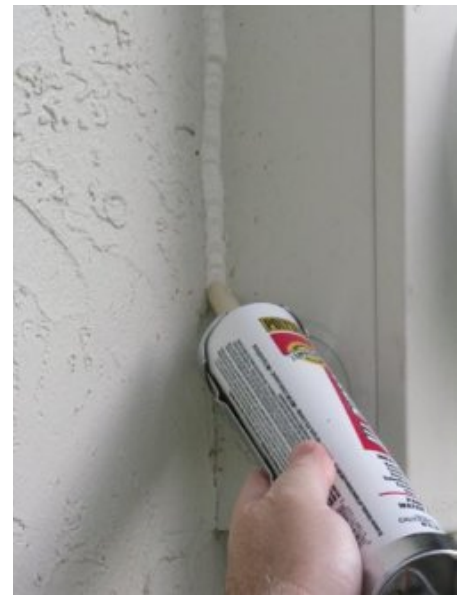
In general check everyplace on a wall where there is any kind of penetration.

- Water faucets: Are there gaps between the water faucets and the house?
- Gas lines: Are there gaps around gas pipes where they enter the house?
- AC: Are there gaps around air conditioning pipes (white and foam covered) where they enter the house?
- Electrical outlet boxes, junction boxes, circuit breaker boxes, disconnect switches, electric meters, etc.: Are there gaps of any sort between these devices and the house?
- Light fixtures: Are there gaps between light fixtures and the face of the house?
- Dryer vents, gas water heater vents, range hood vents: Are there gaps between these devices and the house?
- Are there cracks or voids in mortar under window sills?
- Is the finished floor of the house high (at least 6 inches) above soil and mulch?
- Are there parts of sides of the house where water has gotten into the house after heavy rains or where there has been standing water next to the house?
- Are there penetrations of the house within 6" of the ground??

Retrofit Measures for Cracks and Holes:

If you find any of the above conditions you should seal these joints. You can use single applications of caulk for small cracks up to about 1/4" wide and multiple applications for cracks up to about 1/2" wide. Foam available in spray cans at hardware stores and home supply stores can be effective for filling larger holes. However, these foams deteriorate within a year when exposed to sunlight (even indirect sunlight). Consequently, if you use foam you will need to coat it with a urethane caulk to protect it from sunlight. Holes in stucco can be repaired using a plastic like material (Stuc-O-Flex ®) that is available at some paint stores. It comes in caulk tubes and bucket sized containers. It has the advantage that it can be tooled to look something like stucco. For best functional results push it into cracks and for cosmetic results spread it over as narrow an area as practical. Only use caulks suitable for outdoor applications and for more information about Caulks and Sealants, click on [Caulks and Sealants](#). Caulks used for interior paint work are not suitable for outside use because they will degrade, shrink, and become hard and brittle. They will be ineffective within a year.





Sealing around an electrical disconnect box

(click image for larger version)

Wall Surfaces

The Risks of Wall Finishes:

In an ideal world the exterior finishes on your house would keep all water out but would let water vapor escape if water does get into the walls. Although some older houses have very porous skins and therefore are not very energy efficient it is that very quality, their being porous, that allows these walls to dry out, air out, to breath when they get wet. Newer houses on the other hand are being built to be more energy efficient by among other things being tighter, i.e. not letting air flow through walls. This very good energy quality makes it difficult for walls to dry out if water does get into them. Unfortunately, even energy efficient "tight" walls have lots of ways that water can get past the cladding. These include actual holes as discussed above, a porous skin surface and cracks or holes in the skin.

The significance of cracks

- A hairline crack in stucco only 6" long and only 1/64th wide has the same area to let water in as a square hole over 1/4" on a side.
- A stair step crack only 1/32" wide on a block house that includes two vertical steps and one horizontal run has the same area to let water in as a hole 1" on each side.
- A 1/16" wide crack between 6" wide siding boards has the same area to let water in as a hole nearly 5/8" on a side.
- A crack between a window frame and the house that is only 1/64th inch wide has the same area to let water in as a hole 1/2" on a side.

During a hurricane these are not just innocent holes if they are on a wall with a sheet of water constantly supplied with wind driven rain. That sheet of water is in effect looking for someplace to go. A crack is the easy place for it to go and as it goes the crack is supplied with more water. With the wind pressure of a hurricane such cracks or holes can

be considered as holes in a bucket of water with the water level being several inches deep. This illustrates the risk the seemingly minuscule cracks described above present to houses.

From the above you can see that sealing cracks on your house is critical. If you have very many cracks, they can let in so much water that it overwhelms the wall system by saturating it and makes the interior wet; too wet to dry out before mold and other damage occurs. Remember that in a hurricane, rain water is continuously being blown against the house (a constant supply of water) and that there is a pressure difference across the windward wall that is pushing water inwards.

Short of residing your home or making a major renovation, paint and sealants are your best bet for trying to reduce the amount of water entering through your walls.

Exterior paint: Wind driven rain pounding against walls for hours and hours during hurricanes can saturate walls, especially concrete block ones, with water that raises moisture levels in the entire house. That rising moisture level coupled with water entry at windows and loss of electricity for dehumidification can cause endemic mold.

To learn why even new houses with concrete block walls had become saturated with wind driven rain, the Florida Home Builders Association funded a study by Joe Lstiburek that found some houses simply did not have thick enough suitable paint on the exterior walls to prevent the concrete block (with or without stucco) from becoming saturated. Concrete is not water proof; concrete block which is more porous than ordinary concrete is even less water resistant. Further, he found that older houses with bare (no stucco) block but with multiple layers of paint had fewer water problems than new houses with stucco (albeit thin) and only the initial coat of new house paint.

So the lessons learned are that if you have an older house with multiple coats of paint, with or without stucco, your house walls are less likely to become saturated with water during extended hours of wind driven rain than a new house, with or without stucco, and just one coat of paint. Consequently, one may want to consider painting a new house again. However, before doing so consult with the technical representative of the paint company you are considering using. Generally, they are glad to come to your house to look at the existing paint and make a paint recommendation.

Acrylic latex paints are probably the best for wood and cement. Clear stains do not protect wood from damage caused by ultraviolet light and typically do not offer much water protection unless they are applied annually. This is of course costly. Rigid coatings like urethanes and enamels tend to crack as wood changes width with humidity. Cracks in these coating open the wood to water while limiting the surface area for drying. Elastomeric paints are generally not recommended because in spite of their generic name they are not very elastic and unless they are installed perfectly they can bubble and trap water. They may well make sense in some commercial applications, but are regarded by some as a poor choice for residential applications. If you have any questions about paint, seek advice from knowledge paint store personnel or better seek advice from the technical

representative of a paint company. They are generally willing to look at your house to give you advice about how best to have your house repainted. If the paint is deteriorated or chipped or peeling, then you are well advised to seek technical advice. Since the recognition of the important role of paint in the Florida hurricanes of 2004 paint companies have addressed many of the issues and there have been major advances in paint technology and methods.

The Risks of Inside Wall Coverings, they can Help Mold Grow:

Walls that get wet need to dry. They can potentially dry to both the outside and inside. If interior walls have water impermeable coverings such as tile, vinyl or aluminized wallpaper, or are painted with enamel paint, they will not readily dry to the inside. Walls need to dry out quickly (within a day or two) to prevent mold. So when refinishing the interior surface of an exterior wall avoid using impermeable materials.

Bottom of Walls

The Risk at Bottoms of Walls:

If your house has had water get into the house or nearly had water from the yard get in or if the finished floor of your house is only a few inches above the grade of surrounding ground then you need to consider ways of draining water away from your house. Many times houses were built sufficiently above the ground, but as landscaping developed with roots from plants and accumulations of mulch and other vegetative matter the soil level has built up, sometimes by several inches. In hurricanes it is common for there to be a sheet of rain water on a lawn that gets driven across a yard and up a few inches on a wall. Usually, there is a joint or crack between the foundation of a house and the wall resting on it, even if the wall is one made of concrete block. You can have leaks at the base of the wall if the floor level isn't well above the ground or sidewalk.

Evaluating the Risk:

Walk around your house looking where the floor level may be only 6 or 8 inches above the ground and where there are cracks at the floor level. Both situations put the house at risk regardless of the slope of the yard.

Retrofit Measures:

This may be as simple as pulling away dirt and mulch that has accumulated in flower beds around the house. It may require the more extensive task of making a drainage path between the house and a swale at the side front or back of the house. The swale can be a shallow ditch that is really quite inoffensive if is gradual and wide enough. However, it must have the capacity to carry water away from the house faster than the hurricane can dump it.

You can add extenders to your gutter and downspout system so that water gets discharged harmlessly away from the house. These downspout extensions have to be secured so wind does not pick them up. Even without hurricanes considerations, water from downspouts should discharge on the ground at least 3' away from walls. The reason is that water discharged from them in hot humid climates can keep the soil (or sub soil) damp enough for a long enough time that foundations and walls absorb enough moisture to support mold grow in walls.

If you have a planting area near the house that acts like a pond while surrounding grass or walkways that act as dams, then you should consider changing the slope

of the yard or adding a 4" or 6" diameter pipe under the walkway that acts like a dam. These piping materials are readily available at home supply stores. On the house side of the pipe a catch basin needs to be provide with enough surface area that mulch and other debris do not clog it up.

[Back to Main Wall Page](#)

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[Questions](#)