

A Homeowner's Guide to Minimizing Potential Vapor Entry

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Gaps, cracks, and other openings in basement floors and walls can potentially create a pathway for unwanted gases to enter your home from the soils below. One such unwanted gas is methane. Gas-phase methane is non-toxic, colorless and odorless. Gas-phase methane becomes a potential fire hazard if present within your home at a concentration between 5 and 15 percent by volume. Gas-phase methane is lighter than air, which means it has a tendency to rise and potentially accumulate near the ceiling level.

This guide identifies some inspection and maintenance techniques that you as a homeowner can follow to reduce the potential for gas-phase methane migration from below the ground surface into your home.

Gas-phase methane, when present in the soils beneath a home, can enter the home through any openings in the foundation. Basement, crawlspace, and slab-on-grade are the most common foundation types. Sealing of any openings in these foundations is an important step in preventing the entry of unwanted gases. Therefore, it is important to know how to identify these openings and the proper procedures for sealing them.

What to Look For

An inspection should be performed inside your home which includes a survey of all below ground areas or the lowest level of the structure. Look for the following openings which could function as pathways for unwanted gases to enter your home:

- Cracks in the walls and floor and around the perimeter of the lowest level.
- Openings around piping or conduit penetrations.
- Block walls with open block cores and cracked mortar joints.
- A hole in the floor used to drain condensate from a furnace.
- Openings left in the floor for future installation of tubs or showers.
- Openings in the floor to access plumbing valves (i.e., backflow valves).
- Sumps.
- Dirt floor crawl spaces or other dirt floor areas.

Sealing Tools and Materials

Common tools, materials, and procedures can be used to seal many of the openings that you

identified during your inspection. Start with the following tools:

- Safety Goggles – to protect eyes from dust and particles.
- Wire Brush – for cleaning cracks prior to sealing.
- Wet/Dry Vacuum – for cleaning cracks prior to sealing.

- Utility Knife – for opening caulk tubes.
- Caulking Gun – for applying caulk.
- Putty Knife – for pushing caulking into cracks.

You can purchase the following sealing materials at your local hardware store or home center:

- Non-flowable, paintable, polyurethane caulk – for sealing cracks and gaps up to approximately ½-inch wide. Polyurethane caulk should be used for sealing of gaps and cracks, since it has greater flexibility and lasts longer than other types of caulk.
- Backer Rod – closed cell foam tubing to be pushed into wide cracks or gaps (greater than ¼-inch) prior to applying caulk. The use of backer rod allows the caulk to “float” and stretch during expanding and contracting conditions.
- Spray foam – for sealing open block cores or other openings larger than ½-inch
- Non-shrink grout – for sealing openings larger than ½-inch.
- Sump lid – choose a solid lid that is clear or has a viewing window to allow inspection of pump operation without removal of the lid.
- Silicone caulk – for sealing of sump lids only. Silicone is easier to remove for opening of the sump lid as necessary.

Caulking Procedure

1. Prepare for sealing cracks, gaps, or other small openings by loosening any dirt and any damaged concrete with a wire brush and then vacuuming all dust and dirt from the sealing surface.
2. Push backer rod into cracks or gaps that are greater than ¼-inch wide.
3. Apply caulk, making sure to completely fill the crack. Use a putty knife to force the caulk down into the crack and feather a smooth surface.

Sealing Larger Openings

- Fill larger openings in walls and floors with spray foam or non-shrink grout. Mix grout according to the manufacturer’s recommendations.
- Seal open block cores by first placing newspaper or other equivalent material into the cores and then spraying spray foam into the cores. The newspaper will prevent the foam from falling down to the bottom of the cores.
- When a hole in the floor is used as a condensate drain, reroute the furnace drain to a sump or a floor drain that is connected to the sewer. Then fill the hole with non-shrink grout.
- Seal sumps by installing a solid cover. Seal the penetrations through the cover with caulk or grommets that may be provided with the cover. Seal the perimeter of the cover to the floor with silicone caulk, since it will be easier to remove when the lid needs to be opened for pump maintenance.

Crawlspaces

Sealing of dirt floor crawlspaces is a bigger job and may require the services of a contractor. Be advised that your contractor should use reinforced polyethylene sheeting and that the sheeting should be adhered to the perimeter walls of the crawlspace with caulking. Wood or metal batten strips should also be used to hold the sheeting in place. The strips may be anchored to the walls with concrete anchors. Note that any openings in the foundation walls below grade and above the liner need to be sealed as well. Therefore, in some cases it is best to extend the liner to the top of the walls prior to attaching. Also, don’t forget to seal the open block cores in the crawlspace foundation walls if present. Also seal around any penetrations through the sheeting with caulking. Tape may be used to hold the liner in place at penetrations.

Maintenance

Seasonal changes affect the way a home breathes. Additionally, freezing and thawing of the ground will result in subtle shifting of the home and can produce new cracks or expand existing cracks. Therefore, homes should be inspected at least once each season. Remove and replace any damaged caulking. Seal any new cracks that are found.

Additional Information

This guide briefly describes some of the things that can be done by a homeowner to help prevent unwanted gases, such as methane, from entering your home. These tips are intended only to be a basic overview of steps that are easily completed using readily available tools and materials and at a reasonable cost. Numerous books are available at your library or bookstore that include additional step-by-step procedures for more complex sealing and maintenance projects.