

21-2.4 RADON CONTROL AND MITIGATION

A. Purpose

This chapter provides guidance on design and construction of new buildings to mitigate radon.

B. Background

Radon gas is present in all soils to varying degrees; amounts cannot accurately be predicted from site to site. Radon is carcinogenic in higher concentrations. The Environmental Protection Agency (EPA) "action level" is 4 pCi/L. Since it is easier and cheaper to build in protection during construction than to correct after a building is completed, criteria for incorporating mitigation actions in initial construction should be defined.

C. Guidelines

The design and construction of all new buildings, including quarters, will take into consideration the control and potential mitigation of radon, regardless of the risk zone.

- 1) Buildings with accessible crawl space and all buildings that will never be regularly occupied (e.g. storage) require no special initial construction techniques unless radon emissions are expected or found to exceed the Environmental Protection Agency (EPA) "action level" of 4 pCi/L. If the EPA action level of 4 pCi/L of radon emissions are expected or found in buildings with crawl spaces, procedures detailed below shall be followed, unless the building is permanently un-skirted and there is free flow of outside air.
- 2) For buildings with lowest occupiable level on or below grade:
 - a) A barrier impermeable to gas shall be installed on the crawlspace floor, under the slab on grade, or under the occupiable floor. Sufficient overlapping and sealing in accordance with the EPA Design Guide and the International Residential Code (IRC) shall be provided to prevent leakage through joints and at edges. The impermeable barrier shall be adequately protected to prevent future punctures. Where it is undesirable, for concrete curing purposes, to place a concrete slab directly on an impermeable barrier, a layer of granular fill may be installed over the impermeable barrier under the floor slab as recommended by the American Concrete Institute (ACI).

TECHNICAL HANDBOOK FOR
ENVIRONMENTAL HEALTH AND ENGINEERING
VOLUME III - HEALTH CARE FACILITIES DESIGN AND CONSTRUCTION
PART 21 - DESIGN CRITERIA AND STANDARDS

- b) All penetrations through on-grade slabs, through below-grade slabs or through foundation walls below grade will be sealed.
- 3) For all buildings:
- a) Where significant radon emissions are expected or found to exceed the EPA action level of 4 pci/L; and
 - b) Where the lowest occupiable level is on or below grade; and
 - c) Where there is not continuous mechanical outside air changes meeting the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) criteria within all occupiable spaces when those spaces are occupied, the following shall apply:

In addition to 2a) and 2b) above:
 - Perforated piping shall be installed within the aggregate *under* the slab or floor; and
 - Solid piping shall be brought above the slab or through the foundation wall or skirting in suitable locations for possible extension and connection to mechanical exhaust at a later date; and
 - The solid pipe termination shall be protected from mechanical and weather damage and entry of water or vermin.
- 4) Construction materials and installation for radon mitigation shall be consistent with the International Residential Code.