18. International Standards of Practice for Inspecting Radon Mitigation Systems

18.1 About Radon and These Standards for Inspecting Mitigation Systems

Radon is a radioactive gas that has been found in homes, schools and buildings around the world. Radon comes from the natural breakdown of uranium in soil and rock, and moves up into the indoor air that people breathe. Radon is the leading cause of lung cancer in non-smokers. Radon mitigation systems reduce radon levels in homes and buildings. Inspection of these systems helps assure that they were installed properly and are performing as designed.

Although this Standard applies to both commercial and residential radon mitigation systems, this Standard exceeds the requirements of both InterNACHI's *Commercial* and *Residential Standards of Practices.*

18.2 Purpose

The purpose of this document is to establish international standards for the inspection of radon mitigation systems. This document also provides universal radon mitigation inspection reporting language.

18.3 Definitions

18.3.1 Radon Mitigation System-Specific Definitions

- **active soil depressurization system:** one or more of the following types of radon mitigation system types involving mechanically driven soil depressurization: sub-slab depressurization; sump (pit) depressurization; drain tile depressurization; sub-membrane depressurization; hollow-block wall depressurization; and crawlspace depressurization.
- **crawlspace depressurization:** an active radon mitigation system that lowers the air pressure inside a crawlspace in relation to the rooms adjacent or above the crawlspace. A fan draws air directly from the air space of the crawlspace and discharges the air outside. This type of system is typically not the best choice because of the great potential for appliance back-drafting and energy loss.
- **defect:** a condition of a radon mitigation system that may have an adverse impact on its performance.
- **depressurization:** a negative pressure created in one area compared to an adjacent area.
- **discharge:** fhe end of a vent stack pipe open to outside air.
- **drain tile depressurization:** an active soil depressurization system whereby a suction point is located at a drain tile.
- **heat-recovery ventilation system:** a system that lowers radon levels by using outside air to dilute and pressurize indoor air. HRV systems are considered active radon systems.
- **hollow-block wall depressurization:** an active radon system that depressurizes the open spaces within concrete block foundation walls.
- **inspection:** a non-invasive, visual examination of a radon mitigation system.
- **manifold pipe:** pipe between a vent stack pipe and suction-point pipe with two or more suction points.
- **radon mitigation system:** any system designed to reduce the radon concentrations of indoor air.
- **radon system piping:** the piping of a passive or active radon system that is composed of a suction-point pipe, manifold pipe, and vent stack pipe.
- **readily accessible:** an item or component that is, in the judgment of the inspector, capable of being safely observed without the removal of obstacles, detachment or disengagement of connecting or securing devices, or other unsafe or difficult procedures to gain access.
- **sub-membrane depressurization:** an active radon mitigation system creating low air pressure under a vapor retarder. A common example is when a vapor retarder (polyethylene plastic sheet) is installed over the exposed dirt floor of a crawlspace. The radon fan draws air from below the vapor retarder and sends it outside.
- **sub-slab depressurization (active):** a radon system that creates low air pressure under a concrete floor using a fan.
- **sub-slab depressurization (passive):** a radon system that creates low air pressure under a concrete floor without the use of a fan.

- **suction point:** the end of a radon system that penetrates the slab, wall, vapor barrier, sump cover, or drain tile.
- **sump (pit) depressurization system (active):** a radon system that has a suction point installed in the sump (pit).
- **vent stack pipe:** pipe leading from the suction point (in a system with a single suction point), or the manifold pipe (in a system with more than one suction points), to outside air. In active radon mitigation systems, the radon fan is installed vertically in the vent stack pipe.

18.3.2 Terminology Commonly Found in Commercial Property Inspection Reports
Visit http://www.nachi.org/comsop.htm#101.
18.4 Goal of Inspection
The goal of the inspection is to provide observations which may indicate that a radon mitigation system was installed improperly, is not performing as designed, or is in need of repair.
18.5 Limitations
The inspection is limited to readily accessible and visible portions of the radon mitigation system. The inspection should not be considered all-inclusive or technically exhaustive. It is not a substitute for a radon level measurement.

This Standard does NOT require the inspector to:

- inspect any portion of the system that is not readily accessible and visible.
- activate a system that has been turned off, unplugged, or deactivated.
- measure the radon level.

18.6 Optional Add-On Inspection Service
Although InterNACHI's *Standards of Practice for Inspecting Commercial Properties* and InterNACHI's *Residential Standards of Practice* do not require the inspector to perform radon mitigation system inspections, radon mitigation system inspections may be offered in conjunction with a complete commercial or residential property inspection, or as separate, stand-alone inspection services.
18.7 Visual Inspection
18.7.1 Radon System Type
18.7.1.1 The inspector shall describe the radon system as one of the following types:

- active sub-slab depressurization;
- passive sub-slab depressurization;
- sump (pit) depressurization;
- drain tile depressurization;
- sub-membrane depressurization;
- hollow-block wall depressurization;
- crawlspace depressurization; or
- heat-recovery ventilation.

18.7.2 Drain Tile Depressurization Systems
The inspector should inspect drain pipes that extend to daylight for missing devices, such as one-way flow valves, or water traps that prevent outdoor air from entering the sub-slab area.
18.7.3 Sub-Membrane Depressurization Systems
The inspector should inspect the vapor retarder used for sub-membrane depressurization systems (passive or active) for seams that are lapped less than 12 inches, and edges that are not sealed to the walls, posts or other penetrations.
18.7.4 Hollow-Block Wall Depressurization Systems

The inspector should inspect hollow-block walls for cracks, openings and open top-courses.

18.7.5 Crawlspace Depressurization Systems

The inspector should inspect the crawlspace for the presence of asbestos-like material and combustible fuel-served appliances located within the crawlspace or spaces adjacent to the crawlspace.

18.7.6 Heat-Recovery Ventilation (HRV) Systems

The inspector should inspect the area around the HRV system for the presence of asbestos-like material.

18.7.7 Piping and Fittings

The inspector should inspect for:

- piping that is not PVC or ABS or downspout (outside);
- piping subjected to weather or physical damage that is not Schedule 40;
- pipe and fitting connections of different materials;
- piping that isn't solid and rigid;
- reducers that are installed in the direction of air flow; and
- piping that is not continually sloped toward the suction point.

18.7.8 Piping Supports

The inspector shall inspect for:

- supports installed more than 6 feet apart on horizontal runs; and
- supports installed more than 8 feet apart on vertical runs.

18.7.9 Discharges

The inspector should inspect for:

- discharges less than 10 feet above ground level;
- discharges less than 6 inches above a roof edge, rake or gable that its stack passes by;
- discharges that exhaust less than 12 inches above a roof surface through which its stack pipe passes;
- discharges that exhaust below the roof surface of the highest roof of the building; and
- discharges within 2 feet directly above or less than 10 feet from any window, door or opening, including those in adjacent buildings.

18.7.10 Radon Fan

The inspector should inspect for:

- interior radon fans installed in occupied or conditioned spaces;
- exterior radon fans installed underground;
- radon fans that are not connected to the piping with removable couplings or flexible connections; and
- radon fans that are not mounted vertically.

18.7.11 Condensate Bypass

The inspector should inspect for missing condensate bypass mechanisms on systems in cold climates.

18.7.12 Electrical

The inspector should inspect for:

- cord and plug assemblies supplying power to radon fans that are more than 6 feet in length;
- cord and plug assemblies supplying power to radon fans that pass through walls, floors or ceilings, or are concealed within building components;

- missing means of disconnect, such as a dedicated, labeled, electrical breaker or switch, or an electrical plug cord;
- means of disconnects not in sight of their radon fans;
- missing grounded receptacles (required within 6 feet of radon fans installed under roofs);
- missing GFCI receptacles (required within 6 feet of radon fans installed above roofs); and
- missing electrical junction boxes (required within 6 feet of radon fan locations of both active and passive systems).

18.7.13 Condensate Drain Pipes
The inspector should inspect for condensate drain pipes that are not directed into condensate pumps, not directed into trapped floor drains, or do not have 6-inch or greater standing water trap seals.
18.7.14 Monitoring Device
The inspector should inspect for missing air-flow or pressure-monitoring devices which are required to provide easily visible or audible indication of system failure or performance in active systems.
18.7.15 Labeling
The inspector should inspect for:

- missing piping labels (required on each floor to identify piping as part of a radon system);
- missing labels on the plastic vapor barrier (if installed);
- labels that are illegible from a distance of 3 feet;
- piping or vapor barrier labels that fail to display one the following: "Radon Mitigation System," "Radon Reduction System," "Radon System," or "Radon Removal System";
- a missing main label that contains the mitigator's name and contact information, date of installation, and a recommendation to test the building for radon every two years; and
- a missing "Radon," "Radon Fan" or "Radon System" label at the disconnect breaker controlling the electrical circuit to the radon fan.

18.8 Sample Reporting Language

_____

Radon Mitigation System Inspection Report

Client: _____

Location of radon mitigation
system: _____

This inspection was performed in substantial compliance with InterNACHI's *International Standards of Practice for Inspecting Radon Mitigation Systems.* It is designed to provide an indication as to whether or not the radon mitigation system was installed improperly, is not performing as designed, or is in need of repair. It is not a substitute for a radon level measurement.

Radon is a radioactive gas that has been found in homes, schools and buildings around the world. Radon comes from the natural breakdown of uranium in soil and rock, and moves up into the indoor air that people breathe. Radon is the leading cause of lung cancer in non-smokers. Radon mitigation systems reduce radon levels in homes and buildings.
The inspector noted that the radon system type was:
___ active sub-slab depressurization;
___ passive sub-slab depressurization;
___ sump (pit) depressurizationactive;

___ drain tile depressurization;
___ sub-membrane depressurization;
___ hollow-block wall depressurization;
___ crawlspace depressurization; or
___ heat-recovery ventilation.

Drain Tile Depressurization Systems

___ The inspector noted that the drain pipes that extend to daylight were missing devices, such as one-way flow valves or water traps, that prevent outdoor air from entering the sub-slab area.

Sub-Membrane Depressurization Systems

___ The inspector noted that the vapor retarder used for the sub-membrane depressurization systems (passive or active) had seams that were lapped less than 12 inches, or edges that were not sealed to the walls, posts or other penetrations.

Hollow-Block Wall Depressurization Systems

___ The inspector noted that the hollow-block walls had cracks, openings or open top-courses.

Crawlspace Depressurization Systems

___ The inspector noted that the crawlspace had the presence of asbestos-like material or combustible fuel-served appliances located within the crawlspace or spaces adjacent to the crawlspace.

Heat-Recovery Ventilation (HRV) Systems

___ The inspector noted the area around the HRV system had the presence of asbestos-like material.

Piping and Fittings

___ The inspector noted piping that is not PVC, ABS or downspout (outside).
___ The inspector noted piping subjected to weather or physical damage that is not Schedule 40.
___ The inspector noted pipe and fitting connections of different materials.
___ The inspector noted piping that wasn't solid or rigid.
___ The inspector noted reducers that were installed in the direction of air flow.
___ The inspector noted piping that was not continually sloped toward the suction point(s).

Piping Supports

___ The inspector noted supports installed more than 6 feet apart on horizontal runs.
___ The inspector noted supports installed more than 8 feet apart on vertical runs.

Discharges

___ The inspector noted discharges less than 10 feet above ground level.
___ The inspector noted discharges less than 6 inches above a roof edge, rake or gable that its stack passed by.
___ The inspector noted discharges that exhausted less than 12 inches above a roof surface through which its stack pipe passed.
___ The inspector noted discharges that exhausted below the roof surface of the highest roof of the building.
___ The inspector noted discharges within 2 feet directly above or less than 10 feet from any window, door or opening.

Radon Fan

___ The inspector noted interior radon fans installed in occupied or conditioned spaces.
___ The inspector noted exterior radon fans installed underground.
___ The inspector noted radon fans that were not connected to the piping with removable couplings or flexible connections.
___ The inspector noted radon fans that were not mounted vertically.

Condensate Bypass

___ The inspector noted missing condensate bypass mechanisms on a system in a cold climate.

Electrical

___ The inspector noted cord and plug assemblies supplying power to radon fans that were more than 6 feet in length.
___ The inspector noted cord and plug assemblies supplying power to radon fans that passed through walls, floors or ceilings, or were concealed within building components.

___ The inspector noted missing means of disconnect, such as a dedicated, labeled, electrical breaker or switch, or an electrical plug cord.
___ The inspector noted means of disconnects not in sight of their radon fans.
___ The inspector noted missing grounded receptacles (required within 6 feet of radon fans installed under roofs).
___ The inspector noted missing GFCI receptacles (required within 6 feet of radon fans installed above roofs).
___ The inspector noted missing electrical junction boxes (required within 6 feet of radon fan locations of both active and passive systems).

Condensate Drain Pipes

___ The inspector noted condensate drain pipes that were not directed into condensate pumps, not directed into trapped floor drains, or did not have 6-inch or greater standing water trap seals.

Monitoring Device

___ The inspector noted missing air-flow or pressure-monitoring devices which are required to provide easily visible or audible indication of system failure or performance in active systems.

Labeling

___ The inspector noted missing piping labels (required on each floor to identify piping as part of a radon system).
___ The inspector noted missing labels on the plastic vapor barrier (if installed).
___ The inspector noted labels that are illegible from a distance of 3 feet.
___ The inspector noted piping or vapor barrier labels that fail to display one the following: “Radon Mitigation System,” “Radon Reduction System,” “Radon System” or “Radon Removal System.”
___ The inspector noted a missing main label that contains the mitigator’s name and contact information, date of installation, and a recommendation to test the building for radon every two years.
___ The inspector noted a missing “Radon,” “Radon Fan” or “Radon System” label at the disconnect breaker controlling the electrical circuit to the radon fan.

This inspection was performed by _____

Signature _____

_____