

Water Management of Existing Basement Floor

Last Updated: 12/21/2015

Scope



Retrofit a basement floor or slab to reduce moisture issues, as follows:

- Treat any significant or persistent site water management issues that are contributing to basement water management issues first.
- Inspect the existing slab for cracks, holes, and penetrations.
- Clean the slab prior to beginning any repairs or retrofit work.
- Seal the cracks, holes, and penetrations and apply epoxy paint.

This option is intended as a low-cost/low-disruption method to address moisture transmission from basement slab floors. There are alternate measures to perform this retrofit (e.g., adding topside rigid insulation), but they are all more extensive and will reduce available height in the basement (see [Rigid Foam Insulation Installed over Existing Foundation Slabs](#)).

Description

When retrofitting a basement, one simple and low-cost technique for reducing dampness in the basement is to seal and damp proof the basement floor with an epoxy paint. Soil gas entry and moisture transfer from the ground into the basement can be reduced by patching any cracks in the slab, sealing the seam between the slab and the foundation wall, and sealing the slab surface with epoxy paint.

Note, sealing penetrations and epoxy paint alone will not prevent dampness if poor site grading, lack of gutters, high water table, or other factors are causing serious water intrusion issues at the site. For more on water management of the site, see [BA-1015: Bulk Water Control Methods for Foundations](#).

Also see the following guides:

- [Final Grade](#)
- [Unvented Crawl Spaces and Conditioned Basements](#)
- [Drain or Sump Pump Installed in Basements and Crawlspace](#)
- [Gutters and Downspouts](#)

When retrofitting a basement that will be part of the conditioned space of the envelope, it may be possible to insulate the basement floor either by (a) removing the existing slab, installing insulation, and casting a new slab, or (b) installing insulation over an existing slab. See the guide [Rigid Foam Insulation Installed over Existing Foundation Slabs](#) for more about these options.

If space or budget constraints make insulating the slab unfeasible, the slab can still be sealed, as described in this guide, to improve moisture control in the basement. If the existing slab has continuous insulation and/or has a polyethylene vapor barrier below the slab, then only sealing of penetrations is required. In these cases, retrofit of a coating on the basement floor slab surface is not required.

If sealing the basement floor is part of an overall basement retrofit that includes insulating the walls, see the guide [Rigid Foam Board Interior Insulation for Existing Foundation Walls](#) for air sealing and insulating recommendations.

When performing basement retrofits, consider testing for radon. If radon levels warrant installation of a passive or active radon mitigation system, it should be installed before insulation, vapor, and water barrier layers are installed over the slab. See the guide [Vertical Radon Ventilation Pipe](#) for more information on radon testing and mitigation.

Uninsulated (or Existing Insulated) Slab Assembly

The epoxy paint is applied directly to the cleaned, patched concrete slab surface (see Figure 1). Water-sensitive materials should not be placed in direct contact with the slab. For instance, all wood wall sill plates should be pressure treated and/or separated from the slab with a capillary break. All interior gypsum board should be held off the slab surface.

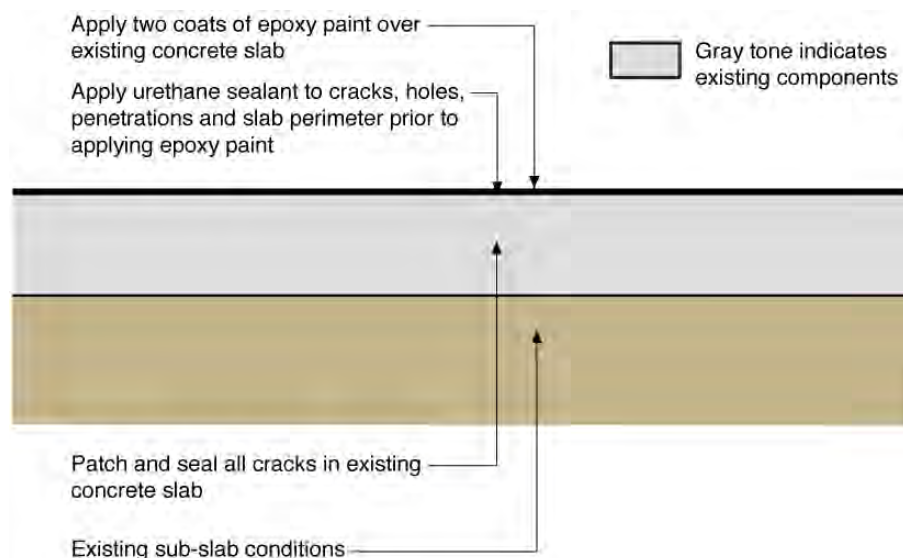


Figure 1. An uninsulated (or existing insulated) basement slab is retrofitted to reduce moisture transmission by sealing with epoxy paint. [Reference](#)

epoxy paint. [Image not found
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How to Water Manage an Uninsulated Slab

1. If significant or persistent water issues exist in the basement, treat those issues prior to sealing the slab.
2. Consider testing radon levels in the basement and home prior to the sealing project. If a radon stack is needed, it could be installed before urethane sealant and epoxy paint are applied to avoid additional steps in the project.
3. Inspect the existing slab for cracks, holes, and penetrations. Locate the areas that need to be addressed.
4. Remove any debris or dust particles from the slab prior to applying urethane sealant and epoxy paint to ensure proper adherence of the products.
5. Apply a generous and continuous bead of urethane sealant to any cracks, holes, around any penetrations, and at the wall-to-slab joints to prevent pest and soil gas entry.
6. Apply two coats of epoxy paint over the existing slab per manufacturer's recommendations (see Figure 1).
7. Recommend that the homeowner consider the use of a dehumidifier in the basement during humid months.

Ensuring Success

Consider performing a short-term or a long-term radon test prior to commencing any retrofit work and after the project has been completed. For information on radon testing visit the [Environmental Protection Agency \(EPA\)'s Radon](#) website. Also see the guide [Vertical Radon Ventilation Pipe](#) for more information on radon testing and mitigation.

Apply urethane sealant and epoxy paint to a clean, dust-free surface. The urethane sealant must be compatible with a concrete substrate. The epoxy paint must be compatible with a high pH environment (see [BSI-003: Concrete Floor Problems](#)). The epoxy paint must be applied per the manufacturer's directions, including surface preparation (removal of oil, grease, laitance, and curing compounds) and temperature/relative humidity requirements.

Upon completion of the work, visually verify the quality of the seal and paint for continuous adhesion and coverage.

Seal any penetrations in the slab, such as sump pumps and plumbing and vent pipes.

Climate

No climate specific information applies.

Training

Right and Wrong Images



Display Image: [WM11013_BasementSpace-1R_BSC_12-19-2013.JPG](#)



Display Image: [WM11013_BasementSpace-2R_BSC_05-20-2008.jpg](#)

CAD

None Available

Compliance

The Compliance tab contains both program and code information. Code language is excerpted and summarized below. For exact code language, refer to the applicable code, which may require purchase from the publisher. While we continually update our database, links may have changed since posting. Please contact our [webmaster](#) if you find broken links.

[ENERGY STAR Certified Homes](#)

[Note: Guidance for Version 3.0, Revision 08 is coming soon.]

ENERGY STAR Certified Homes is a voluntary high-performance home labeling program for new homes operated by the U.S. Department of Energy and the U.S. Environmental Protection Agency. Builders and remodelers who are conducting retrofits are welcome to seek certification for existing homes through this voluntary program.

ENERGY STAR Certified Homes (Version 3, Rev. 07), in the ENERGY STAR Water Management Checklist, specifies Water-Managed Site and Foundation:

1.7 Sump pump covers mechanically attached with full gasket seal or equivalent.

[DOE Zero Energy Ready Home](#)

The DOE Zero Energy Ready Home Program is a voluntary high-performance home labeling program for new homes operated by the U.S. Department of Energy. Builders and remodelers who are performing retrofits on existing homes are welcome to seek certification for those homes through this voluntary program.

The DOE Zero Energy Ready Home program requires compliance with [EPA's Indoor airPLUS program](#). Item 1.4 under moisture control requires that basements/crawlspaces are insulated, sealed and conditioned.

[2009 IECC](#)

Section 402.4 Air leakage (Mandatory).

[2009 IRC](#)

Section R317 Protection of Wood and Wood Based Products Against Decay.

Section R317.1 Location Required.

Section R318 Protection Against Subterranean Termites.

Section N1102.4 Air leakage (Mandatory).

[2012 IECC](#)

Section 402.4 Air leakage (Mandatory).

[2012 IRC](#)

Section R317 Protection of Wood and Wood Based Products Against Decay.

Section R317.1 Location required.

Section R318 Protection Against Subterranean Termites.

Section N1102.4 Air leakage (Mandatory).

More Info.

Access to some references may require purchase from the publisher. While we continually update our database, links may have changed since posting. Please contact our [webmaster](#) if you find broken links.

Case Studies

None Available

References and Resources*

1. [2009 IECC - International Energy Conservation Code](#)

Author(s): ICC

Organization(s): ICC

Publication Date: January, 2009

Code establishing a baseline for energy efficiency by setting performance standards for the building envelope (defined as the boundary that separates heated/cooled air from unconditioned, outside air), mechanical systems, lighting systems and service water heating systems in homes and commercial businesses.

2. [2009 IRC - International Residential Code for One and Two Family Dwellings](#)

Author(s): ICC

Organization(s): ICC

Publication Date: January, 2009

Code for residential buildings that creates minimum regulations for one- and two-family dwellings of three stories or less. It brings together all building, plumbing, mechanical, fuel gas, energy and electrical provisions for one- and two-family residences.

3. [2012 IECC - International Energy Conservation Code](#)

Author(s): ICC

Organization(s): ICC

Publication Date: January, 2012

Code establishing a baseline for energy efficiency by setting performance standards for the building envelope (defined as the boundary that separates heated/cooled air from unconditioned, outside air), mechanical systems, lighting systems and service water heating systems in homes and commercial businesses.

4. [2012 IRC - International Residential Code for One and Two Family Dwellings](#)

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Organization(s): ICC

Publication Date: January, 2012

Code for residential buildings that creates minimum regulations for one- and two-family dwellings of three stories or less. It brings together all building, plumbing, mechanical, fuel gas, energy and electrical provisions for one- and two-family residences.

5. [Building Radon Out, A Step-by-Step Guide On How To Build Radon-Resistant Homes](#)

Author(s): EPA

Organization(s): EPA

Publication Date: April, 2001

Document detailing how to build radon-resistant homes.

6. [Bulk Water Control Methods for Foundations](#)

Author(s): Ueno, Lstiburek

Organization(s): BSC

Publication Date: January, 2011

Report about the fundamental concepts that must be understood at the planning or initial inspection of existing homes regarding surface and ground water management.

7. [Mass Save Deep Energy Retrofit Builder Guide](#)

Author(s): Pettit, Neuhauser, Gates

Organization(s): BSC

Publication Date: July, 2013

Guidebook providing useful examples of high performance retrofit techniques for the building enclosure of wood frame residential construction in a cold and somewhat wet climate.

*Publication dates are shown for formal documents. Dates are not shown for non-dated media. Access dates for referenced, non-dated media, such as web sites, are shown in the measure guide text.

Contributors to this Guide

The following authors and organizations contributed to the content in this Guide.

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