

ACTION PLAN: BASEMENTS



**MAKE THE BASEMENT AIR AS GOOD
AS THE AIR IN YOUR LIVING SPACE.**

Basements come in a wide variety of shapes, styles, and sizes. They can be unfinished, partially finished, or finished. They can be full basements, partial with small crawlspaces, garden level, or walk-out.

They can have a dirt floor, concrete slab, OSB supported on beams and joists, or even wall-to-wall carpeting. Some may have water control systems such as interior or exterior drainage systems and sump pits - some pits have pumps installed and some do not. They can be used as an extension of the living space with the addition of bedroom, exercise areas, or simply locating a home office in the basement. At the same time, basements typically house furnaces, forced air systems, and other combustion systems, used for storage, or not used at all.

The most important thing to know about basement air is that it will circulate into your living space, even if the door to the basement is always closed. Generally speaking, basement air is not ideal to breathe. It gets sucked into the house through cracks and openings in the foundation and subfloor bringing all kinds of contaminants with it. This is not healthy fresh air and it makes its way from your basement into your living spaces through a wide variety of pathways so you need to make sure that basement air is as good as the air in the rest of your home.

IMPORTANT NOTE:

If you have both a basement and a crawlspace adjacent to or below all or part of the basement, deal with the crawlspace first. Details can be found in the Crawlspace Action Plan and Implementation Manual.

IMPLEMENTATION MANUAL

OVERVIEW

Although basements and crawlspaces are part of the structure of a house, there are critical differences. Crawlspace air is usually raw outside air which is further polluted by the open soil floor with all its potential soil gasses, bacteria, mold growth, plus the possibility of infestations by insects and rodents. Therefore, crawlspace air must be separated from the “breathing zone” of the living space air.

Basement air is almost never as polluted as crawlspace air, but it is rarely as good as the upstairs air. Therefore, total separation of the two air spaces isn't necessary. This is fortunate because isolating basement air from breathing zone air is impossible because of major air pathways that often exist between them. Stairways, plumbing and electrical penetrations, inherent gaps in the construction allow airflow throughout. In addition, forced air vents and ducting are typically located in the basement providing additional air migration.

Our methodology encompasses building science, academic research, medical science, and years of field experience. Our practices exceed most industry standards and will both improve the air in your basement and limit the amount of basement air entering your living spaces. It is critically important that the steps be completed as specified and in the order listed!

STEP 1: ASSESS CURRENT CONDITIONS

STEP 2: REPAIR (AS NEEDED)

STEP 3: ADD MECHANICAL VENTILATION

This manual contains two different sets of implementation steps, one each for:

- Finished basements
- Unfinished basements

For partially finished basements, you should read through both sets of steps to understand what you need to do in each section of your basement. Many of the steps are the same, but it is important to know the subtle differences.

FINISHED BASEMENTS

Finished basements are usually used as an extension of the living space of a house. With a finished basement, most if not all of the structures are hidden behind building materials like sheetrock, paneling, flooring, and ceiling. However, this complicates the ability to visually identify leaks, moisture intrusion, condensation and other issues. Routine assessment of your basement allows to you notice any changes and get ahead of small problems before they become serious issues.

If there is also a crawlspace - even a small one under only one room of the house - go to the Crawlspace Action Plan [\[link\]](#) before proceeding with the basement. Not sure if you have a crawlspace? One way to tell is if your floor is OSB or plywood supported on beams and joists. This means there is a shallow crawlspace below the wooden floor.

STEP 1: ASSESS CURRENT CONDITIONS

Be prepared with a flashlight (even if basement is well lit) and a moisture meter. Determine if the entire footprint of the house is a basement or if there is a small crawlspace. Remove, move or at least place on risers all furniture, stored items, and other contents so all interior surfaces including floors, walls, and ceiling are clearly visible. If items, such as appliances, can't be moved, do your best to check behind/under them with a flashlight.

Note any off-odors or odors that are different from those upstairs, trace to the source. Look for any areas and sources of moisture, dampness, leaks, efflorescence on the finished materials of the walls, flooring, and ceiling.

- Water stains or discoloration
- Visible mold
- Visible condensation or dampness
- Visible rotting or damage to building materials especially wood
- Crystalline deposits on surfaces of masonry, stucco or concrete.

Inspect all appliances, equipment, and vents in basement to ensure they are in good working order and holes around pipes and wiring are sealed.

Forced Air (see the Forced Air Action Plan and Implementation Manual for more detail)

- Hot water heater
- Washing machine and dryer
- Vents to the outside (especially dryer vent)
- Ventilation fans
- Sump pump(s)
- Boiler or furnace

Examine all windows and window frames. Look for signs of water intrusion, condensation or damage. Make sure panes are intact and seals are tight to prevent pests from entering the house.

TIP!

If the finished surfaces (walls, floors, ceiling) show evidence of moisture or mold growth, you must determine if the source is condensation on the front surface or penetration from the back side. If you suspect it is penetrating from the back, you must remove that “finished” layer of the interior structure to gain access to the foundational structure of the basement where the problem is likely occurring. Go to Unfinished Basement Implementation Manual for more details.

STEP 2: REPAIR (AS NEEDED)

Remove visible mold and water stains from wall, flooring, and ceiling surfaces. If any of the above are visible on the inside surfaces, then the interior of the walls, flooring, and ceilings must be opened for inspection, determination of cause, and possible repair.

Fix all sources of water leaks and condensation

Fix or replace all broken and/or rotted structures

Install perimeter drainage and sump pumps if necessary

STEP 3: ADD MECHANICAL VENTILATION

Install a small mechanical venting system in the basement.

If an HRV or ERV is used then the airflow must be designed and installed according to manufacturers specifications. See also, the Ventilation Action Plan

UNFINISHED BASEMENTS

While unfinished basements may not be as nice to look at as their finished cousins, they are easier to assess and repairs as there are not decorative layers covering the surfaces of the floor, foundation walls, and the ceiling. Everything is visible and easily inspected.

If there is also a crawlspace – even a small one under only one room of the house - go to the Crawlspace Action Plan [\[link\]](#) before proceeding with the basement. Not sure if you have a crawlspace? One way to tell is if your floor is OSB or plywood supported on beams and joists. This means there is a shallow crawlspace below the wooden floor.

STEP 1: ASSESS CURRENT CONDITIONS

Be prepared with a flashlight (even if basement is well lit) and a moisture meter. Determine if the entire footprint of the house is a basement or there is a small crawlspace.

Remove, move, or place on risers, stored items, and other contents so all interior surfaces including floors, walls, and ceiling are clearly visible. If items, such as appliances, can't be moved, do your best to check behind/under them with a flashlight. Note any off-odors or odors that are different from those upstairs, trace to the source. Look for any areas and sources of moisture, dampness, leaks, efflorescence on the unfinished materials of the walls, flooring, and ceiling.

- Water stains or discoloration
- Visible mold
- Visible condensation or dampness
- Visible rotting or damage to building materials especially wood
- Crystalline deposits on surfaces of masonry, stucco or concrete.

TIP!

If the any surface (walls, floors, ceiling) show evidence of moisture or mold growth, you must determine if the source is condensation on the front surface or penetration from the back side. you suspect it its penetrating from the back, you should be able to gain access to the foundational structure of the basement where the problem is likely occurring without having to remove any materials.

Inspect all appliances, equipment, and vents in basement to ensure they are in good working order and holes around pipes and wiring are sealed. Forced Air (see the Forced Air Action Plan and Implementation Manual for more detail)

- Hot water heater
- Washing machine and dryer
- Vents to the outside (especially dryer vent)
- Ventilation fans
- Sump pump(s)
- Boiler or furnace

Examine all windows and window frames. Look for signs of water intrusion, condensation or damage. Make sure panes are intact and seals are tight to prevent pests from entering the house.

STEP 2: REPAIR (AS NEEDED)

- Fix all sources of water leaks and condensation
- Fix or replace all broken and/or rotted structures
- Remove visible mold and water stains from wall, flooring, and ceiling surfaces
- Install perimeter drainage and sump pumps if necessary

STEP 3: ADD MECHANICAL VENTILATION

Install a small mechanical venting system in the basement.

- If an HRV or ERV is used then the airflow must be designed and installed according to manufacturers specifications. See also, the Ventilation Action Plan

CHECKLIST

In addition to what is required for every basement, there are specific steps for different types of basements—so be sure to follow the correct steps in the Implementation Manual for your basement. Completion of all steps for the appropriate type of basement, in the order listed below, will provide maximum benefit.



STEP 1: ASSESS CURRENT CONDITIONS

Remove, or at least move, stored items so that you can clearly see if there is damage or dampness on floors, walls, ceiling, or other structures.



Determine locations and sources of moisture, dampness, leaks, efflorescence on the walls, flooring, and ceiling.



Check for off-odors or any odors which are different from the upstairs.



Examine all windows and window frames.



Inspect all appliances, equipment, and vents in basement to ensure they are in good working order and holes around pipes and wiring are sealed.



STEP 2: REPAIR (AS NEEDED)

Fix all sources of water leaks and condensation



Fix or replace all broken or rotted structures



Remove visible mold and water stains from wood and concrete surfaces



STEP 3: ADD MECHANICAL VENTILATION

Choose and install an appropriate ventilation system for your basement type. Options include using conditioned air from the house, outside air, or an HRV/ERV.

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