

Moisture Control in Buildings
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FLOORS

Moisture problems with floors are likely to be confined to the following conditions:

1. Capillary rise of earth moisture through concrete slabs on grade and foundations.
2. Indoor condensation at the perimeter surface of concrete slabs on grade.
3. Transfer of moisture from the earth through wood floors over crawl spaces by diffusion and air leakage.
4. Mold and fungus growth on wood members including decay in crawl spaces due to high humidity.
5. Leaky return ducts for heating systems located in crawl space bringing moist air into the living space.
6. Inadequate slope of earth surrounding the building to drain away surface water.

Concrete slab floors should be underlaid with a 4-in. (0.1-m) layer of gravel to serve as a capillary break for groundwater. The gravel should be covered by a continuous vapor retarder of sufficient strength to prevent puncture by the gravel during construction. The subfloor vapor retarder should be turned up and sealed with the vapor retarder in the walls. The vapor retarder should be placed underneath the grade beam in that type of construction.

Water impermeable rigid insulation of sufficient thickness to prevent winter condensation on the perimeter of concrete floor slabs should be placed outside of the slab edge to a depth of at least 2 ft (0.61 m) or horizontally inward under the slab for a distance of 2 ft (0.61 m) or more.

Crawl spaces underneath a building should have the earth covered with a continuous vapor retarder of 6 mil (0/15 mm), polyethylene or equal, to reduce moisture migration from the earth. In vented crawl spaces, the vapor retarder needs to be turned up several centimeters on the wall perimeter. In unvented crawl spaces, the ground cover vapor retarder should be continued up the inside and over the top of the foundation wall. Ventilated crawl spaces should be provided with distributed vents with an area equal to 1/500th of the floor area of the building [4] and should be open only during spring and fall seasons.

Floors over ventilated crawl spaces require insulation between joists and a vapor retarder covering both the insulation and the joists on the underside to prevent condensation on the underside of the floor in summer. In winter, air leakage is typically from the crawl space to the living space due to the stack effect of the heated building. Unless well sealed and insulated, ducts for warm air heating systems should not be placed

in ventilated crawl spaces because leaks in the ducts will cause an undesirable exchange of heat and moisture both in winter and summer. Care must be taken to seal penetrations of floors over crawl spaces and basements for plumbing and water lines, electric service, ducts, and other utility services to prevent passage of warm, moist air and soil gases into conditioned space under the influence of chimney effect or mechanical ventilation.

Floors located below grade level need to be protected from water leakage, especially in wet climates or on generally flat terrain. Such floors need a layer of coarse gravel underneath the floor covered by a heavy weight vapor retarder carefully overlapped and sealed at the joints. In addition, a perforated drain pipe surrounded by several centimeters of coarse gravel may be required around the building at the level of the foundation. The drain pipe must be connected to the storm sewer or to an outlet at lower level, or sump.