M D England & Sons
Home Renovations

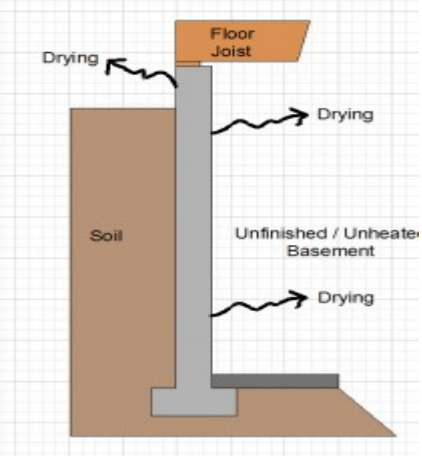
Two Keys to a Dry, Mold-Free Finished Basement: Vapor Barriers and a Dehumidifier

Protect Your Investment

Finishing your basement is a great investment, increasing the finished square footage of your home by up to 50%, for a small fraction of the your homes overall cost. For example, take an average 2,000 s.f. colonial in Massachusetts that costs $500,000: If one were to spend $40,000 to finish 750 s.f. of the basement space, the homes finished space would increase by 37%, but the cost of the additional space would be only 8.0% of the homes overall cost. In addition, most if not all of this investment can be recaptured in increased value of the home at re-sale. Having said that, $40,000 is a substantial amount of money to invest, so it is important that you protect your investment from the most common threat that almost all basements face: moisture and mold.

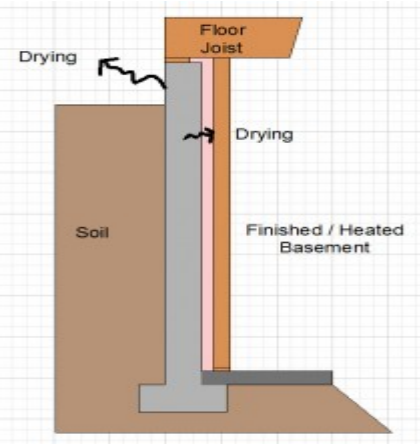
Understanding Vapor Movement

Before we explain where to use vapor barriers it's a good idea to talk about where the vapor comes from which ultimately makes the discussion easier to understand. First off you need to think of your concrete (or block) walls as a huge sponge for moisture (water vapor). Over time and throughout seasonal changes in temperature concrete will "dry" out, releasing a tremendous amount of water vapor. The sketch below shows an unfinished, un-insulated, un-heated basement wall. We've shown arrows that indicate where the water vapor goes as the wall "dries"



Depending on the time of year it's possible that all that humidity in the air will turn around and condensate on the cool concrete surface if the dew point is correct. The point here though is how moisture in the form of water vapor leaves the foundation walls and migrates into the basement space or outside above grade.

Bad Basement Insulation Detail: Fiberglass insulation up against the foundation wall.

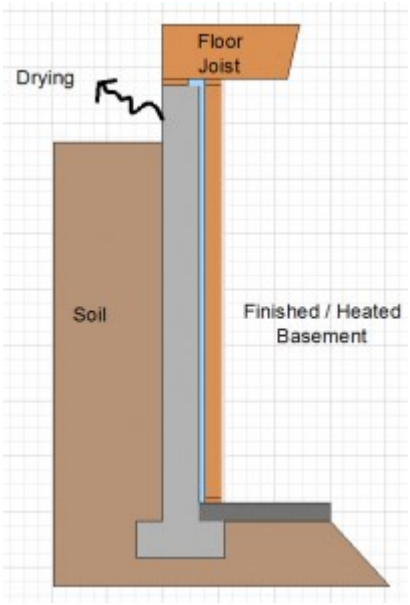


The basement insulation shown above is the most common type used in Massachusetts. It involves a framed 2 x 4 wall adjacent to the concrete foundation walls. The stud cavities are filled with R- 15 kraft – faced insulation. The kraft facing, which is the vapor barrier, is on the room side of the wall, protecting the sheetrock from moisture. The reason this is not a good idea is that as the foundation walls wick off water vapor, it gets trapped between the concrete wall and the vapor barrier. This causes the fiberglass insulation to become saturated with water. Water laden fiberglass is extremely inefficient and very prone to mold growth. As you can imagine once the fiberglass becomes soaked in water it's nearly impossible

for it to dry out. The fiberglass must be completely removed and disposed of. It's also very likely that mold will have grown on all the studs, drywall and floor joist framing, creating potential health risks for you and your family if not treated properly.

See the next page for our solution to this problem.

The M D England and Sons Solution – 2" Polyisocyanurate Foam Board plus R-19 Fiberglass Insulation



The M D England and Sons Solution – Foam and Fiberglass Hybrid

One of the best ways to insulate basement walls is by using spray-in-place foam insulation. However, spray foam insulation can be VERY expensive for some projects. That's why we use a hybrid insulation plan that uses a combination of rigid foam insulation and fiberglass insulation. The idea for this detail, which is endorsed by Todd Fratzel, Licensed Professional Engineer and Editor of Home Construction and Improvement, is to install a layer of rigid 2" Dow Tuff –R Polyisocyanurate foam board insulation (R-13, continuous, which meets the energy code requirement) directly to the concrete foundation walls using adhesive, then seal all joints with a metallic vapor barrier tape. We then frame our stud walls, and any

interior walls that lead to unconditioned spaces (the wall to the utility room, for example) will have the stud wall cavities filled with kraft faced fiberglass insulation (R-19, cavity, which exceeds the energy code requirement). This combination gives you both the moisture protection you need, while meeting/exceeding the required insulation values for the finished space.

What About My Floor?

Moisture will also work its way up through your concrete floor slab, which is typically poured 4 inches deep. The good news is that if your home was built after 1985, it should have a poly moisture barrier installed below the slab, dramatically reducing vapor movement up through the slab. Regardless of your homes age, we install a vapor barrier beneath our interlocking or engineered flooring prior to installation to protect it from moisture (some flooring products already have built-in vapor barriers or don't require an underlayment, in those cases we do not install a vapor barrier). If you go with carpeting, we install a moisture resistant under pad. The only floor surface that we don't use underlayment for is tile, which is applied directly to the slab.

The Second Piece of the Puzzle: A Dehumidifier

No matter how well sealed your basement is, you will still have to deal with humidity in the air, particularly in the summer months. To maintain an ideal humidity level (the ideal range is 40-50%), you'll need a dehumidifier. The size of the unit will depend on the square footage of the area being conditioned and the existing humidity level, but a good rule of thumb is a 50 pint unit can handle up to 1,000 s.f., and a 70 pint unit can handle up to 1,500 s.f.. We typically install your unit in an unfinished space, and have the face of the unit flush-mounted into the finished space with decorative trim around the face of the unit. We also highly recommend a direct water discharge line routed to either an existing condensation pump on your furnace, a sump pump if you have one, or a separate condensate pump to discharge the water to the exterior of your home. Without a direct discharge, you'll need to empty the units' water sump at least once per day during the humid months, something most people don't have the time to keep up with.

Summary

Properly installing vapor barriers in your wall insulation will cost a little more than the old method of just putting fiberglass insulation up against the concrete foundation wall. In a typical 750 s.f. space, the foam/fiberglass hybrid method described above will cost approx. $700 more than the fiberglass-only method. A decent dehumidifier costs about $250, and flush mounting with direct discharge might cost another $400-600 depending on the setup. Not pocket change by any means, but considering the size of the overall investment you are making in your basement space, and taking into account the potential

health risks and remediation expenses that you would incur if you had a mold issue in the future (like the one shown below!), we believe taking these two steps is money well spent.