Crawl Space Moisture Control

Crawl space foundations are found in many homes. Typically, these foundation types are equipped with operable vents designed to provide ventilation for moisture control. Unfortunately, venting a crawl space during air conditioning season allows for the migration of hot, humid outside air into the cooler environment inside the crawl space. Instead of drying the crawl space, ventilation actually increases the moisture load. Once present, moisture migrates to the colder floor framing surfaces where the wood moisture content elevates to a point ideal for fungal growth and wood damage.

Temperature stability makes crawlspaces an excellent location for air conditioning equipment, ductwork and plumbing, however; high crawl space humidity during summer months may lead to condensation on ductwork and equipment damage. Additionally, high humidity provides an ideal environment for insect growth. Long term abatement of these problems must focus on eliminating the source, not treating the symptoms (i.e.spraying insecticides and re-insulating ductwork).

Research and experience has shown that unvented and conditioned crawl spaces provide better moisture control than vented crawl spaces and behave similarly to houses constructed with basements. Outlined below are techniques for unvented and conditioned crawlspace construction.

Unvented Crawl Space

Unvented crawl space retrofits are usually made in response to high moisture conditions in existing homes. This technique is not in full compliance with local and national building codes and should not be specified for new construction. However, extensive field experience indicates that it does provide exceptional environmental control for a safe and healthy crawl space environment.

Before any efforts are made to control ground or air born moisture, all bulk moisture entering the crawlspace (i.e. rain water, underground springs) must be eliminated. Then, the following steps must be followed in their entirety or desired results may prove elusive.

1. Install gutters and slope grade away from the foundation at least 5%(6 inches per 10 feet) to direct rain and surface water away from the house. Empty downspouts 8 to 10 feet from the foundation.

2. Cover the crawl space with a minimum 6 mil polyethylene vapor barrier. Overlap all seams a minimum of 1 to 2 feet and seal with tape. Extend the outside edge of the poly up the foundation wall to a point at least 6 inches above the outside grade. Seal the poly to the foundation wall by using construction adhesive, duct mastic/sealer or a pressure treated nailing strip. The goal of this step is to provide 100% ground coverage.

3. Close and seal all foundation vents to eliminate warm, moist outdoor air from entering the crawl space. Cut blocks of ½" to 2" rigid polystyrene and pressure fit into the backside of vent openings to further reduce the intrusion of outdoor air.

4. Seal forced air ductwork to reduce or eliminate leakage. Supply air leaks can lower crawl space temperature leading to higher relative humidity. Return air leaks cause negative crawl space pressure, increasing the rate of soil moisture evaporation and soil gas migration.

If the crawl space is saturated at the time corrective measures are taken, it is prudent to run a dehumidifier for several weeks to bring the moisture content under control. From that point forward, the space should operate safely. Because outside ventilation has been eliminated, under no circumstances should combustion products, such a lawnmowers, gasoline, paints or solvents be stored in the crawl space. If a combustion appliance such as a gas or oil furnace is present, a dedicated combustion air supply may be necessary during the heating season.

Condtioned Crawl Space

This method is usually used in new construction but can be specified for retrofit applications when existing insulation is damaged and must be removed. The conditioned crawlspace varies slightly from the unvented crawl space in that it treats the crawl space area as part of the living space, much like a basement. This construction technique also meets local and national building codes.

The primary characteristics making this method code approved are the insulation of the exterior foundation wall and the introduction of conditioned/house air into the crawl. Because this foundation technique is utilized in a relatively small number of new homes, it is prudent to talk to your local county or city code official before construction.

Several construction details ensure an unvented-conditioned crawl space provides desired results.

1. Rainwater is controlled by gutters and downspouts, as well as a 5% grade sloping away from building. Downspouts should empty 8 to 10 feet from the foundation or be tied to an underground drain system.

2. Ground water is controlled by a foundation drain system. If outside grade is higher than inside grade, a damp proof coating on the exterior foundation wall is recommended. If interior grade is higher than exterior grade damp proofing and foundation drains may be eliminated.

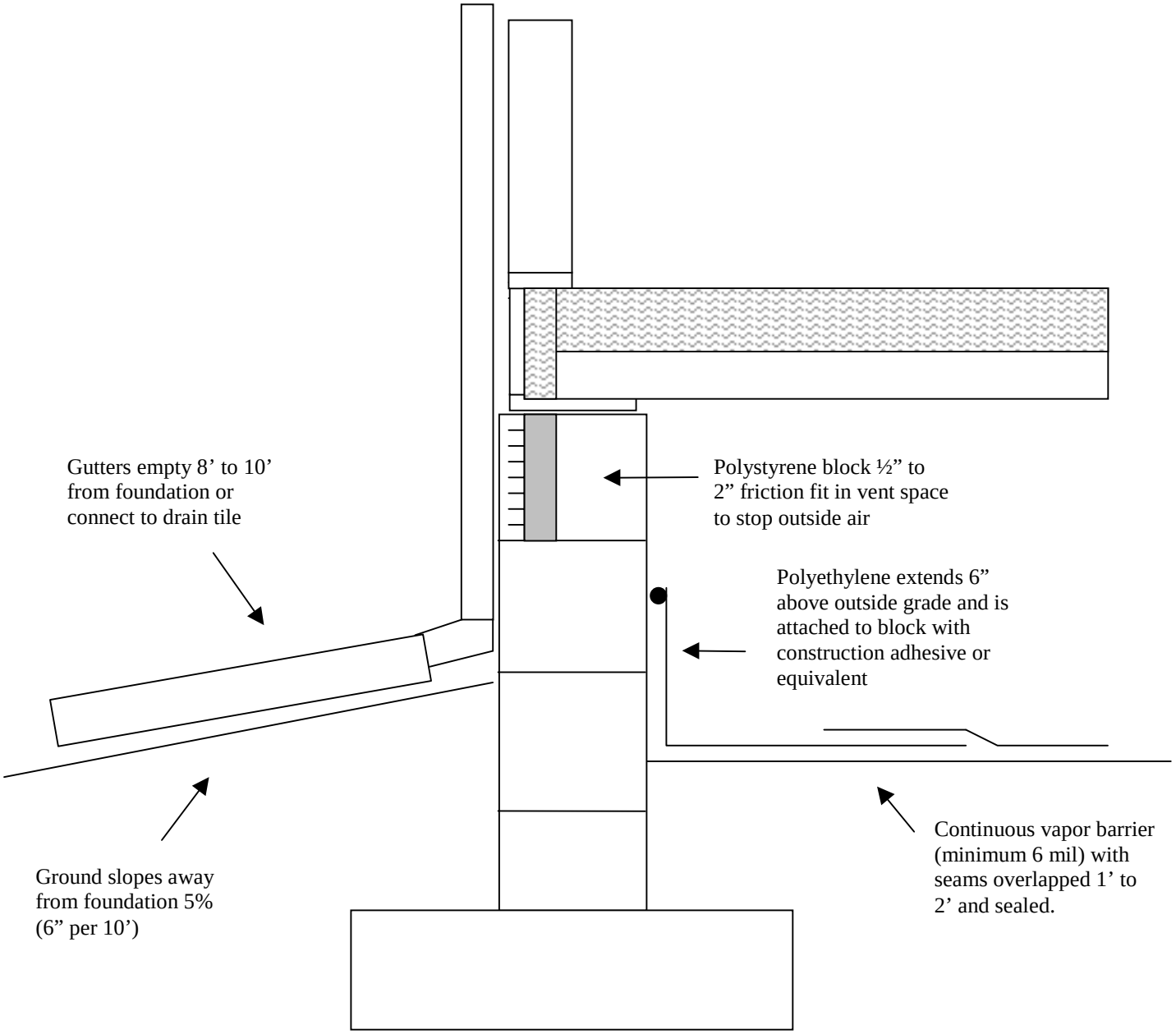
3. The polyethylene ground cover or equivalent vapor barrier covers the foundation wall and terminates under the sill plate.

4. Outdoor air is controlled by sealing all penetrations to the exterior and installing gaskets around access doors.

5. Outside foundation walls are insulated using code approved rigid or batt insulation with flame spread less than 25. Rigid insulation extends down to the top of the footing with the polyethylene ground cover sealed to its face at the bottom. Batt insulation extends down the wall and terminates 2 to 3 feet into crawlspace with seams continuously taped. In either case, the band joist is insulated using either rigid or batt insulation. Access doors are insulated using 2 inches rigid foam board or equivalent.

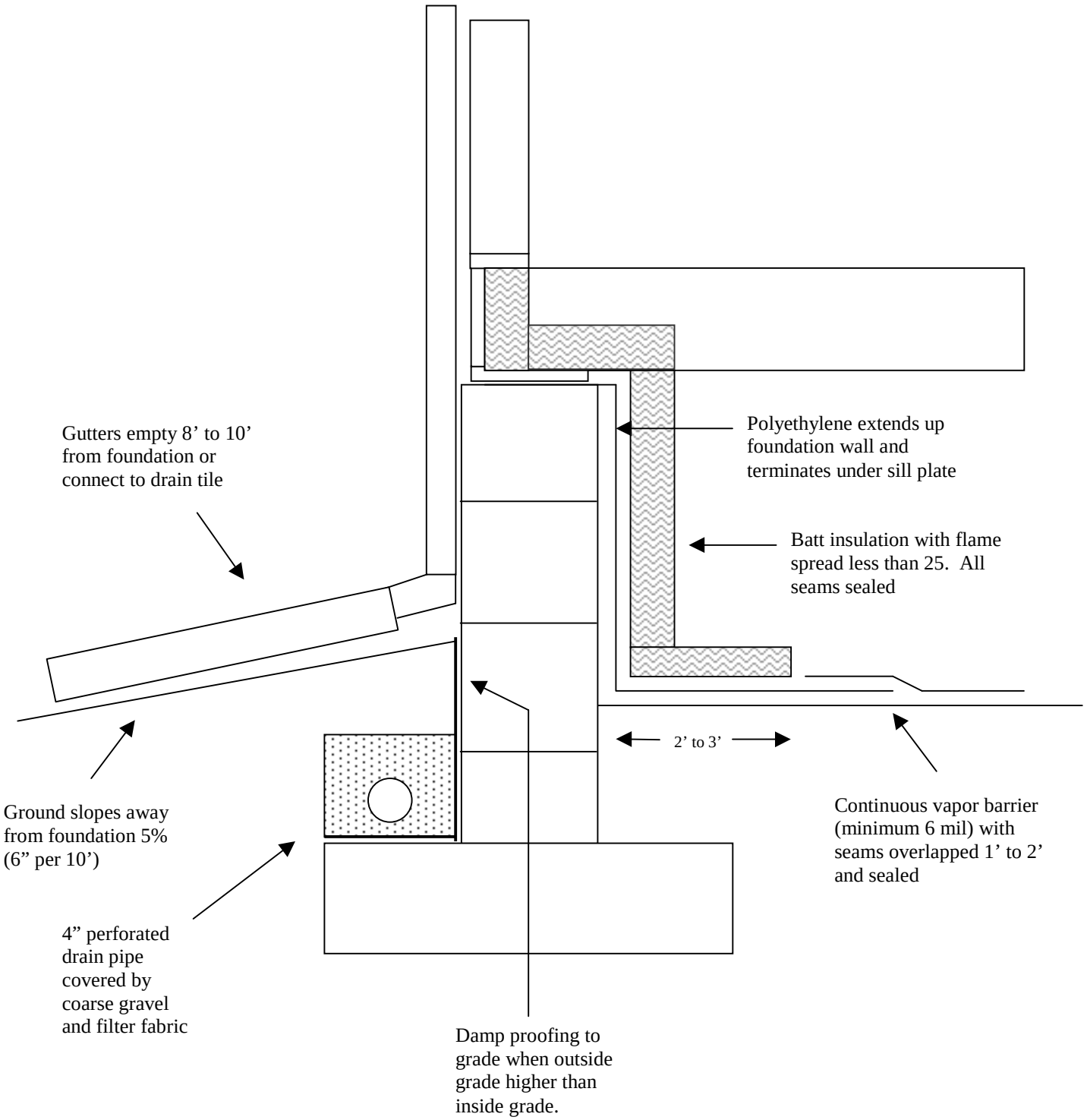
6. A dampered duct attached to the forced air heating/air conditioning system or a small exhaust fan transferring air from the house provides conditioned/ house air to the crawl space. The code also allows for the installation of an exhaust fan to exhaust crawl space air to the outside. Because exhausting can create negative pressure in the crawlspace, this method is not recommended.

The Unvented Crawl Space



The Conditioned Crawl Space

(Batt Insulation with Low Inside Grade)



The Conditioned Crawl Space

(Rigid Insulation with High Inside Grade)