2010 Oregon Structural Specialty Code
Special Amendment
Section 1812 Radon Mitigation
R-2 and R-3

Effective Date: April 1, 2011

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New code section 1812 has been adopted by the State of Oregon.

The over-all purpose of the proposed amendments to the 2010 OSSC is to implement Senate Bill 1025 approved by the 2010 Legislature. The bill required the Building Codes Structures Board to adopt radon mitigation standards for certain types of new residential buildings and new public buildings. Radon mitigation standards adopted by these rules amend the 2010 OSSC. These requirements are applicable in Baker, Clackamas, Hood River, Multnomah, Polk, Washington and Yamhill Counties.

These proposed rules would become effective April 1, 2011 for new R-2 and R-3 occupancies.

These changes have been prepared in the following pages as an insert for the 2010 Oregon Structural Specialty Code and are formatted for insertion in loose leave binders.

SECTION 1812
Radon Control Methods
R-2 and R-3 Occupancies

1812.1 Scope. The provisions of this section apply to new R-2 and R-3 occupancies constructed in Baker, Clackamas, Hood River, Multnomah, Polk, Washington and Yamhill Counties for which initial building permits are issued on or after April 1, 2011.

1812.2 DEFINITIONS. For the purpose of these requirements, the terms used shall be defined as follows:

SUBSLAB DEPRESSURIZATION SYSTEM (Passive). A system designed to achieve lower sub-slab air pressure relative to indoor air pressure by use of a vent pipe routed through the conditioned space of a building and connecting the sub-slab area with outdoor air, thereby relying on the convective flow of air upward in the vent to draw air from beneath the slab.

SUBSLAB DEPRESSURIZATION SYSTEM (Active). A system designed to achieve lower sub-slab air pressure relative to indoor air pressure by use of a fan-powered vent drawing air from beneath the slab.

DRAIN TILE LOOP. A continuous length of drain tile or perforated pipe extending around all or part of the internal or external perimeter of a basement or crawl space footing.

RADON GAS. A naturally-occurring, chemically inert, radioactive gas that is not detectable by human senses. As a gas, it can move readily through particles of soil and rock and can accumulate under the slabs and foundations of homes where it can easily enter into the living space through construction cracks and openings.

SOIL-GAS-RETARDER. A continuous membrane of 6-mil (0.15 mm) polyethylene or other equivalent material used to retard the flow of soil gases into a building.

SUBMEMBRANE DEPRESSURIZATION SYSTEM. A system designed to achieve lower-sub-membrane air pressure relative to crawl space air pressure by use of a vent drawing air from beneath the soil-gas-retarder membrane.

1812.3 REQUIREMENTS

1812.3.1 General. The following construction techniques are intended to resist radon entry and prepare the building for post-construction radon mitigation. (see Figure 1812).

1812.3.2 Subfloor preparation. A layer of gas-permeable material shall be placed under all concrete slabs and other floor systems that directly contact the ground and are within the walls of the living spaces of the building, to facilitate future installation of a sub-slab depressurization system, if needed. The gas-permeable layer shall consist of one of the following:

1. A uniform layer of clean aggregate, a minimum of 4 inches (102mm)thick. The aggregate shall consist of material that will pass through a 2-inch (51mm)sieve and be retained by a 1/4-inch (6.4 mm) sieve.

2. A uniform layer of sand (native or fill), a minimum of 4 inches (102 mm) thick, overlain by a layer or strips of geotextile drainage matting designed to allow the lateral flow of soil gases.

3. Other materials, systems or floor designs with demonstrated capability to permit depressurization across the entire sub-floor area.

1812.3.3 Soil-gas-retarder. A minimum 6-mil (0.15 mm) [or 3-mil (0.075 mm) cross-laminated] polyethylene or equivalent flexible sheeting material shall be placed on top of the gas-permeable layer prior to casting the slab or placing the floor assembly to serve as a soil-gas-retarder by bridging any cracks that develop in the slab or floor assembly and to prevent concrete from entering the void spaces in the aggregate base material. The sheeting shall cover the entire floor area with separate sections of sheeting lapped at least 12 inches (305 mm). The sheeting shall fit closely around any pipe, wire or other penetrations of the material. All punctures or tears in the material shall be sealed or covered with additional sheeting.

1812.3.4 Entry routes. Potential radon entry routes shall be closed in accordance with Sections 1812.3.4.1 through 1812.4.10.

1812.3.4.1 Floor openings. Openings around bathtubs, showers, water closets, pipes, wires or other objects that penetrate concrete slabs or other floor assemblies shall be filled with a polyurethane caulk or equivalent sealant applied in accordance with the manufacturer's recommendations.

1812.3.4.2 Concrete joints. All control joints, isolation joints, construction joints and any other joints in concrete slabs or between slabs and foundation walls shall be sealed with a caulk or sealant. Gaps and joints shall be cleared of loose material and filled with polyurethane caulk or other elastomeric sealant applied in accordance with the manufacturer's recommendations.

1812.3.4.3 Condensate drains. Condensate drains shall be trapped or routed through non perforated pipe to daylight.

1812.3.4.4 Sumps. Sump pits open to soil or serving as the termination point for sub-slab or exterior drain tile loops shall be covered with a gasketed or otherwise sealed lid. Sumps used as the suction point in a sub-slab depressurization system shall have a lid designed to accommodate the vent pipe. Sumps used as a floor drain shall have a lid equipped with a trapped inlet.

1812.3.4.5 Foundation walls. Hollow block masonry foundation walls shall be constructed with either a continuous course of solid masonry, one course of masonry grouted solid, or a solid concrete beam at or above finished ground surface to prevent passage of air from the interior of the wall into the living space. Where a brick veneer or other masonry ledge is installed, the course immediately below that ledge shall be sealed. Joints, cracks or other openings around all penetrations of both exterior and interior surfaces of masonry block or wood foundation walls below the ground surface shall be filled with polyurethane caulk or equivalent sealant. Penetrations of concrete walls shall be filled.

1812.3.4.6 Dampproofing. The exterior surfaces of portions of concrete and masonry block walls below the ground surface shall be dampproofed in accordance with Section 1805.2 of this code.

1812.3.4.7 Air-handling units. Air-handling units in crawl spaces shall be sealed to prevent air from being drawn into the unit.

Exception: Units with gasketed seams or units that are otherwise sealed by the manufacturer to prevent leakage.

1812.3.4.8 Ducts. Ductwork passing through or beneath a slab shall be of seamless material unless the air-handling system is designed to maintain continuous positive pressure within such ducting. Joints in such ductwork shall be sealed to prevent air leakage.

Ductwork located in crawl spaces shall have all seams and joints sealed by closure systems in accordance with Section 603.9 of the Oregon Mechanical Specialty Code.

1812.3.4.9 Crawl space floors. Openings around all penetrations through floors above crawl spaces shall be caulked or otherwise filled to prevent air leakage.

1812.3.4.10 Crawl space access. Access doors and other openings or penetrations between basements and adjoining crawl spaces shall be closed, gasketed or otherwise filled to prevent air leakage.

1812.3.5 Passive sub membrane depressurization system (crawl spaces). In buildings with crawl space foundations, the following components of a passive sub-membrane depressurization system shall be installed during construction.

Exception: Buildings in which an approved mechanical crawl space ventilation system or other equivalent system is installed.

1812.3.5.1 Ventilation. Crawl spaces shall be provided with vents to the exterior of the building. The minimum net area of ventilation openings shall comply with Section 1203.3 of this code.

1812.3.5.2 Soil-gas-retarder. The soil in crawl spaces shall be covered with a continuous soil-gas-retarder in conformance with Section 1812.3.3. The soil-gas-retarder shall extend to all foundation walls enclosing the crawl space area.

1812.3.5.3 Vent pipe. A vent pip complying with the requirements of section 1812.3.7 for subslab soil exhaust system ducts.

1812.3.6 Passive subslab depressurization system (basement or slab-on-grade). In basement or slab-on-grade buildings, subslab soil exhaust system ducts complying with Section 1812.3.7 shall be installed during construction.

1812.3.7 Subslab soil exhaust system ducts (SSESD). SSESD's shall be provided in accordance with this section and shall run continuous from below the soil-gas-retarder to the termination point described in section 1812.3.7.5. SSESD's shall consist of one three- or four inch diameter solid pipe or multiple pipes providing the same cross-sectional area. All annular openings between the SSESD and floor slabs or soil-gas-retarders shall be sealed airtight. In addition, all SSESD joints shall be sealed airtight. Penetrations of SSESDs through fire resistive construction shall comply with the applicable sections of Chapter 7 of this code. SSESDs shall be located within the building's insulated envelope and may be combined above the slab where the cross-sectional area of all combined SSESDs is maintained to the required termination point.

1812.3.7.1 Location. One SSESD shall be installed for every 2,000 square feet or portion thereof of building subslab or crawl space area served. Subslab areas

isolated by subslab walls shall be provided with separate SSESDs in the number noted above.

1812.3.7.2 Materials. SSESD material shall be air duct material listed and labeled to the requirements of UL 181 for Class 0 air ducts, or any of the following piping materials that comply with the Plumbing Code as building sanitary drainage and vent pipe: cast iron; galvanized steel; brass or copper pipe; copper tube of a weight not less than that of copper drainage tube, Type DWV; and plastic piping.

1812.3.7.3 Grade. SSESDs shall not be trapped and shall have a minimum slope of one-eighth unit vertical in 12 units horizontal (1-percent slope).

1812.3.7.4 Subslab aperture. SSESD's shall be embedded vertically into the sub-slab aggregate or other permeable material prior to casting a slab. A "T" fitting or equivalent method shall be used to ensure that the SSESD opening remains within the gas permeable material. Alternatively, the SSESD shall be inserted directly into an interior perimeter drain tile loop or through a sealed sump cover where the sump is exposed to the sub-slab aggregate or connected to it through a drainage system.

1812.3.7.5 Termination. SSESDs shall extend through the roof and terminate at least 6 inches (152 mm) above the roof and at least 10 feet (3048 mm) from any operable openings or air intake.

1812.3.7.6 Identification. All exposed and visible interior SSESDs shall be permanently identified with at least one label on each floor and in accessible attics. The label shall be by means of a tag, stencil or other approved marking which states: "Radon Reduction System."

1812.3.7.8 SSESD accessibility. SSESD's shall be accessible for future fan installation through an attic or other area outside the habitable space.

Exception: The SSESD need not be accessible in an attic space where an approved roof-top electrical supply is provided for future use.

1812.3.7.9 Combination foundations. Combination basement/crawl space or slab-on-grade/crawl space foundations shall have separate radon vent pipes installed in each type of foundation area. Each radon vent pipe shall terminate above the roof or shall be connected to a single vent that terminates above the roof.

1812.3.8 Building depressurization. Joints in air ducts and plenums in unconditioned spaces shall meet the requirements of Section 603 of the Oregon Mechanical Specialty Code. Thermal envelope air infiltration requirements shall comply with the Oregon Energy Efficiency Specialty Code. Fireblocking shall meet the requirements contained in Section 717.2 of this code.

1812.3.9 Power source. To provide for future installation of an active sub-membrane or sub-slab depressurization system, an electrical circuit terminated in an approved box shall be installed during construction in the attic or other anticipated location of vent pipe fans. An electrical supply shall also be accessible in anticipated locations of system failure alarms.

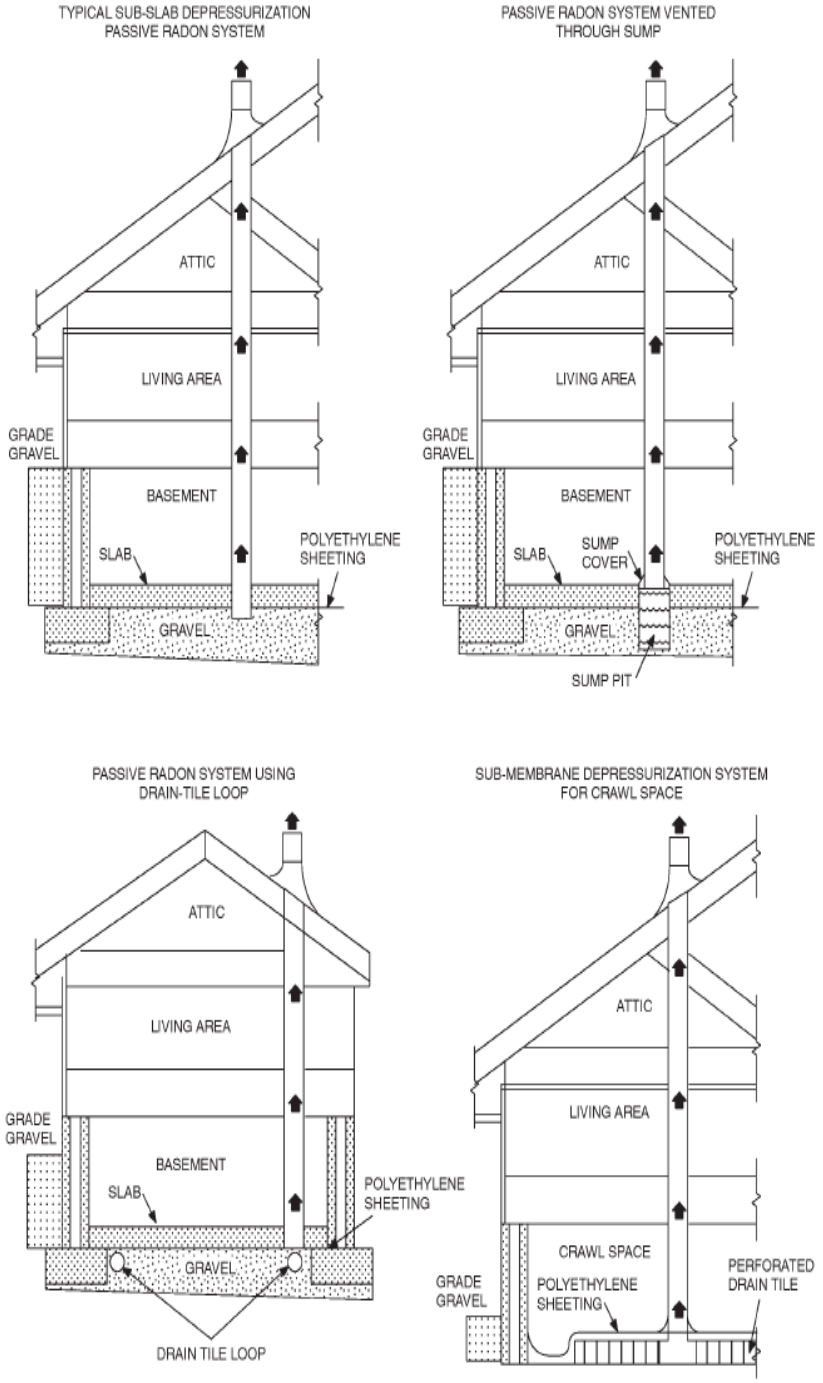

FIGURE 1812

RADON-RESISTANT CONSTRUCTION DETAILS FOR FOUR FOUNDATION TYPES