



**MANDATORY RADON
TESTING PROTOCOLS**

DH\PI 150-334

**BUREAU OF ENVIRONMENTAL HEALTH
Radon Program**

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Radon Program
ERRATA SHEET**

Mandatory Radon Measurement Protocols

Section 404.056(4), Florida Statutes, was amended in 1999, 2001, 2004, and again in 2006. These amendments changed some of the radon measurement requirements for certain facilities in Florida. Some elements of this 1998 measurement protocol are out of date because of these statute revisions. While this measurement protocol is undergoing revision, use the revised statute and state maps (included in the CD) to determine which facilities require testing, and the amount of testing to conduct.

The information in section 1.2, section 2.1, section 3.1.1 and section 3.1.2 for the selection and placement of devices and building testing conditions shall still be followed. Report forms may be obtained as indicated in section 5.1. **Where other sections of this protocol are in conflict with the amended statute, the statute shall take precedence.**

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MANDATORY RADON TESTING PROTOCOLS

Section 1: General Information

These protocols are designed to identify and test the potential for elevated radon concentrations in Florida structures (Section 404.056(4), F.S., Mandatory Testing)

Initial tests are to be reported to the department on the proper forms within one year from the date of occupancy, or license approval. Fifth Year Follow-up Test shall be started and completed between the fifth and sixth anniversary of the date of occupancy or license approval.

Once a building has been tested twice, no further testing is required unless the building undergoes structural changes or receives approval for a new or amended license, when a cycle of initial and follow-up testing is repeated. At that time, testing begins again, even if it has been completed under the previous license or for the previous building design.

1.1 Facilities Requiring Radon Testing

Only facilities located in counties designated within the Department of Business and Professional Regulation (former Department of Community Affairs) Florida Radon Protection Map as "Intermediate" or "Elevated Radon Potential" are required to test to determine the level of indoor radon. Appendix C of this brochure contains a listing of the designated counties.

The following facilities in the designated counties are required by Florida Statute to be tested for radon or radon progeny using these procedures and protocols:

- All public and private school buildings or school sites housing students in kindergarten through grade 12.
- All state-owned, state-operated, state-regulated or state-licensed 24-hour care facilities. This shall include but not be limited to the following: hospitals, nursing homes, foster homes, assisted living facilities, mental health facilities, detention centers, correctional institutions, and pre-release centers.
- All state-licensed day care centers for children or minors.

The requirement for radon testing is divided into two building types:

- 1) single family homes and duplexes, and
- 2) all other building types (large buildings).

You must first identify the type of building(s) at your facility to determine if there is a radon testing requirement.

Refer to Appendix C for county specific testing requirements. Once you establish that you are required to test, determine if your facility is operated out of a residential dwelling or a building other than a dwelling to identify the testing protocol used. Residential dwelling units

are tested using the methods specified in section 2 (Measuring Facilities in Houses, Apartments, Condominiums and other Dwellings). All other buildings are tested using the methods in section 3 (Testing Facilities in Buildings other than Dwellings). Examples of the application of the testing protocols to different facility type and building type combinations can be found in Appendix E.

1.2 Exclusions

1.2.1 Portable classrooms or other small buildings which meet all of the following criteria may be excluded:

- the building's floor area is less than 2,000 square feet,
- the building has a crawlspace or pier foundation that is open and unobstructed on all sides of the building,
- there is a minimum clearance of 6 inches between the floor joists and grade,
- supporting pillars are of **solid** construction or have barriers to prevent the transport of radon through any hollow cavities, and
- there is no usable HVAC duct, HVAC duct penetration or fresh air intake in the crawlspace.

1.2.2 Facilities not located on the first floor:

When a facility has no presence on the ground contact or first floors of a building, it is exempt from radon testing. In this case, clients of the facility may only use the ground contact or first floors of the building as a means to access the facility. No facility related activities may occur on the ground contact or first floors of the building for this exemption to remain in effect.

Section 2: Testing Facilities in Houses, Apartments, Condominiums and other Dwellings

2.1 Initial Test

Buildings or portions of buildings, which were originally constructed and are currently used as a dwelling, are tested using the "initial testing" method described in section 2 of the US Environmental Protection Agency's (EPA) Protocols for Radon and Radon Decay Product Measurements in Homes, Publication No. **EPA 402-R-93-003**.

Any radon testing device that meets requirements of a national proficiency program recognized by the EPA or the department can be used to conduct these tests. The testing period for dwelling units must be within the time limits specified in the EPA protocols and within the exposure times specified in the manufacturer's instructions for the device used. The initial testing for dwelling units shall be reported to the department within one year from the date of occupancy or license approval. Additional reporting information may be found in section 5 of this document. Initial testing for these facilities shall be reported on form **DH1778**.

Section 3: Testing Facilities in Buildings other than Dwellings

Facilities in buildings other than dwellings are tested using the procedures for initial and follow-up test found in this section. *Examples of these types of facilities can be found in Appendix E*. The initial testing results shall be reported to the department within one year of the date of occupancy, establishment or license approval. Fifth year follow-up tests shall begin after the first day of the fifth year since the date of occupancy or license approval and reported by the first day of the sixth year. All reports shall be submitted as specified in section 5, Reporting Testing Results. Testing results must be reported on form **DH1777**.

3.1 Identifying the Locations for Initial Test

Initial testing shall be made at all of the following:

- newly licensed or previously untested facilities
- newly licensed or constructed buildings at existing facilities
- a cycle of initial and follow-up testing is required when there is a change of usage for existing buildings of existing facilities
- existing buildings at existing facilities after structural changes have been made to the buildings (even if the building was previously tested)

Initial testing shall be made in a minimum of twenty percent (20%) of the habitable ground contact and/or first floor rooms (or one room whichever is greater) which are used or accessed by the clientele.

A floor plan of the building shall be marked and evaluated to identify locations for initial testing before placing radon testing devices in a building. The following shall be identified on the floor plan(s):

- plumbing, electrical conduit and ventilation penetrations entering through the floor;
- ventilating fans;
- chases with plumbing or other conduits;
- locations where initial testing devices are placed;
- locations of re-testing devices when placed.

Rooms with the highest radon entry potential, such as those with in room floor penetrations (other than bathroom, kitchens, etc), shall be selected first for testing. After that a random selection of rooms shall be made to complete the 20% requirement.

3.2 Approved Devices and Placement for Initial Testing

Any of the following testing devices, which meet proficiency requirements of a program recognized by the department (either the National Radon Safety Board [www.nrsb.org] or the NEHA- National Radon Proficiency Program [National Environmental Health Association www.neha-nrpp.org]), can be used to conduct initial non-residential testing:

- Alpha track detectors;
- Charcoal adsorption devices;
- Continuous radon monitors; or
- Electret ion chambers

Placement of the radon testing devices must follow these general guidelines:

- Test devices shall be placed in client used, occupied, or accessed habitable spaces.
- Large rooms require at least one testing for each 2,000 square feet of habitable floor space or part thereof.
- Test devices shall be placed away from room corners, between 2 feet and 6 feet above the floor, at least 1 foot from any wall, and at least 3 feet from windows or other potential openings in an exterior wall.
- Test devices shall be placed away from drafts caused by sources such as heating and air conditioning vents, doors, fans, windows, and fireplaces.
- Test devices shall remain undisturbed during the testing period.
- Test devices shall not be placed in direct sunlight or near or on top of appliances or other devices which emit heat or moisture.
- Test devices shall be placed in areas of normal air supply and shall not be shielded or covered during the testing period. A “tamper-proof” cage may be used if it has been shown not to interfere with the accuracy of the test.
- Test devices (short-term) shall be exposed or operated in place for at least 48 hours, or longer if recommended by the device manufacturer.
- Test devices (long-term) shall be exposed or operated in place for at least 90 days, or longer if recommended by the device manufacturer. At least thirty days of testing period shall be when the HVAC system is either heating or cooling while the building is occupied.
- Test exposure time shall not exceed the maximum specified in the manufacturer's instructions.
- A duplicate test shall be taken for each 10 test devices to check testing precision.
- One control blank shall be used for each 20 devices to check for potential problems occurring during shipping, storage, or processing of test devices. This quality assurance device shall be opened, then immediately resealed for the remainder of the exposure period, and processed with the other exposed test devices.

3.3 Building Operations and Testing Conditions for Initial Tests

The following conditions shall be maintained for 12 hours preceding the test and during the testing period when using short-term test devices for initial testing:

- All windows and doors shall be kept closed except for normal entry and exit. This shall include those rooms that do not have an HVAC system and are ventilated by natural means.
- The HVAC system shall be operated on a 24-hour basis in all rooms of the building.
- The HVAC system shall be to the normal heating, cooling, or ventilation cycle, appropriate for the time of year.
- Thermostatic controls shall be set to the normal operating temperatures used when the building is occupied.
- These tests should not be conducted if severe storms with high winds (≥ 30 mph) or rapidly changing barometric pressure are predicted during the testing period.

For buildings in which the HVAC system is not turned off during the evenings, weekends or other unoccupied times, initial tests may be conducted any time the building and testing conditions specified above are met.

For buildings in which the HVAC system is normally turned off during the evenings, weekends or other unoccupied times, initial test may not be conducted during the weekend or during other periods when the rooms are unoccupied unless the HVAC system is set to operate normally beginning 12 hours prior to and during the testing period. The building and testing conditions specified above shall be maintained for the testing period. For example, in schools and other buildings normally closed during the weekends, a testing period from Friday afternoon to Monday morning is acceptable, provided the HVAC system is set to operate normally during testing.

For those buildings that do not have an HVAC system, windows shall be operated in the manner appropriate for the building, the weather conditions and the time of year.

3.4 Evaluation of Initial Results and Additional Testing

If any initial room testing results exceeds 4 pCi/l, follow-up tests using the follow-up measurement procedures in Appendix D, shall be conducted in those rooms with elevated levels within 90 days. In addition, 20 percent of the second story rooms shall be measured using the initial measurement procedures in section 3.1 through 3.3. If elevated radon levels are found on the second story, all additional second story rooms must be measured. No measurements are required above the second story.

Section 4: Fifth Year Follow-up Testing Requirements [Section 404.056(4) Florida Statutes]

After successfully completing all initial radon tests, facility operators are to repeat radon testing for their facility as specified in sections 4.1 or 4.2. Fifth year follow-up tests indicate if radon levels have increased due to building changes such as aging, settling, or renovations. Fifth year follow-up tests shall be completed and reported to the department between the fifth and sixth anniversary of the date of: 1) occupancy, 2) license approval or 3) completion of structural changes. After the fifth year follow-up testing, no additional radon testing is required unless there are structural changes to any building or there is a change in facility license, or address change, or change of functional use.

4.1 Follow-up Testing Requirements for Facilities in Houses, Apartments, Condominiums and other Dwellings

Facilities with buildings or portions of buildings, which were built as and are currently used as dwellings, are tested again after five years, following the procedures for initial and follow-up tests specified in section 2, Testing Facilities in Houses, Apartments, Condominiums and other Dwellings. If a building has been renovated so that it is no longer designated as a residential dwelling unit, it shall be retested following the procedures in section 4.2. The requirements for reporting these results are found in section 5, Reporting Testing Results.

4.2 Follow-up Testing Requirements for Facilities in Buildings other than Dwellings

The fifth year follow-up test for facilities with non-residential buildings follow the procedures for initial testing found in section 3, Measuring Facilities in Buildings other than Dwellings except as noted here:

- A minimum of five percent or one of the ground contact and first floor rooms (whichever is greater) must be tested.
- Any room previously found to have elevated levels shall be included in the selection of the rooms for the fifth year follow-up test.
- If no elevated levels were previously found, or if additional rooms need to be selected to meet the 5% minimum, the remainder shall be selected from any untested rooms and shall be evenly distributed throughout ground contact and first floor structures.
- Those that have floor penetrations for plumbing, electrical conduit, or ventilation or other open pathway to the ground shall be selected first out of the untested rooms.

Testing shall be reported as noted in section 5, Reporting Testing Results. Additional reporting information may be found in section 5.

Section 5: Reporting Testing Results

Facilities that are issued a certificate of occupancy or licensed after June 11, 1999 shall report initial testing results to the department within one year following the date of occupancy or licensing. Any results of 100 pCi/l (0.5 WL) or higher shall be reported on the appropriate form to the department within 2 working days after testing results are known. As required by section 404.056(4), F.S., the five year follow-up tests shall be started and completed and must be reported to the department by the first day of the 6th year of occupancy.

5.1 Report Forms

Testing results from residential dwellings, which have been tested using section 2 of the EPA Radon and Radon Decay Product Measurements in Homes, Publication No. EPA 402-R-93-003, shall be reported to the department on form **DH1778**, or the most recent version. Testing results obtained using the non-residential protocols in this document shall be reported to the department on form **DH1777**, or the most recent version. Testing results and the floor plans identifying the location of these tests may be kept for your records.

Copies of the mandatory radon testing reporting forms and this pamphlet may be obtained from your local county health unit's environmental health division, online at <http://radon.floridahealth.gov> (under the "FORMS" used by the radon program link) or by calling the department's radon information line at 1-800 543-8279.

APPENDIX A

Definitions

Addition means an extension or increase in floor area or height of a building or structure.

Alpha Track Detector means a long term passive radon testing device consisting of a small piece of plastic film enclosed in a container with a filter-covered opening that performs a time-integrated average test.

Charcoal Adsorption Device means a short term radon testing device filled with activated charcoal that performs a time-integrated average test.

Continuous Radon Monitor means an active radon detection device which uses an electronic detector to accumulate, store and calculate information related to the periodic average radon concentration for short or long term test.

Crawlspace means an area beneath the living space in a building and between the floor of the lowest living area and the under floor ground level.

Day Care Center means any child care facility or family day care home, as defined in 402.302, Florida Statutes.

Dwelling or Dwelling Unit means a single unit providing complete, independent living facilities for one or more persons including permanent provisions for living, eating, cooking and sanitation. Dwelling units are residential units that include single family residences, town houses, apartments, boarding houses and condominiums.

Electret Ion Chamber means a passive radon testing device consisting of a canister containing a charged electret that performs a time-integrated average test.

Exterior Wall is a bearing or nonbearing wall that is used as an enclosing wall for a building, other than a party wall or fire wall.

Fifth Year Follow-up Test means radon tests taken between the fifth and sixth year anniversary of the date of occupancy or license approval as referred to in s. 404.056(4), F. S.

Fire Wall means a fire-resistant wall, having protective openings, which restricts the spread of fire and extends continuously from the foundation to or through the roof, with sufficient structural stability under fire conditions to allow the collapse of construction on either side without collapse of the wall.

Floor means that portion of a building included between the upper surface of a floor and upper surface of the floor or roof next above.

Floor Plan means an architectural or construction drawings or schematic representations of a building which identifies clearly each floor and room by name or number and which is of

sufficient detail to identify plumbing, electrical conduit and HVAC penetrations into a room and the locations of the test devices.

Follow-up Test means an additional testing performed in a room that was previously tested to confirm radon levels or to determine more accurately the radon concentrations to which the occupants are exposed. This definition is taken to include the definition that is used by the USEPA (*Protocols for Radon and Radon Decay Product Measurements in Homes, EPA #404-R93-003*).

Group I Restrained Occupancy means the use of a building, structure or any portion thereof to provide sleeping facilities for four or more persons who are confined or housed under some degree of restraint or security, including jails, detention centers, correctional institutions, reformatories, pre-release centers and other residential-restrained care facilities.

Group I Unrestrained Occupancy means the use of a building, structure or any portion thereof to provide medical care and sleeping facilities for four or more persons who are mostly incapable of self-preservation because of physical or mental disability, including hospitals, nursing homes, mental institutions and nursery facilities providing 24-hour care for persons less than 6 years of age.

Habitable Space means the space in a structure for living, sleeping, eating or working. Cooking areas, bathrooms, toilet compartments, closets, halls, stairwells, chases, storage or utility spaces, and similar areas are not considered habitable space.

HVAC System means the heating, ventilating and air conditioning system for a building; it generally refers to a ducted air handling system.

Initial Test means the first test performed in a ground contact and first floor habitable space to determine if elevated radon or radon progeny concentrations are present.

Large Building means any building other than a single family home or duplex.

NEHA-NRPP is an acronym for the National Environmental Health Association National Radon Proficiency Program. NEHA-NRPP operates a radon proficiency program recognized by Florida as being equivalent to the original EPA proficiency program. Details on the program can be found at <http://www.radongas.org>

NRSB is an acronym for the National Radon Safety Board. NRSB operates a radon proficiency program recognized by Florida as being equivalent to the original EPA proficiency program. Details on the program can be found at <http://www.nrsb.org>.

Radon refers to Radon-222, a naturally occurring odorless, tasteless, invisible, radioactive gas released from natural deposits of uranium in the soil, which is an alpha emitter and exposure is associated with lung cancer.

Radon Progeny means radioactive element by-products from the decay of radon which emit either alpha radiation or beta radiation, and sometimes gamma radiation.

Room means a habitable space in a building.

School means a building or collection of buildings used primarily for instructional purposes that may include rooms used as classrooms, offices, cafeterias, libraries, and gymnasiums.

Story means that portion of a building included between the upper surface of a floor and upper surface of the floor or roof next above.

Structural Change means any modification, replacement or repair of foundation, walls, floors, ceilings or roof assembly, or any addition to the existing building.

Transient Use means use of an area as a byway or thruway between two locations.

Twenty-four Hour Care Facility means any Group I restrained occupancy, Group I unrestrained occupancy or any dwelling unit with a resident caregiver providing care and sleeping facilities to children or other individuals, neither of whom are related to the caregiver.

APPENDIX B

Florida Statutes

Section 404.056, F. S. - Environmental radiation standards and programs; radon protection.

(4) **MANDATORY TESTING.**—All public and private school buildings or school sites housing students in kindergarten through grade 12; all state-owned, state-operated, state-regulated, or state-licensed 24-hour care facilities; and all state-licensed day care centers for children or minors which are located in counties designated within the Department of Business and Professional Regulation’s Florida Radon Protection Map Categories as “Intermediate” or “Elevated Radon Potential” shall be measured to determine the level of indoor radon, using measurement procedures established by the department. Initial measurements shall be conducted in 20 percent of the habitable first floor spaces within any of the regulated buildings and shall be completed and reported to the department within 1 year after the date the building is opened for occupancy or within 1 year after license approval for the entity residing in the existing building. Followup testing must be completed in 5 percent of the habitable first floor spaces within any of the regulated buildings after the building has been occupied for 5 years, and results must be reported to the department by the first day of the 6th year of occupancy. After radon measurements have been made twice, regulated buildings need not undergo further testing unless significant structural changes occur. No funds collected pursuant to s. [553.721](#) shall be used to carry out the provisions of this subsection.

Florida Administrative Code

Chapter 64E-5.1208 - Measurement Requirements and Procedures

- (1) The following buildings are required to be measured for radon or radon progeny.
 - (a) All public and private school buildings or school sites housing students in kindergarten through grade 12.
 - (b) All state-owned, state-operated, state-regulated or state-licensed 24-hour care facilities. This shall include but not be limited to the following; hospitals, nursing homes, foster homes, adult congregate living facilities, mental institutions, nursery facilities providing 24-hour care, detention centers, correctional institutions, and pre-release centers.
 - (c) All state-licensed day care centers for children or minors.
- (2) The radon measurement procedures for use in fulfillment of the requirements of section 404.056(4), F.S., Mandatory Radon Measurement Protocols, (Brochure **DH 150-334**), may be obtained from the Department of Health and is incorporated herein by reference. This measurement protocol will be used to identify structures in which the potential exists for elevated radon concentrations, to specify longer term measurements to establish occupant exposure levels when elevated concentrations are found, and to periodically re-measure facilities.
- (3) Measurement reports for dwelling units which have been measured using section 2 of the EPA Radon and Radon Decay Product Measurements in Homes, Publication No. EPA 402-R-93-003, shall be reported to the department on **DH Form 1778**, Feb 96, herein incorporated by reference and available from the department. Measurement reports for non-residential buildings which have been measured using sections 3 and 4 of the Mandatory Radon Measurement Protocols, (Brochure **DH/PI 150-334**), shall be reported to the department on **DH Form 1777**, Feb 96, herein incorporated by reference and available from the department.

APPENDIX C

Counties with Mandatory Testing Requirements

Section 404.056(4), F. S. requires mandatory radon testing in the Florida counties that the Department of Business and Professional Regulation has identified as containing areas of 'Intermediate' or 'Elevated Radon Potential'. DCA developed standards for radon resistant construction in these areas. These standards are included as appendices to the statewide building code. The standards are divided into two categories: Residential Building and Commercial Construction. DCA documents define this difference as follows: Residential Buildings as single family homes or duplexes, Commercial Construction as all other buildings also referred to as 'large buildings'.

Single Family Home or Duplex (Residential)

Alachua
Brevard
Charlotte
Citrus
De Soto
Duval
Gadsden
Gilchrist
Hardee
Hernando
Highlands
Hillsborough
Indian River
Jackson
Jefferson
Leon
Levy
Manatee
Marion
Martin
Nassau
Osceola
Polk
Putnam
Sarasota
Seminole
Sumter
Suwannee
Union
Volusia
Walton

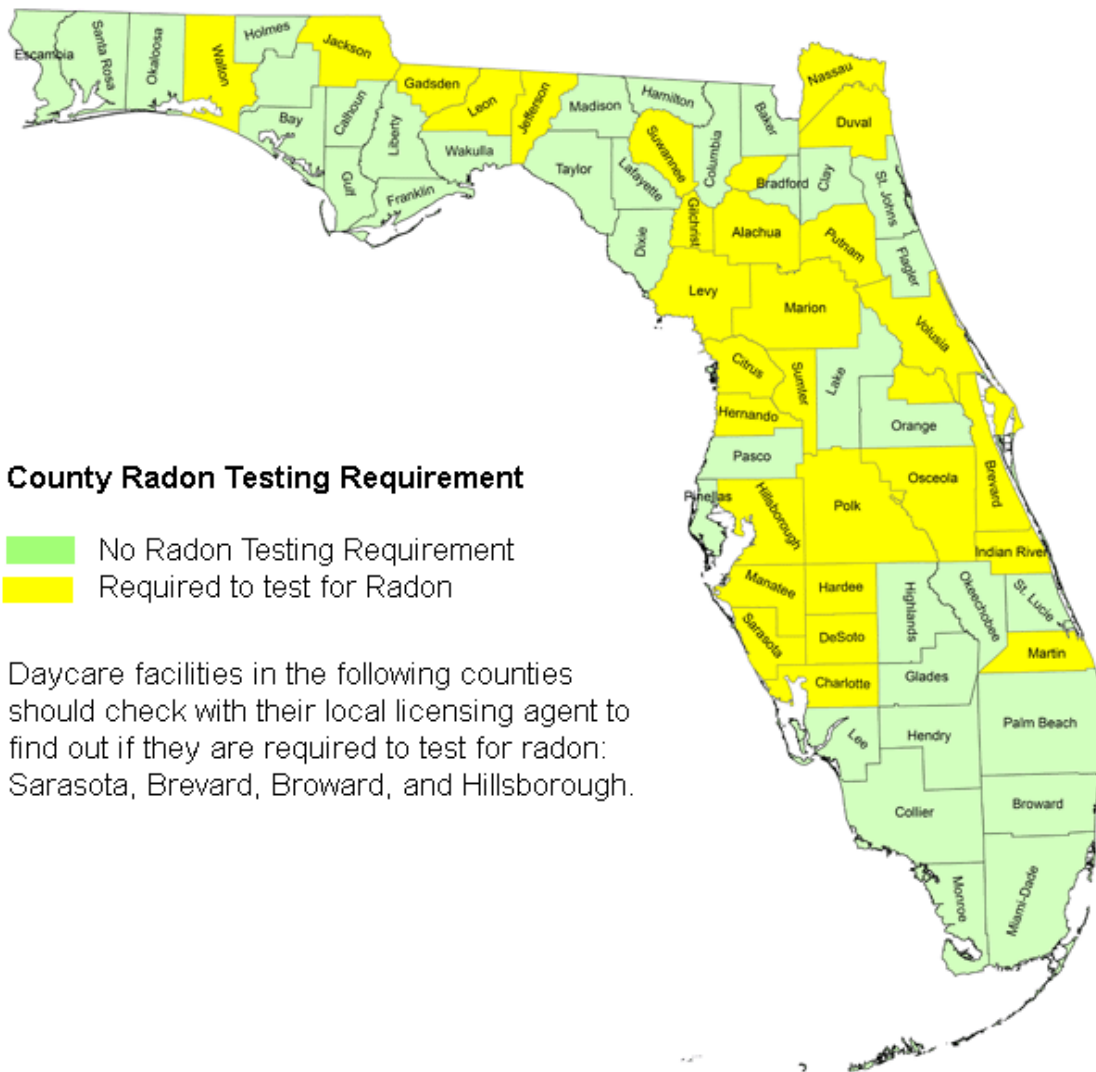
All Other Buildings (Commercial)

Alachua
Brevard
Broward
Calhoun
Charlotte
Citrus
Columbia
Dade
De Soto
Dixie
Duval
Gadsden
Gilchrist
Gulf
Hamilton
Hardee
Hernando
Highlands
Hillsborough
Holmes
Indian River
Jackson
Jefferson
Leon
Levy
Liberty
Madison
Manatee
Marion
Martin
Nassau
Okaloosa
Osceola
Palm Beach
Pasco
Pinellas
Polk
Putnam
St. Johns
St. Lucie
Sarasota
Seminole
Sumter
Suwannee
Taylor
Union

The intermediate or elevated radon potential designation identifies areas in Florida where it is better to build with radon resistant construction techniques, than to rely only on post construction remediation to control radon problems. These designations do not reflect the overall pattern of elevated radon problems in existing buildings in these or any other areas of the state. The only way to determine if a building anywhere has a radon problem is to test that building.

Mandatory Radon Testing Requirement for State Licensed or Regulated Facilities in Single Family Home and Duplex Buildings

The 1999 legislature amended the mandatory radon testing requirement to require it only in the select counties show in the map below. For more guidance on the mandatory radon testing requirements contact the radon and indoor air quality program. Radon testing is required in the yellow shaded counties, while those counties shaded green are exempt.



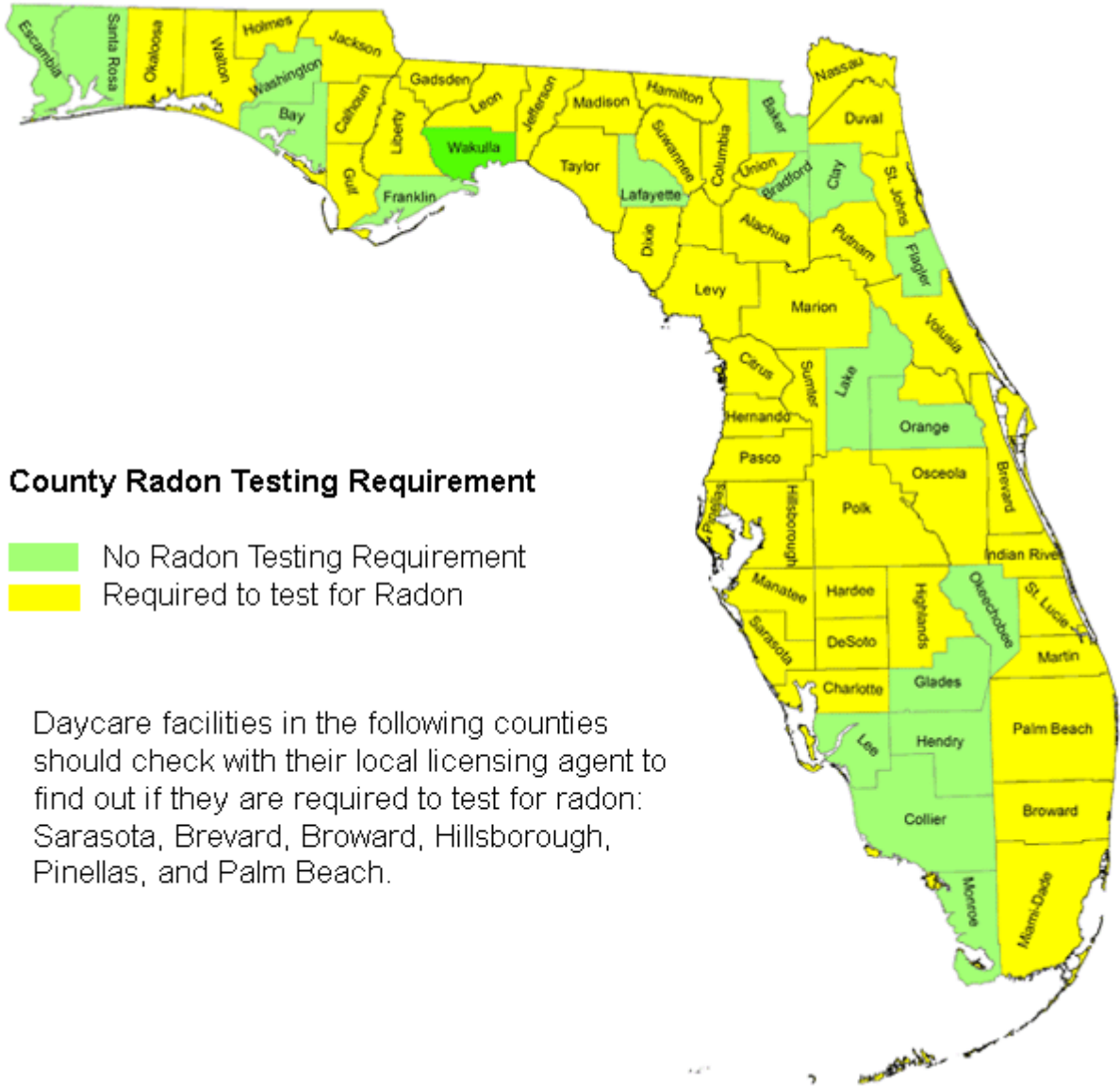
Mandatory Radon Testing Requirement for Large Buildings

The 1999 legislature amended the mandatory radon testing requirement to require it only in the select counties show in the map below. For more guidance on the mandatory radon testing requirements contact the radon and indoor air quality program. Radon testing is required in the yellow shaded counties, while those counties shaded green are currently exempt.

County Radon Testing Requirements:

Map describing counties that require radon testing. Mandatory Radon Testing Requirement for State Licensed or Regulated Facilities in Large Buildings.

Daycare facilities in the following counties should check with their local licensing agent to find out if they are required to test for radon: Sarasota, Brevard, Broward, Hillsborough, Pinellas, and Palm Beach.



County Radon Testing Requirement

- No Radon Testing Requirement
- Required to test for Radon

Daycare facilities in the following counties should check with their local licensing agent to find out if they are required to test for radon: Sarasota, Brevard, Broward, Hillsborough, Pinellas, and Palm Beach.

APPENDIX D

Recommendations for Facilities with Elevated Radon Levels

Section 404.056(4), F. S. does not require any action if elevated radon levels are found in a facility. However, the presence of elevated radon levels represents an increased lung cancer risk to all occupants of the building. The only way to protect the health and well being of the occupants is to reduce the radon exposure. Prior to taking actions to mitigate, it is recommended that follow-up tests be conducted. For facilities in residential dwellings, it is recommended that follow-up tests be made in accordance with the USEPA guidance in the "A Citizen's Guide to Radon: The Guide to Protecting Yourself and Your Family from Radon," EPA 402-K02-006, Revised September 2005. For all other facilities, the recommended procedures are described below.

Follow-Up Testing of Facilities in Buildings other than Dwellings

The purpose of follow-up tests is to more accurately determine the radon levels to which the room occupants are exposed and to confirm the initial results. Initial testing results of 4 pCi/l (0.02 WL) or greater in a building indicate there is potential for exposure risks in the building. There is still a health risk associated with long-term exposure to levels below 4 pCi/l (0.02 WL) and reduction to levels below this is desirable but may not be achievable using current technology.

A building's radon concentration is affected by seasonal weather changes and the operation of the heating, ventilation and air conditioning system. When initial testing results are 4pCi/l or greater but less than 10 pCi/l, an estimate of the occupants annual exposure is determined with seasonal testing and can only be made when the building is occupied. For levels 10 pCi/l or greater, instead of seasonal testing, a single short term test is made to confirm the elevated levels. This test can only be made only when the building is occupied. Each room that had test results of 4 pCi/l (0.02 WL) or greater during the initial testing period should be retested using the follow-up testing procedures and testing devices that follow.

Recommended Devices for Follow-Up Tests

For buildings which are occupied less than 24 hours per day, any of the following testing devices meeting proficiency requirements of the NRSB or NEHA-NRPP can be used to conduct follow-up tests:

- Continuous radon monitors; and
- Electret ion chambers.

For buildings which are occupied 24 hours per day, any of the following testing devices meeting proficiency requirements of the NRSB or NEHA-NRPP can be used to conduct follow-up testing:

- Alpha track detectors;
- Charcoal adsorption devices;
- Continuous radon monitors; or

- Electret ion chambers

Follow-Up Testing Procedures

Follow-up testing shall be obtained during working or occupied hours with the HVAC system set to its normal setting. This is to determine the actual radon levels to which the room occupants are exposed.

If any initial testing result in a room is greater than or equal to 10 pCi/l (0.05 WL), a follow-up test in that room should begin as soon as reasonably possible. For buildings that are not occupied 24 hours a day, testing shall be conducted during sequentially occupied periods. The accumulated exposure time shall be at least 48 hours. For buildings that are occupied 24 hours a day, testing shall be conducted for a minimum continuous 48 hour period.

If any initial test result in a room is greater than or equal to 4.0 pCi/l (0.02 WL), but less than 10 pCi/l (0.05 WL), a follow-up test in that room should be started within 90 calendar days. For buildings that are not occupied 24 hours a day, testing shall be conducted during sequentially occupied periods. The accumulated exposure time shall be at least 48 hours. A follow-up test shall be conducted during the ensuing 12 months in each season the facility is operated. For buildings that are occupied 24 hours a day, testing shall be conducted for a minimum continuous 48 hour period in each season of operation. Alternatively, an annual test may be conducted with a long term device in buildings occupied 24 hours a day.

Mitigation Options

If elevated radon levels are confirmed, mitigation is recommended. See Appendix E of the Florida Statewide Residential Building Code, 2004 or Appendix C of the Florida Statewide Building code, 2004 or their successors for guidance and requirements on radon mitigation. If hiring a firm to perform the mitigation, they **must be certified** by the Department of Health as a radon mitigation business. Information on certified radon mitigation companies is available from the Department of Health at 800-543-8279 or by visiting our website at: <http://radon.floridahealth.gov> (under the "Measurement and Mitigation Businesses" link).

APPENDIX E

Examples of the Application of Radon Testing Protocols and Answers to Commonly Asked Questions

Self Testing:

Any facility may test itself using its own personnel by following the appropriate EPA or state guidelines or regulations. Once a facility hires or contracts with someone who is not one of its employees to perform the testing, the individual who places and retrieves the test kits or provides guidance on the testing must be certified by the department and must work for a certified business. Should you choose to self test, the Department recommends you consider having those personnel involved in radon testing attend a course from a Florida approved radon training provider. For example, if a school uses their environmental safety officer to perform the radon testing, he/she does not have to be certified since they are school personnel. However, school personnel performing these tests are encouraged to attend a Florida approved radon training course (<http://radon.floridahealth.gov> - under the "certification" link). If the school hires a business to perform the radon testing, the company and its personnel providing the radon services shall be certified.

Why do storm fronts affect radon levels?

The amount of radon that escapes from the soil to enter the house is influenced by the weather, soil porosity, soil moisture, the negative pressure within the house (stack effect), the HVAC system, and cracks in the concrete slab. You should not conduct short-term tests lasting just 2 or 3 days during unusually severe storms or periods of unusually high winds. Severe weather will affect the test results in several ways. First, a high wind will increase the variability of radon concentration because of wind-induced differences in air pressure between the building interior and exterior. Second, rapid changes in barometric pressure increase the chance of a large difference in the interior and exterior air pressures, consequently changing the rate of radon influx. Weather predictions available on local news stations can provide sufficient information to determine if these conditions are likely. While unusual variations between radon tests may be due to weather or other effects, the test system should be checked for possible problems.

Use CRM's to test if calibrated to proficiency standards.

Some influencing conditions:

- CRM's should be used for all the obvious reasons (storm front, etc) and calibrated to proficiency standards.

- Test results will be affected because pressure decreases and radon elevation is probably the consequence of heavy rain (may have occurred prior to or during the test).

- Humidity does not affect the radon levels but a storm accompanied with heavy rain will increase the indoor radon levels and humidity.

- At night, with wind subsiding, the indoor radon level increases.

-Outdoor radon levels higher than indoor radon levels is unusual but may occur when there is a weather inversion event because radon near ground level may increase.

-Simultaneous testing of indoor radon and outdoor radon may be a valuable research project

Why keep HVAC running 24 hrs?

Night time variations. Radon levels vary hourly, daily, and monthly. There are clear fluctuations between the daytime and nighttime levels. Running the HVAC system should help account for these fluctuations and should provide more accurate test results of exposure.

How do I test my residential facility?

To determine what procedures to follow when testing your facility, you must first look at the building type and how it is used. For facilities in single family or multi-family homes and still used as or operated as a home, testing is performed according to section 2 and reported on Form **DH1778**. All other facilities test following the procedures in section 3 and report on **DH1777**.

Table 1. How to Report Using Mandatory Radon Testing

Facility	Description	Discussion	Testing procedures
Foster Home	In a private residence		Section 2, Form 1778
Foster Home	In specially built structure	Group care facilities in specially built buildings are generally constructed to group care occupancy standards and not single family or duplex code standards	Section 3, Form 1777
ALF	In an unmodified single family home	When a home is converted to a group care facility, with out renovations that would change its building code class, and if facility is still operated in a home like fashion, then testing standard is for a residence.	Section 2, Form 1778
ALF	In a modified single family home	Once structural modifications are performed on a home being converted to a group care facility, and if those changes must meet any other building construction standard other than that for single family homes or duplexes, then the testing standard is that for a large building.	Section 3, Form 1777
ALF	In a specially built structure	This is a commercially constructed building, not built to single family or duplex standards	Section 3, Form 1777
Adult Care Home	In a private residence		Section 2, Form 1778
Adult Care Home	In specially built structure	Group care facilities in specially built buildings are generally constructed to group care occupancy standards and not single family or duplex code standards	Section 3, Form 1777

- Form DH1777 is used for reporting mandatory radon testing in the following facilities: Assisted Living Facility (previously ACLF); Alcohol, Drug Abuse or Mental Health; Correctional Facility or Jail; Day Care Center (pre kindergarten); Delinquency Program (Ex: Start Center, Training School); Hospitals (Acute Care, Physical Rehab.,

Psychiatric, or Intensive Residential Treatment); Nursing Home/Skilled Nursing Facility; Public School (K-12); Private School (K-12)

- Form DH1778 is used for reporting mandatory radon testing in buildings built as and used as home or apartment, for the following facilities: Assisted Living Facility (previously ACLF); Alcohol, Drug Abuse or Mental Health; Developmentally Disabled (Ex: ICFDD Cluster, Small Group Homes); Delinquency Program (Ex: Halfway Houses, Non-secure Detention Homes); Foster Care - 24 hour Family (for children); Foster Care - Adult; Family Day Care Home

Does my shelter require testing?

Do you offer 24-hour care? In general, shelters provide a place for emergency or temporary housing and do not offer any level of care. The individuals who use a shelter are generally independent persons free to come or go. Unless a shelter offered a 24-hour care component or some other service that would require testing such as K12 education, it would not be required to test. Halfway houses are transitional living arrangements that offer a reduced level of care to someone working towards independence. Halfway houses are required to test for radon.

Does my halfway house or transitional living facility require testing?

Transitional living facilities offer a reduced level of care to someone working towards independence. They employ some form of 24-hour care or monitoring. Transitional living facilities are required to test for radon.

What rooms do I test?

Any room that a client uses as part of routine facility activities that is designed and licensed for occupancy is tested. Examples include but are not limited to classrooms, offices, dining rooms, lounges, lobbies, patient rooms, rehabilitation rooms, assessment or evaluation rooms, activity rooms, and other rooms that are used by clients and their attending staff. Exempted rooms include those not designed or licensed for occupancy or not designed and licensed for very short term use or those rooms where reliable radon test results would be difficult to obtain due to environmental and high humidity factors. Examples include those rooms or areas not considered as 'livable' space and include bathrooms, kitchens, storage areas, hallways.

However, when chairs or other furnishings are added to hallways to create a space for seating or longer occupancy, the hallway space is tested for radon.

How many rooms shall be tested?

Initial testing requires a minimum of 20% of habitable first floor rooms used by the clients of the facility in each building. For example: building A has 50 ground contact rooms, 40 of which are habitable and 33 of the 40 which are used by clients. To meet a minimum 20% of the 33 habitable rooms, seven rooms must be tested. If there are one to five rooms that meet the criteria, at least one must be tested. If there are six to ten rooms that meet the criteria, at least two rooms shall be tested and so forth. For the fifth year follow-up test, a minimum of 5% of the rooms shall be tested. For example, if there are between one and twenty rooms that meet the criteria, at least one shall be tested. If there are between 21 and 40 rooms that meet the criteria, at least two rooms shall be tested, and so forth.

What about my sanctuary, fellowship hall, or auxiliary buildings?

If regular scheduled activities occur in the space, testing is required. An example may include weekly facility sponsored assemblies. If the use of the space is infrequent and incidental, no testing is required. An example may include a space used occasionally for an awards ceremony, banquet or other assembly.

We are temporarily using a room/building/facility, do we need to test?

If you occupy the temporary space for more than 45 days, you are required to test.

We are remodeling or repairing our room/building/facility, do we need to test?

If the remodeling or repair activities involve the building structure, you are required to retest the building or facility after completing the work, and as specified in Section 1, General Information.

What affect does the mandatory radon testing requirement have on my facility license or funding?

Section 404.056(4), F. S. does not link the mandatory radon testing with facility licensure or funding. However, the agency licensing or providing funding to your facility may, under their own authority, require compliance with the radon testing or require you meet certain radon levels as conditions of licensing or funding. You will have to contact your licensing or funding agency for more information.

When do I need to report my radon test results to the Department of Health?

For facilities that receive a license such as daycare centers, hospitals and adult living facilities, the initial results shall be provided to the department within one year of your license approval date. For facilities such as schools which do not receive a license, initial test results shall be reported to the department with in one year of the day the doors are opened for normal facility operation. The fifth year follow-up test shall be started and reported by the first day of the sixth year after license approval or building occupancy.

We have added, reduced or reconfigured our room usage, do we need to test?

For licensed facilities with any change in room usage that requires a license amendment, a new cycle of initial and follow up testing is required. For example, an ALF that was originally licensed for six beds and amended their license to add additional beds, radon testing shall be repeated. For non-licensed facilities, when those changes involve rooms or spaces not previously used radon testing is required. For example, a private school was using a designated number of rooms in a building and now is expanding into the rest of the building, the building must be retested.

What Realtors, Buyers, Sellers, Landlords, Tenants, and Homeowners (apartments, houses, condominiums, and other dwellings) should know about radon

Please be aware of notification requirements on section 404.056(5) F.S, NOTIFICATION ON REAL ESTATE DOCUMENTS.--Notification shall be provided on at least one document, form, or application executed at the time of, or prior to, contract for sale and purchase of any building or execution of a rental agreement for any building. Such notification shall contain the following language:

"RADON GAS: Radon is a naturally occurring radioactive gas that, when it has accumulated

in a building in sufficient quantities, may present health risks to persons who are exposed to it over time. Levels of radon that exceed federal and state guidelines have been found in buildings in Florida. Additional information regarding radon and radon testing may be obtained from your county health department."

How do I know which form to use when reporting testing results

- Form DH1750 is used for reporting radon testing in residential facilities (homes, apartments, condominiums)
- Form DH1777 is used for reporting mandatory radon testing in the following facilities: Assisted Living Facility (previously ACLF); Alcohol, Drug Abuse or Mental Health; Correctional Facility or Jail; Day Care Center (pre kindergarten); Delinquency Program (Ex: Start Center, Training School); Hospitals (Acute Care, Physical Rehab., Psychiatric, or Intensive Residential Treatment); Nursing Home/Skilled Nursing Facility; Public School (K-12); Private School (K-12)
- Form DH1778 is used for reporting mandatory radon testing in buildings built as and used as home or apartment, for the following facilities: Assisted Living Facility (previously ACLF); Alcohol, Drug Abuse or Mental Health; Developmentally Disabled (Ex: ICFDD Cluster, Small Group Homes); Delinquency Program (Ex: Halfway Houses, Non-secure Detention Homes); Foster Care - 24 hour Family (for children); Foster Care - Adult; Family Day Care Home
- Form DH1753 is used for reporting monthly radon mitigation reports
- Form DH1833 is used for reporting radon testing in non-residential facilities (i.e. private and public office space, restaurants, malls, etc).

Questions?

Call the radon program at 800-543-8279.

Visit our website: <http://radon.floridahealth.gov>