

Pittsfield Village Condominiums
Specification for Crawlspace Insulation vs. Encapsulation
Revised 9/9/2022

Introduction:

Co-owners have chosen to upgrade their crawlspaces for various reasons, such as to: decrease coldness of first level flooring; create a cleaner space for storage; facilitate radon control; or, manage undesirable wetness, or even pooling of water.

Increased moisture in crawlspaces can occur for a variety of reasons; for example: some buildings are located in areas of higher water tables; some buildings were constructed (mid-1940s) without drainage tiles in the crawlspaces, and tended to accumulate moisture over time. Some of these spaces have had piping added over time to mitigate the absence of tiles; others have had ventilation fans installed; rarely, concrete flooring has been created, or a sump pump installed.

Experts consulted over many years have offered widely differing opinions on the safest management of crawlspace moisture, ranging from maintaining free movement of air (including use of open external vents) uninhibited by any barriers or coverings, to full encapsulation of the space as a complete barrier against water or vapor from dirt floor, effluence through concrete blocks, or contact with external air through the vent.

A primary requirement of the HOA (Home Owner's Association) during any crawlspace intervention would be to prevent rot and mold caused by trapped water, which would impact the long-term integrity of the wood frame structures, as well as residents' health! Thus, a Modification Request must be submitted detailing the contractor's proposal as alignment with this specification ("spec"), and be accepted for approval before installation is begun.

(Of note, this spec does not address requirements for addition of concrete flooring to the crawlspace; the plans and rationales for this option must be detailed in the Modification Request for further discussion with the M&M Committee.)

Definitions:

Unit: an individual condo. The Village has 2-plex, 4-plex, and 6-plex buildings (e.g., 2, 4, or 6 units each).

Central Pier: concrete post in middle of crawlspace supporting the first floor through the central wooden beam, and ultimately the first floor ceiling and attic structures through either through a weight bearing post centered above it, or through weight bearing walls.

Perimeter walls: external concrete block walls, above and below ground: present on opposite sides of crawlspace for internal units; and surrounding 3 sides of crawlspace for end units.

Common wall: concrete block wall separating condo's lower level from that of the neighbor's. For internal units, one common wall separates two crawlspaces, and the other common wall separates two basements; for end units, the single wall separates the basement from the neighboring basement.

Interior wall: the concrete block wall separating the basement from the crawlspace within one unit; it supports a 6" x 8" air duct and two slotted door openings, all of which are critical for maintaining internal air flow to ensure adequate combustion and make-up air for furnace and water heater.

Band Joists: wooden frame sitting on the concrete block foundation (external, common, and internal walls) upon which the building's wooden structure rests.

Joists: vertical boards, spaced 16 inches apart, spanning the distance between the band joist and the central beam; supports the above flooring.

Levels of Intervention: Co-owners choosing to install coverings within the crawlspace must follow the following specifications based on the desired “Tier” of intervention they desire to utilize.

- Tier A). “Insulation” is the “minimum essential” level of intervention, and the least costly. “Insulation” is defined as removal of debris, sealing of vents, insulation at the band boards, and installation of a waterproof vapor barrier on dirt flooring, sealed correctly to the exterior walls, common wall, internal wall, and central pier.
- Tier B). “Encapsulation” is the “better and preferred” requirement, and the moderately costly level. “Encapsulation” is defined as removal of debris, sealing of vents, insulation at the band boards above the exterior walls, and installation of a waterproof vapor barrier on dirt flooring, central pier, and external, common, and internal walls up to the band joists, all sealed correctly together as a unit. The ceiling of the crawlspace is not insulated (traps moisture; harbors pests).
- Tier C). “Encapsulation Plus” is the “best quality”, and most costly level. It includes all features of Tier B, but utilizing more pricey materials, and/or additional features or variables such as additional wall insulation, radon mitigation, water alarm, reshaping/removal of dirt flooring, etc.

Additionally:

- Besides the installation contractor, consultation with an external HVAC specialist is indicated for all Tiers, especially when the water heater and furnace units are not converted to high efficiency units! This specialist makes necessary space measurements and calculations to ensure that adequate combustion and make-up air is available to prevent back drafting and entry of carbon monoxide into the living space. Additionally, for Tiers B) and C), encapsulation profoundly alters internal / external water vapor and air flow dynamics within the crawlspace, and ultimately of the entire unit. Most companies that do encapsulation do not have adequate familiarity with the right products that a HVAC specialist would prescribe for needed safety corrections.
- In areas with evidence of high water tables or questionable external drainage, consultation may be indicated for correction of drainage before making changes in the crawlspace.
- Some may want to install a 4 inch perforated drain tile system which can be connected in the future with an active or passive sub-membrane depressurization radon control system.
- For some internal units, the wall dividing neighboring crawl spaces does not connect with the floor joists above, leaving an open space that will allow unconditioned air to travel into your conditioned space, lowering its effectiveness of encapsulation. Please make your contractor aware to check for this possibility so the open space can be blocked if it is present.

1. Preparation – for Tiers A), B), and C) (Insulation or Encapsulation):

- Debris must be removed and regrading done to create a smooth, even mound without dips or edges.
- External vent permanently closed; options include an external vent cover, additional internal insulation, ¾ inch pressure treated plywood installed flush with the inside of external wall, or a concrete masonry unit.
- Pipes or wiring along walls should be supported and fastened securely to the wall.

- Air seal wall openings (including “penetrations” drilled through concrete block or band joists) and at the top and bottom of the band joist with weather-resistant caulk, spray foam, or similar.

2. Floor Membrane – for Tiers A), B), and C) (Insulation or Encapsulation):

- Minimum 8 mil thick, polyethylene vapor retarder, covering 100% of floor. Many companies use proprietary products; some fiberglass reinforced; some with tear-resistant fibers.
- For Tiers B) and C), a wall vapor material is installed first (see 3 below); then the floor membrane laid internal to the vapor barrier.
- Overlap floor membrane seams by a minimum of 6” and fasten directly to the walls (in insulation) or with the wall insulation (in encapsulation).
- The floor membrane usually lays flat on the dirt floor. Optionally, if concerned about movement of membrane, secure the ground vapor barrier to the ground using 6” galvanized spikes or turf staples. (Suggested: at least one spike or staple be placed within 2 feet of each corner in the crawlspace.)
- Attach either the floor membrane to central pier at least 4” above the crawl space floor. Overlap the seam at least 2”.

3. Wall Membrane Vapor Barrier -- for Tiers B) and C) (Encapsulation):

- Material must be 6 mil, fiberglass- reinforced wall vapor retarder, installed directly over concrete block foundation.
- Attach to foundation walls using Hilti X-GN 20MX or equivalent fasteners driven through Hilti 23MM GX 100 or equivalent washers. This combination shall be installed in a single row within 4” of the top edge.
- Overlap seams must be at least 2” and sealed with Nail Power, 4” wide VaporBond TVB-4, fiberglass mesh tape embedded in mastic, or equivalent construction adhesive.
- Material will be extended 12” horizontally onto the crawl space dirt floor.

4. Perimeter, Common, and Interior Walls -- for Tiers B) and C) (Encapsulation):

- Minimum R-13 Dow Thermax insulation or equivalent will be used on all walls, covering the wall vapor retarder.
- Secure insulation to walls with plastic “Christmas Tree” fasteners (most common), Hilti X-IE 6-50-DI52 type fasteners, or equivalent.
- Seal seams in the insulation with foil tape.
- Close any gap between the top of the walls & insulation and the flooring above to prevent any moisture or unconditioned air from entering.

5. Band Joists, Finishing, and Access Doors -- for Tiers A), B) and C) (Insulation or Encapsulation):

- The band joist area will be insulated with friction-fit pieces of R-19 or higher (ideally R-30) un-faced batt insulation. Install without voids, gaps, or compression. R19 foamed insulation may be used in lieu of the bat insulation (but harder to guarantee R-Value).
- Joints between metal sections of ducts shall be air sealed with tapes, mastics, gaskets or other approved methods complying with E3 Energy’s ENERGY STAR program requirements.
- The 6”x8” air duct shall remain open to supply code required conditioned air to the crawl space.
- The slatted access doors to the crawl space shall remain uncovered and unobstructed.