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Radon Mitigation Standards, 2000 International Residential Code vs. EPA Mitigation Standards

Paul V. Jennemann
MARYLAND RADON LABORATORY, INC.
3220-E Corporate Court
Ellicott City, MD 21042

ABSTRACT

This paper will explore the similarities and differences between the two documents. It is obvious that the 2000 IRC is structured after the EPA Standards with the exception that the 2000 IRC is intended for new construction, and the EPA Standards cover existing structures.

This paper will concentrate on the differences between the documents and will alert mitigation contractors to changes in code requirements where the 2000 IRC has been adopted. *For example, the 2000 IRC does not allow the use of water traps with moving parts.*

I learned about the 2000 IRC quite by accident. I was not notified by AARST, NEHA, EPA, or NSRB of the existence of the code or of the ramifications of its adoption.

BACKGROUND

This paper will compare various sections of EPA Minimum Mitigation Standards with the 2000 International Residential Code, Appendix F Radon Control Methods. Any of these standards, guidelines, protocol, etc., are meaningless unless they are adopted by some agency with the authority to enforce them. Effective January 9, 2001, Howard County Maryland has adopted many provisions of the 2000 INTERNATIONAL RESIDENTIAL CODE including Appendix F, Radon Control Methods.

It is interesting to note that the State of Maryland is not a compliant state and there are no regulations with regard to radon testing or mitigation. There was a feeble attempt by the Legislature to pass a law to regulate the radon industry in the late 1980s. By the time the bill got out of comittee and was passed the only "meat" remaining was the requirement that any company or laboratory performing analysis on radon testing devices must be listed by the latest *EPA* Radon Proficiency Program test round.

I wrote the county and asked if mitigation contractors were required to follow these standards when performing mitigation on existing homes. I also suggested that there were unqualified contractors performing radon mitigation who were not following minimum standards, and inquired if it were not possible to require contractors to apply for a building permit prior to performing mitigation? This would at least give the Department of Permits and Inspectoions an idea of who was performing mitigations and what were their qualifications. The reason for this suggestion was was based on my observation that many mitigators were not following the minimum EPA Standards and that plumbers, electricians, and many others were performing mitigations with total disregard to the standards.

The answer to my inquery: "If a property owner has a desire to install an optional RMS as part of his building addition/alteration project we will certainly be willing to inspect it. However, we have no plans to, nor do we have legal authority to require a building permit for a stand-alone RMS retrofit installation.

Finally, one point regarding the stand-alone RMS retrofit cases. Now that the IRC has requirements for RMS installations our staff is familiar with the components and arrangements of these systems. We have been, and will continue to educate the public concerning these guidelines whenever the opportunities arise. The 2000IRC requirements, which you state are equivalent to the EPA guidelines, certainly represent a reasonable minimum expectation of performance of any installation. If a contractor fails to meet these minimum standards a consumer still has recourse with consumer rights organizations both at the state and local levels. I think this will have an impact on the substandard contractors you are concerned about."

2000 IRC vs EPA

Many of the provisions of the 2000 IRC were adopted from the EPA "Model Standards and Techniques for Control of Radon in New Residential Buildings." It is quite obvious that the 2000 IRC is intended for New Home Construction, whereas the EPA Minimum Mitigation Standards EPA 402-R-93-078, October 1993, Revised April 1994 are intended for the mitigation of existing homes.

The 2000 IRC covers subfloor preparation, sealing of entry routes, foundation walls, crawl spaces, and general construction techniques to prevent the entry of radon. These subjects will not be addressed in this paper because they are out of the control of the mitigation contractor..

(IRC)SECTION AF103.1 The following construction techniques are intended to resist radon entry and prepare the building for post-construction radon mitigation. These techniques are required in areas where designated by the jurisdiction. (The 2000 IRC recommends that any area within Zone 1 of the EPA Map or Radon Zones should adopt Appendix F of the Code.)

(IRC)SECTION AF103.4.3 Condensate drains shall be trapped or routed through non-perforated pipe to daylight. (The only reference to requirements of a water trap is contained in section P3201-5 **Prohibited trap designs** .....(5) Trap designs with moving parts.

Paragraph P3201-5 prohibits the use of the "Dranjer Floor Drain" in those areas where the IRC 2000 has been adopted.

(EPA)Paragraph 14.7.2 If condensate drains from air conditioning units terminate beneath the floor slab, the contractor shall install a trap in the drain that provides a minimum 6-inch standing water seal depth, reroute the drain directly into a trapped floor drain, or reconnect the drain to a condensate pump.

(IRC)SECTION AF103.4.4 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.

(EPA)Paragraph 14.5.1 Sump pits that permit entry of soil-gas or that would allow conditioned air to be drawn into a sub-slab depressurization system shall be covered and sealed. The covers on sumps that previously provided protection or relief from surface water collection shall be fitted with a water or mechanically trapped drain. Water traps should be fitted with an automatic supply of priming water. (See paragraph 15.7 for details on sump cover and sealing materials.)

I have not seen a water trap with an automatic supply of priming water, and Section P3201-5 prohibits trap designs with moving parts.

(EPA)Paragraph 14.7.1 If drains discharge directly into the soil beneath the slab or through solid pipe to a soakaway, the contractor should install a drain that meets the requirements in paragraph 14.5.1

(EPA)Paragraph 14.7.4 When a sump pit is the only system in a basement for protection or relief from excess surface water and a cover is installed on the sump for radon control, the cover shall be recessed and fitted with a trapped drain meeting the requirements of paragraph 14.5.1

EPA Standards require a recessed cover with a trapped drain. This prohibits the use of a "Domed Cover" or "flat Plate" unless a separate "trapped Floor Drain" is installed

(EPA)Paragraph 15.7 Sump pit covers shall be made of durable plastic or other material and designed to permit air-tight sealing. To permit easy removal for sump pump servicing , the cover shall be sealed using silicone or other non-permanent type caulking materials or an air-tight gasket.

(EPA)Paragraph 15.8 Penetrations of sump covers to accommodate electrical wiring, water ejection pipes, or radon vent pipes shall be designed to permit air-tight sealing around penetrations, using caulk or grommets. Sump covers that permit observation of conditions in the sump pit are recommended.

SECTION AF103.6 In basement or slab-on-grade buildings, the following components of a passive sub-slab depressurization system shall be installed during construction.

(IRC)SECTION AF103.6.1 A minimum 3-inch-diameter ABS, PVC or equivalent gas-tight pipe shall be embedded vertically into the sub-slab aggregate or other permeable material before the slab is cast. A AT≡ fitting or equivalent method shall be used to ensure that the pipe opening remains within the sub-slab permeable material. Alternatively, the 3-inch pipe 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.

The pipe shall be extended up through the building floors, terminate at least 12 inches above the surface of the roof in a location at least 10 feet away any window or other opening into the conditioned spaces of the building that is less than 2 feet below the exhaust point, and 10 feet from any window or other opening in adjoining or adjacent buildings.

(IRC)SECTION AF103.8 Radon vent pipes shall be accessible for future fan installation through an attic or other area outside the habitable space.

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

(IRC)SECTION P2719: FLOOR DRAINS

(IRC)P2719.1 Minimum size. Floor drains shall have waste outlets not less than 2 inches (51 mm) in diameter and shall be provided with a removable strainer with an open area of at least two-thirds of the cross-sectional area of the drain line to which it connects.

Some contractors use the condensate drain conduit as a floor drain. They cut off the condensate drain conduit even with the floor and re-insert the condensate conduit from the A/C as well as the relief valve discharge pipe. There are two problems with this procedure: 1) The open area of the "drain" does not meet meet minimum open area, and 2) The relief valve discharge conduit cannot feed into a trapped drain.

(IRC)CHAPTER 28, WATER HEATERS

(IRC)SECTION P2803: RELIEF VALVES

(IRC)P2803.6.1 Requirements of discharge pipe. The outlet of a pressure relief valve, temperature relief valve or combination thereof, shall not be directly connected to the drainage system. The discharge from the relief valve shall be piped full size separately to the outside of the building or to an indirect waste receptor located inside the building. In areas subject to freezing, the relief valve shall discharge through an air-gap into an indirect waste receptor located within a heated space, or by other approved means. The discharge shall be installed in a manner that does not cause personal injury or property damage and that is readily observable by the building occupants. The discharge from a relief valve shall not be trapped. The diameter of

the discharge piping shall not be less than the diameter of the relief valve outlet. The discharge pipe shall be installed so as to drain by gravity flow and shall terminate atmospherically not more that 6 inches (152 mm) above the floor. The end of the discharge pipe shall not be threaded

(IRC)P3201-5 Prohibited trap designs.....(5) Trap designs with moving parts.

There are several conflicts between the EPA and 2000 IRC:

Many building contractors route the condensate drain and the water heater relief valve discharge drain through a common conduit into the sump-hole area. The pressure relief valve cannot discharge into a trapped drain! Therefore the condensate drain should discharge into a condensate pump or the relief valve should be terminated at the floor or through a separate conduit to daylight or the sump receptacle.

In conclusion it is quite obvious that these issues need to be discussed and alternatives must be developed.