

Summary of Significant Code Changes

2012 International Residential Code (IRC) Portion

Of the 2016 Connecticut State Building Code

Effective for Permit Applications Submitted On or After October 1, 2016

Connecticut Amended

1. R105.2 - Fences up to 7 foot high now exempt from permit

Exception: When used as swimming pool barriers

2. R105.3.1.1 - Flood hazard area 50% rule wording corrected

R105.3.1.1 Determination of substantially improved or substantially damaged existing buildings in flood hazard areas. For applications for reconstruction, rehabilitation, addition or other improvement of existing buildings or structures located in a flood hazard area as established by Table R301.2(1), the building official shall examine or cause to be examined the construction documents and shall prepare a finding with regard to the value of the proposed work. For buildings that have sustained damage of any origin, the value of the proposed work shall include the cost to repair the building or structure to its predamaged condition. If the building official finds that the value of the proposed work equals or exceeds 50 percent of the market value of the building or structure before the damage has occurred or the improvement is started, the building official shall issue a determination of substantial damage and require that all existing portions of the entire building or structure meet the requirements of section R322.

Commentary: Definitions found in Federal Regulations 44 CFR 59.1 for the National Flood Insurance Program (NFIP).

Substantial damage means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

Substantial improvement means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "substantial damage", regardless of the actual repair work performed. The term does not, however, include either:

(1) Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions or;

(2) Any alteration of a "historic structure", provided that the alteration will not preclude the structure's continued designation as a "historic structure".

For additional guidance refer to Federal Emergency Management Agency (FEMA) 213, "Answers to Questions about Substantially Damaged Buildings", and FEMA 311 "Guidance on Estimating Substantial Damage Using NFIP Residential Substantial Damage Estimator"

3. R110.9 - Better explanation of when to issue a Certificate of Approval

R110.9 Certificate of approval. The building official shall issue a certificate of approval indicating substantial compliance with the requirements of this code for all completed work that requires a building permit but does not require a certificate of occupancy. Such work shall include, but not be limited to: fences greater than 7 feet in height; retaining walls greater than 3 feet in height; decks; garages; swimming pools; basements and attics converted to habitable space; electrical, plumbing, and mechanical repairs or alterations.

4. R202.1 - Habitable attic definition changed to finished area

ATTIC, HABITABLE. A finished area, not considered a story and not containing any dormers, complying with all of the following requirements:

1. The occupiable floor area is at least 70 square feet in accordance with Section R304,
2. The occupiable floor has a ceiling height in accordance with Section R305, and
3. The occupiable space is enclosed by the roof assembly above, knee walls (if applicable) on the sides and the floor-ceiling assembly below.
4. Roofs of habitable attics containing dormers will be considered a story.

Also note: R311.4 Vertical egress. Egress from habitable levels including habitable attics and basements not provided with an egress door in accordance with Section R311.2 shall be by a ramp in accordance with Section R311.8 or a stairway in accordance with Section R311.7.

5. Table R301.2(1) - Ground snow load now varies between 30 and 40 psf per Appendix R

Note: Most of New London County remains at 30 psf

6. R312.1.2 - Removed guard requirement above built in seating

7. R301.2.1.2 - The term "windows" changed to "exterior glazing" as it applies to windborne debris regions

R301.2.1.2 Protection of openings. Exterior glazing in buildings located in windborne debris regions shall be protected from windborne debris. Glazed opening protection for windborne debris shall meet the requirements of the Large Missile Test of ASTM E 1996 and ASTM E 1886 referenced therein. The

applicable wind zones for establishing missile types in ASTM E 1996 are shown on Figure R301.2(4)C. **Garage door glazed opening** protection for windborne debris shall meet the requirements of an approved impact-resisting standard or ANSI/DASMA 115.

Exception: Wood structural panels with a minimum thickness of 7/16 inch and a maximum span of 8 feet shall be permitted for opening protection in one- and two-story buildings. Panels shall be pre-cut and attached to the framing surrounding the opening containing the product with the glazed opening. **Panels shall be predrilled as required for the anchorage method** and shall be secured with the attachment hardware provided. Attachments shall be designed to resist the component and cladding loads determined in accordance with either Table R301.2(2) or ASCE 7, with the permanent corrosion-resistant **attachment hardware provided and anchors permanently installed on the building**. Attachment in accordance with Table R301.2.1.2 is permitted for buildings with a mean roof height of 33 feet or less where located in Wind Zones 1 and 2 in accordance with Figure R301.2(4)C.

8. R303.4 - Less Than 5 AC/H air infiltration rate requires whole-house mechanical ventilation

R303.4 Mechanical ventilation. Where the air infiltration rate of a dwelling unit is less than 5 air changes per hour when tested with a blower door at a pressure of 0.2 inch w.c. in accordance with Section N1102.4.1.2, the **dwelling unit shall be provided with whole-house mechanical ventilation in accordance with Section M1507.3.**

9. R308.4 - Major language/organization clarification of glazing hazardous locations section

R308.4.5 **Glazing and wet surfaces.** Glazing in walls, enclosures or fences containing or facing hot tubs, spas, whirlpools, saunas, steam rooms, bathtubs, showers and indoor or outdoor swimming pools where the bottom exposed edge of **the glazing is less than 60 inches measured vertically above any standing or walking surface shall be considered a hazardous location.** This shall apply to single glazing and all panes in multiple glazing.

Exception: Glazing that is more than 60 inches, measured horizontally and in a straight line, from the water's edge of a bathtub, hot tub, spa, whirlpool, or swimming pool.

R308.4.6 Glazing adjacent stairs and ramps. Glazing where **the bottom exposed edge of the glazing is less than 36 inches above the plane of the adjacent walking surface of stairways, landings between flights of stairs and ramps shall be considered a hazardous location.**

Exceptions:

1. When a rail is installed on the accessible side(s) of the glazing 34 to 38 inches above the walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot without contacting the glass and be a minimum of 1-½ inches in cross sectional height.
2. Glazing 36 inches or more measured horizontally from the walking surface.

10. R311.7.5.2.1 - Winder tread now allowed within a flight

R311.7.5.2.1 Winder treads. Winder treads shall have a minimum tread depth of 10 inches measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline (*as defined in Section R311.7.4*). Winder treads shall have a minimum tread depth of 6 inches at any point within the clear width of the stair. Within any flight of stairs, the largest winder tread depth at the walkline shall not exceed the smallest winder tread by more than 3/8 inch. **Consistently shaped winders at the walkline shall be allowed within the same flight of stairs as rectangular treads** and do not have to be within 3/8 inch of the rectangular tread depth.

Reference – Section R311.7.4 defines the walkline as across winder treads concentric to the curved direction of travel through the turn and located 12 inches from the side where the winders are narrower. The 12-inch dimension shall be measured from the widest point of the clear stair width at the walking surface of the winder. If winders are adjacent within the flight, the point of the widest clear stair width of the adjacent winders shall be used.

11. R311.7.6 - Quarter circle landings now allowed, no longer required to be 36" x 36" square

R311.7.6 Landings for stairways. There shall be a floor or landing at the top and bottom of each stairway. The minimum width perpendicular to the direction of travel shall be no less than the width of the flight served. **Landings of shapes other than square or rectangular shall be permitted provided the depth at the walk line and the total area is not less than that of a quarter circle with a radius equal to the required landing width.** Where the stairway has a straight run, the minimum depth in the direction of travel shall be not less than 36 inches.

Exception: A floor or landing is not required at the top of an interior flight of stairs, including stairs in an enclosed garage, provided a door does not swing over the stairs.

12. R314.5 - Wireless technology specifically allowed for required smoke alarm interconnection

R314.5 Interconnection. Where more than one smoke alarm is required to be installed within an individual dwelling unit in accordance with Section R314.3, the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual unit. **Physical interconnection of smoke alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm.**

Exception: Interconnection of smoke alarms in existing areas shall not be required where alterations or repairs do not result in removal of interior wall or ceiling finishes exposing the structure, unless there is an attic, crawl space or basement available which could provide access for interconnection without the removal of interior finishes.

Reference - Section 314.3 calls for alarms in each sleeping room, outside each separate sleeping area, basements and habitable attics. Further, Section 314.3.1 calls for the entire building to be equipped when alterations other than roofing, siding, windows and decks are performed.

13. R316.4 - New standard NFPA 275 allowed as alternative to covering foam with ½" sheetrock

R316.4 Thermal barrier. Unless otherwise allowed in Section R316.5 or Section R316.6, foam plastic shall be separated from the interior of a building by an approved thermal barrier of minimum ½ inch gypsum **wallboard or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.**

R316.5 Specific requirements. The following requirements shall apply to these uses of foam plastic unless specifically approved in accordance with Section R316.6 or by other sections of the code or the requirements of Sections R316.2 through R316.4 have been met.

R316.5.1 Masonry or concrete construction. The thermal barrier specified in Section R316.4 is not required in a masonry or concrete wall, floor or roof when the foam plastic insulation is separated from the interior of the building by a minimum 1-inch thickness of masonry or concrete.

R316.5.2 Roofing. The thermal barrier specified in Section R316.4 is not required when the foam plastic in a roof assembly or under a roof covering is installed in accordance with the code and the manufacturer's installation instructions and is separated from the interior of the building by tongue-and-groove wood planks or wood structural panel sheathing in accordance with Section R803, not less than 15/32 inch thick bonded with exterior glue and identified as Exposure 1, with edges supported by blocking or tongue-and-groove joints or an equivalent material. The smoke-developed index for roof applications shall not be limited.

R316.5.3 Attics. The thermal barrier specified in Section R316.4 is not required where all of the following apply:

1. Attic access is required by Section R807.1.
2. The space is entered only for purposes of repairs or maintenance.
3. The foam plastic insulation is protected against ignition using one of the following ignition barrier materials:
 - 3.1. 1-1/2-inch-thick mineral fiber insulation;
 - 3.2. 1/4-inch-thick wood structural panels;
 - 3.3. 3/8-inch particleboard;
 - 3.4. 1/4-inch hardboard;
 - 3.5. 3/8-inch gypsum board; or
 - 3.6. Corrosion-resistant steel having a base metal thickness of 0.016 inch;
 - 3.7. 1-1/2 inch-thick cellulose insulation. The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R316.6.

R316.5.4 Crawl spaces. The thermal barrier specified in Section R316.4 is not required where all of the following apply:

1. Crawl space access is required by Section R408.4
2. Entry is made only for purposes of repairs or maintenance.
3. The foam plastic insulation is protected against ignition using one of the following ignition barrier materials:
 - 3.1. 1-1/2 inch-thick mineral fiber insulation;
 - 3.2. 1/4-inch-thick wood structural panels;
 - 3.3. 3/8-inch particleboard;
 - 3.4. 1/4-inch hardboard;
 - 3.5. 3/8-inch gypsum board; or
 - 3.6. Corrosion-resistant steel having a base metal thickness of 0.016 inch. The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R316.6.

R316.5.5 Foam-filled exterior doors. Foam-filled exterior doors are exempt from the requirements of Sections R316.3 and R316.4.

R316.5.6 Foam-filled garage doors. Foam-filled garage doors in attached or detached garages are exempt from the requirements of Sections R316.3 and R316.4.

R316.5.7 Foam backer board. The thermal barrier specified in Section R316.4 is not required where siding backer board foam plastic insulation has a maximum thickness of 0.5 inch and a potential heat of not more than 2000 Btu per square foot when tested in accordance with NFPA 259 provided that:

1. The foam plastic insulation is separated from the interior of the building by not less than 2 inches of mineral fiber insulation;
2. The foam plastic insulation is installed over existing exterior wall finish in conjunction with re-siding; or
3. The foam plastic insulation has been tested in accordance with Section R316.6.

R316.5.8 Re-siding. The thermal barrier specified in Section R316.4 is not required where the foam plastic insulation is installed over existing exterior wall finish in conjunction with re-siding provided the foam plastic has a maximum thickness of 0.5 inch and a potential heat of not more than 2000 Btu per square foot when tested in accordance with NFPA 259.

R316.5.9 Interior trim. The thermal barrier specified in Section R316.4 is not required for exposed foam plastic interior trim, provided all of the following are met:

1. The minimum density is 20 pounds per cubic foot.
2. The maximum thickness of the trim is 0.5 inch and the maximum width is 8 inches.
3. The interior trim shall not constitute more than 10 percent of the aggregate wall and ceiling area of any room or space.
4. The flame spread index does not exceed 75 when tested per ASTM E84 or UL723. The smoke-developed index is not limited.

R316.5.10 Interior finish. Foam plastics shall be permitted as interior finish where approved in accordance with Section R316.6 Foam plastics that are used as interior finish shall also meet the flame spread index and smoke developed index requirements of Sections R302.9.1 and R302.9.2.

R316.5.11 Sill plates and headers. Foam plastic shall be permitted to be spray applied to a **sill plate and header without the thermal barrier** specified in Section R316.4 subject to all of the following:

1. The maximum thickness of the foam plastic shall be 3-1/4 inches.
2. The density of the foam plastic shall be in the range of 0.5 to 2.0 pounds per cubic foot.
3. The foam plastic shall have a flame spread index of 25 or less and an accompanying smoke-developed index of 450 or less when tested in accordance with ASTM E 84 or UL 723.

R316.5.12 Sheathing. Foam plastic insulation used as sheathing shall comply with Section R316.3 and Section R316.4. **Where the foam plastic sheathing is exposed to the attic space at a gable or kneewall, the provisions of Section R316.5.3 shall apply.**

R316.5.13 Floors. The thermal barrier specified in Section R316.4 is not required to be installed on the walking surface of a structural floor system that contains foam plastic insulation when the foam plastic is covered by a minimum nominal 1/2-inch-thick wood structural panel or equivalent. The thermal barrier specified in Section R316.4 is required on the underside of the structural floor system that contains foam plastic insulation when the underside of the structural floor system is exposed to the interior of the building.

R316.6 Specific approval. Foam plastic not meeting the requirements of Sections R316.3 through R316.5 shall be specifically approved on the basis of one of the following approved tests: NFPA 286 with the acceptance criteria of Section R302.9.4, FM4880, UL 1040, or UL 1715, or fire tests related to actual end-use configurations. Approval shall be based on the actual end use configuration and shall be performed on the finished foam plastic assembly in the maximum thickness intended for use. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.

14. R317.4 – Composite decking and rails to be labeled

R317.4 Wood/plastic composites. Wood/plastic composites used in exterior deck boards, stair treads, handrails and guardrail systems shall bear a label indicating the required performance levels and demonstrating compliance with the provisions of ASTM D7032.

R317.4.1 Labeling. Deck boards and stair treads shall bear a label that indicates compliance to ASTM D 7032 and includes the allowable load and maximum allowable span. Handrails and guardrail systems or their packaging shall bear a label that indicates compliance to ASTM D7032 and includes the maximum allowable span.

R317.4.2 Installation. Wood/plastic composites shall be installed in accordance with the manufacturer's instructions.

15. R405.1 - Filter membrane now required for surrounding or covering perforated footing drains

R405.1 Concrete or masonry foundations. Drains shall be provided around all concrete or masonry foundations that retain earth and enclose habitable or usable spaces located below grade. Drainage tiles, gravel or crushed stone drains, perforated pipe or other approved systems or materials shall be installed at or below the area to be protected and shall discharge by gravity or mechanical means into an approved drainage system. Gravel or crushed stone drains shall extend at least 1-foot beyond the outside edge of the footing and **6 inches above the top of the footing and be covered with an approved filter membrane material**. The top of open joints of drain tiles shall be protected with strips of building paper. Perforated drains shall be surrounded with an approved filter membrane or the filter membrane shall cover the washed gravel or crushed rock covering the drain. Drainage tiles or perforated pipe shall be placed on a minimum of 2 inches of washed gravel or crushed rock at least one sieve size larger than the tile joint opening or perforation and covered with not less than 6 inches of the same material.

Exception: A drainage system is not required when the foundation is installed on well-drained ground or sand-gravel mixture soils according to the Unified Soil Classification System, Group I Soils, as detailed in Table R405.1.

16. R501.3 - I-joint and smaller than 2x10 floor structure now required to be protected

R501.3 Fire protection of floors. Floor assemblies, not required elsewhere in this code to be fire-resistance rated, **shall be provided with a ½ inch gypsum wallboard membrane, 5/8-inch wood structural panel membrane, or equivalent on the underside of the floor framing member.**

Exceptions:

1. Floor assemblies located directly over a space protected by an **automatic sprinkler** system in accordance with Section P2904, NFPA13D, or other approved equivalent sprinkler system.
2. Floor assemblies located directly over a **crawl space not intended for storage or fuel-fired appliances**.
3. Portions of floor assemblies can be unprotected when complying with the following:
 - 3.1. The aggregate area of the unprotected portions **shall not exceed 80 square feet per story**
 - 3.2. Fire blocking in accordance with Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
4. Wood floor assemblies using dimension lumber or structural composite lumber **equal to or greater than 2-inch by 10-inch nominal** dimension, or other approved floor assemblies demonstrating equivalent fire performance.

17. R602.10.1 - Entire braced wall section reorganized and simplified

R602.10 Wall bracing. Buildings shall be braced in accordance with this section or, when applicable, Section R602.12. Where a building, or portion thereof, does not comply with one or more of the bracing requirements in this section, those portions shall be designed and constructed in accordance with Section R301.1.

*Comment: Nothing changed, **just easier to follow** with simpler tables and better explanations.*

18. R703.8 - Pan flashing required for windows and doors if details are not provided by the manufacturer

R703.8 Flashing. Approved corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. The flashing shall extend to the surface of the exterior wall finish. Approved corrosion-resistant flashings shall be installed at all of the following locations:

1. Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. Flashing at exterior window and door openings shall be installed in accordance with one or more of the following:
 - 1.1. The fenestration **manufacturer's installation and flashing instructions**, or for applications not addressed in the fenestration manufacturer's instructions, in accordance with the flashing manufacturer's instructions. **Where flashing instructions or details are not provided, pan flashing shall be installed at the sill of exterior window and door openings**. Pan flashing shall be sealed or sloped in such a manner as to direct water to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. Openings using pan flashing shall also incorporate flashing or protection at the head and sides.
 - 1.2. In accordance with the flashing design or method of a registered design professional.
 - 1.3. In accordance with other approved methods.
2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. **Continuously above all projecting wood trim**.
5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
6. At wall and roof intersections.
7. At built-in gutters.

19. R806.5 - Unvented cathedral ceilings specifically allowed

R806.5 Unvented attic and unvented enclosed rafter assemblies. Unvented attic assemblies (spaces between the ceiling joists of the top story and the roof rafters) and unvented enclosed rafter assemblies (spaces between ceilings that are applied directly to the underside of roof framing members/rafters and the structural roof sheathing at the top of the roof framing members/rafters) **shall be permitted if all the following conditions are met:**

1. The unvented attic space is completely contained within the building thermal envelope.
2. No interior Class I vapor retarders are installed on the ceiling side (attic floor) of the unvented attic assembly or on the ceiling side of the unvented enclosed rafter assembly.
3. Where wood shingles or shakes are used, a minimum ¼ inch vented air space separates the shingles or shakes and the roofing underlayment above the structural sheathing.
4. In Climate Zones 5, 6, 7 and 8, any air-impermeable insulation shall be a Class II vapor retarder, or shall have a Class III vapor retarder coating or covering in direct contact with the underside of the insulation.
5. Either Items 5.1, 5.2 or 5.3 shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.
 - 5.1 .Air-impermeable insulation only. Insulation shall be applied in direct contact with the underside of the structural roof sheathing.
 - 5.2. Air-permeable insulation only. In addition to the air-permeable insulation installed directly below the structural sheathing, rigid board or sheet insulation shall be installed directly above the structural roof sheathing as specified in Table R806.5 for condensation control.
 - 5.3. Air-impermeable and air-permeable insulation. The air-impermeable insulation shall be applied in direct contact with the underside of the structural roof sheathing as specified in Table R806.5 (R-20 for Climate Zone 5) for condensation control. The air-permeable insulation shall be installed directly under the air-impermeable insulation.
 - 5.4. Where preformed insulation board is used as the air-impermeable insulation layer, it shall be sealed at the perimeter of each individual sheet interior surface to form a continuous layer.

20. R903.2.1 - Kick out flashing required where step flashing terminates at sidewall

R903.2.1 Locations. Flashings shall be installed at wall and roof intersections, wherever there is a change in roof slope or direction and around roof openings. A flashing shall be installed to divert the water away from where the eave of a sloped roof intersects a vertical sidewalk. Where flashing is of metal, the metal shall be corrosion resistant with a thickness of not less than 0.019 inch (No.26 galvanized sheet).

21. R905.2.8.5 - Drip edge and rake edge now required for shingle roofs

R905.2.8.5 Drip edge. A drip edge shall be provided at eaves and gables of shingle roofs. Adjacent pieces of drip edge shall be overlapped a minimum of 2 inches. Drip edges shall extend a minimum of 0.25 inch below the roof sheathing and extend up the roof deck a minimum of 2 inches. Drip edges shall be mechanically fastened to the roof deck at a maximum of 12 inches o.c. with fasteners as specified in Section R905.2.5. Underlayment shall be installed over the drip edge along eaves and under the underlayment on gables. Unless specified differently by the shingle manufacturer, shingles are permitted to be flush with the drip edge.

22. N1101.1 - IECC and IRC energy requirements are now identical

N1101.1 Scope. This chapter regulates the energy efficiency for the design and construction of buildings regulated by this code.

Note: The text of the following Sections N1101.2 through N1105 is extracted from the 2012 edition of the International Energy Conservation Code - Residential Provisions and has been editorially revised to conform to the scope and application of this code.

23. N1102.1.1 - Prescriptive insulation values increased

N1102.1.1 Insulation and fenestration criteria. The building thermal envelope shall meet the requirements of Table N1102.1.1 based on the climate zone specified in Section N1101.10.

Excerpts from Table N1102.1.1

1.) Prescriptive ceiling insulation goes to R-49

Noted Exceptions:

N1102.2.1 Ceilings with attic spaces. R-38 shall be deemed to satisfy the requirement for R-49 wherever the full height of uncompressed R-38 insulation extends over the wall top plate at the eaves. This reduction shall not apply to the total UA alternative (REScheck).

N1102.2.2 Ceilings without attic spaces. Where the design of the roof/ceiling assembly does not allow sufficient space for the required insulation, the minimum required insulation for such roof/ceiling assemblies shall be R-30. This reduction shall be limited to 500 square feet or 20 percent of the total insulated ceiling area, whichever is less. This reduction shall not apply to the total UA alternative (REScheck).

2.) Prescriptive basement and crawl space walls go to R-15 continuous or R-19 cavity.

24. N1102.2.3 - Eave baffle required for air permeable insulation in vented attics

N1102.2.3 Eave baffle. For air permeable insulations in vented attics, a baffle shall be installed adjacent to soffit and eave vents. Baffles shall maintain an opening equal or greater than the size of the vent. The baffle shall extend over the top of the attic insulation. The baffle shall be permitted to be any solid material.

25. N1102.4.1.2 - Blower door test requires 3 AC/H to pass

N1102.4.1.2 Testing. The building or dwelling unit shall be tested and verified as having an air leakage rate of not exceeding 3 air changes per hour in Climate Zone 5. Testing shall be conducted with a blower door at a pressure of 0.2 inches w.c. Where required by the code official, testing shall be conducted by an approved third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the code official. Testing shall be performed at any time after creation of all penetrations of the building thermal envelope.

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weather stripping or other infiltration control measures;
2. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures;
3. Interior doors, if installed at the time of the test, shall be open;
4. Exterior openings for continuous ventilation systems and heat recovery ventilators shall be closed and sealed;
5. Heating and cooling systems, if installed at the time of the test, shall be turned off; and

6. Supply and return registers, if installed at the time of the test, shall be fully open.

Exceptions:

1. Low-rise attached dwelling unit buildings in Climate Zone 5: For dwelling units greater than 850 square feet of floor area, the air leakage threshold shall be set at 5 air changes per hour. For dwelling units less than or equal to 850 square feet of floor area, the air leakage threshold shall be set at 6.5 air changes per hour. Testing shall be conducted with a blower door, unguarded, at a pressure of 0.2 inches e.g. If guarded blower door testing (a test with one or more adjacent units pressurized, which should eliminate any leakage between units) is being performed, this exception is not allowed and the standard testing requirements of Section 402.4.1.2 apply. Where required by the code official, testing shall be conducted by an approved third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the code official. Testing shall be performed at any time after creation of all penetrations of the building thermal envelope. For buildings with more than 7 units, a sampling protocol is allowed by an approved third party. The sampling protocol requires the first seven units to be tested without any failures. Upon successful testing of those initial seven units, remaining units can be sampled at a rate of 1 in 7. If any sampled unit fails compliance with the maximum allowed air leakage rate, two additional units in the same sample set must be tested. If additional failures occur, all units in the sample set must be tested. In addition, all units in the next sample set must be tested for compliance before sampling of further units can be continued.
2. Additions and alterations: A visual inspection of the building envelope tightness and insulation installation shall be considered acceptable when the items listed in Table N1102.4.1.1, applicable to the method of construction, are field verified. Where required by the code official, an approved party independent from the installer of the insulation shall inspect the air barrier and insulation.

26. N1103.2.2 - Duct tightness test goes to max. 8cfm/100 sq. ft. leakage tested across entire system

N1103.2.2 Sealing (Mandatory). Ducts, air handlers, and filter boxes shall be sealed. Joints and seams shall comply with Section M1601.4.1 of this code. Exceptions:

1. Air-impermeable spray foam products may be applied without additional joint seals.
2. Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.
3. Continuously welded and locking-type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column pressure classification shall not require additional closure systems. Duct tightness shall be verified by either of the following:
 1. Post-construction test: Total leakage shall be less than or equal to 8 cf/m per 100 square feet of conditioned floor area when tested at a pressure differential of 0.1 inches w.c. across the entire system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test.
 2. Rough in test: Total leakage shall be less than or equal to 8 cf/m per 100 square feet of conditioned floor area when tested at a pressure differential of 0.1 inches w.c. across the entire system, including the manufacturer's air handler enclosure. All registers shall be taped or otherwise sealed during the test. If the air handler is not installed at the time of the test, total leakage shall be less than or equal to 3 cf/m per 100 square feet of conditioned floor area.

Exceptions:

1. The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope.
2. Where ducts from an existing heating and cooling system are extended to an addition or are extended due to an alteration, duct systems with less than 40 linear feet in unconditioned spaces shall not be required to be tested in accordance with Section 403.2.2.

27. N1102.4.2 - New wood burning fireplaces shall have tight fitting dampers

N1102.4.2 Fireplaces. New wood-burning fireplaces shall have tight-fitting flue dampers or doors, and outdoor combustion air. Where using tight-fitting doors on factory-built fireplaces listed and labeled in accordance with UL 127, the doors shall be tested and listed for the fireplace. Where using tight-fitting doors on masonry fireplaces, the doors shall be listed and labeled in accordance with UL 907.

28. N1103.4.2 - Hot water pipe insulation mandatory

N1103.4.2 Hot water pipe insulation (Prescriptive). Insulation for hot water pipe with a minimum thermal resistance of R-3 shall be applied to the following:

1. Piping larger than 3/4-inch nominal diameter.
2. Piping serving more than one dwelling unit.
3. Piping from the water heater to kitchen outlets.
4. Piping located outside the conditioned space.
5. Piping from the water heater to a distribution manifold.
6. Piping located under a floor slab.
7. Buried piping.
8. Supply and return piping in recirculation systems other than demand recirculation systems.
9. Piping with run lengths greater than the maximum run lengths for the nominal pipe diameter given in Table N1103.4.2. All remaining piping shall be insulated to at least R-3 or meet the run length requirements of Table N1103.4.2.

TABLE N1103.4.2 - MAXIMUM RUN LENGTH (based on largest diameter pipe in the run)
(total length in feet of all piping from the distribution manifold or the recirculation loop to a point of use)

Nominal pipe diameter:	3/8	1/2	3/4	>3/4
Maximum run length:	30	20	10	5

29. N1104.1 - High-efficacy lighting required

N1104.1 Lighting equipment (Mandatory). A minimum of 75 percent of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps or a minimum of 75 percent of the permanently installed lighting fixtures shall contain only high-efficacy lamps.

Exception: Low-voltage lighting shall not be required to utilize high-efficiency lamps.

30. N1104.1 - Pool covers

N1103.9.3 Covers. Heated pools and in-ground permanently installed spas shall be provided with a vapor retardant cover.

Exception: Pools deriving over 70 percent of the energy for heating from site-recovered energy, such as a heat pump or solar energy source computed over an operating season.

31. M1502.4.2 - Dryer vent now required to be mechanically fastened

M1502.4.2 Duct installation. Exhaust ducts shall be supported at intervals not to exceed 12 feet and shall be secured in place. The insert end of the duct shall extend into the adjoining duct or fitting in the direction of airflow. Exhaust duct joints shall be sealed in accordance with Section M1601.4.1 and shall be mechanically fastened. Ducts shall not be joined with screws or similar fasteners (i.e. pop rivets) that protrude more than 1/8 inch into the inside of the duct.

32. M1506.2 - Exhaust air termination minimum distances to intakes

M1506.2 Exhaust openings. Air exhaust openings shall terminate not less than 3 feet from property lines; 3 feet from operable and non-operable openings into the building and 10 feet from mechanical air intakes except where the opening is located 3 feet above the air intake. Openings shall comply with Sections R303.5.2 and R303.6.

R303.5.2 Exhaust openings. Exhaust air shall not be directed onto walkways.

R303.6 Outside opening protection. Air exhaust and intake openings that terminate outdoors shall be protected with corrosion-resistant screens, louvers or grilles having a minimum opening size of 1/4 inch and a maximum opening size of 1/2 inch in any dimension. Openings shall be protected against local weather conditions. Outdoor air exhaust and intake openings shall meet the provisions for exterior wall opening protectives in accordance with this code.

33. M1507.3.3 - Mechanical ventilation required to be continuous or intermittent at airflow rates as per Table

M1507.3 Whole-house mechanical ventilation system. Whole-house mechanical ventilation systems shall be designed in accordance with Sections M1507.3.1 through M1507.3.3.

M1507.3.1 System design. The whole-house ventilation system shall consist of one or more supply or exhaust fans, or a combination of such, and associated ducts and controls. Local exhaust or supply fans are permitted to serve as such a system. Outdoor air ducts connected to the return side of an air handler shall be considered to provide supply ventilation.

M1507.3.2 System controls. The whole-house mechanical ventilation system shall be provided with controls that enable manual override.

M1507.3.3 Mechanical ventilation rate. The whole house mechanical ventilation system shall provide outdoor air at a continuous rate of not less than that determined in accordance with Table M1507.3.3(1).

TABLE M1507.3.3(1)
CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0-1	2-3	4-5	6-7	>7
< 1,500	30	45	60	75	90
1,501-3,000	45	60	75	90	105
3,001-4,500	60	75	90	105	120
4,501-6,000	75	90	105	120	135
6,001-7,500	90	105	120	135	150
> 7,500	105	120	135	150	165

For SI: 1 square foot = 0.0929 sq. m, 1 cubic foot per minute = 0.0004719 m³/s.

Exception: The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25-percent of each 4-hour segment and the ventilation rate prescribed in Table M1507.3.3(1) is multiplied by the factor determined in accordance with Table M1507.3.3(2).

TABLE M1507.3.3(2)
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION RATE FACTORS^a

RUN-TIME PERCENTAGE IN EACH 4-HOUR SEGMENT	25%	33%	50%	66%	75%	100%
Factor ^b	4	3	2	1.5	1.3	1.0

a. For ventilation system run time values between those given, the factors are permitted to be determined by interpolation.
b. Extrapolation beyond the table is prohibited.

M1507.4 Local exhaust rates. Local exhaust systems shall be designed to have the capacity to exhaust the minimum airflow rate determined in accordance with Table M1507.4.

TABLE M1507.4 - MINIMUM REQUIRED LOCAL EXHAUST RATES FOR ONE- AND TWO-FAMILY DWELLINGS

Kitchens	100 cf/m intermittent or 25 cf/m continuous
Bathrooms-Toilet Rooms	Mechanical exhaust capacity of 50 cf/m intermittent or 20 cf/m continuous

34. G2404.3 Appliances to be listed and labeled for application

G2404.3 Listed and labeled. Appliances regulated by this code shall be listed and labeled for the application in which they are used unless otherwise approved in accordance with Section R104.11 (approved test reports). The approval of unlisted appliances in accordance with Section R104.11 shall be based upon approved engineering evaluation.

35. **G2412.2.1 - LP Gas supplier identification required on tanks**

G2412.2.1 Identification Label. LP-Gas fuel suppliers shall affix and maintain in a legible condition, their firm name(s) and emergency telephone number(s) in a readily visible location on LP-Gas supplier-owned Department of Transportation (DOT) and American Society of Mechanical Engineers (ASME) containers installed on a consumer's premises. The firm name(s) and emergency telephone number(s) shall be at least ½ inch high and of contrasting color to the container. The emergency telephone number(s) shall be staffed 24 hours a day to ensure that the LP-Gas supplier is available in the event of an emergency at the consumer's premises. Cylinders, tanks or containers shall be filled, evacuated or transported only by the owner of the cylinder, tank or container or upon the owner's authorization.

36. **P2503.5.1 - Testing of plastic plumbing pipe with air is no longer allowed**

P2503.5.1 Rough plumbing. DWV systems shall be tested on completion of the rough piping installation by water or for piping systems other than plastic, by air with no evidence of leakage. Either test shall be applied to the drainage system in its entirety or in sections after rough piping has been installed, as follows:

1. Water test. Each section shall be filled with water to a point not less than 10 feet above the highest fitting connection in that section, or to the highest point in the completed system. Water shall be held in the section under test for a period of 15 minutes. The system shall prove leak free by visual inspection.
2. Air test. The portion under test shall be maintained at a gauge pressure of 5 pounds per square inch (psi). This pressure shall be held without introduction of additional air for a period of 15 minutes.

37. **P2801.5 - Storage type water heaters installed where a leak would cause damage now require a pan**

P2801.5 Required pan. Where a storage tank-type water heater or a hot water storage tank is installed in a location where water leakage from the tank will cause damage, the tank shall be installed in a galvanized steel pan having a material thickness of not less than 0.0236 inch (No. 24 gage), or other pans approved for such use. Listed pans shall comply with CSA LC3.

P2801.5.1 Pan size and drain. The pan shall be not less than ½ inches deep and shall be of sufficient size and shape to receive all dripping or condensate from the tank or water heater. The pan shall be drained by an indirect waste pipe of not less than ¾ inch diameter. Piping for safety pan drains shall be of those materials listed in Table P2905.5.

P2801.5.2 Pan drain termination. The pan drain shall extend full-size and terminate over a suitably located indirect waste receptor or shall extend to the exterior of the building and terminate not less than 6 inches and not more than 24 inches above the adjacent ground surface.

38. **P3103.5 - Plumbing vent termination minimum distances to openings specified**

P3103.5 Location of vent terminal. An open vent terminal from a drainage system shall not be located less than 4 feet directly beneath any door, openable window, or other air intake opening of the building or of an adjacent building, nor shall any such vent terminal be within 10 feet horizontally of such an opening unless it is not less than 3 feet above the top of such opening

39. **E3609.7 - All gas piping (including black CSST) must be bonded to the grounding electrode system**

E3609.7 Bonding other metal piping. Where installed in or attached to a building or structure, metal piping systems, including gas piping, capable of becoming energized shall be bonded to the service equipment enclosure, the grounded conductor at the service, the grounding electrode conductor where of sufficient size, or to the one or more grounding electrodes used. The bonding conductor(s) or jumpers shall be sized in accordance with Table E3908.12 using the rating of the circuit capable of energizing the piping. The equipment grounding conductor for the circuit that is capable of energizing the piping shall be permitted to serve as the bonding means. The points of attachment of the bonding jumper(s) shall be accessible.

Note: NFPA 54 7.13.2 also applies: "shall be bonded between the point of delivery and the first downstream CSST fitting", not smaller than 6 AWG copper.

40. **E3901.7 - At least one electrical outlet to be installed on balcony, deck, or porch of any size**

E3901.7 Outdoor outlets. At least one receptacle outlet that is accessible while standing at grade level and located not more than 6 feet, 6 inches above grade, shall be installed outdoors at the front and back of each dwelling unit having direct access to grade. Balconies, decks, and porches that are accessible from inside of the dwelling unit shall have at least one receptacle outlet installed within the perimeter of the balcony, deck, or porch. The receptacle shall be located not more than 6 feet, 6 inches above the balcony, deck, or porch surface.

41. **E3901.11 - Foyers greater than 60 sq. ft. now required to have receptacles in each wall 3 ft. or greater in length**

E3901.11 Foyers. Foyers that are not part of a hallway in accordance with Section E3901.10 and that have an area that is greater than 60 square feet shall have a receptacle(s) located in each wall space that is 3 feet or more in width and unbroken by doorways, floor-to-ceiling windows, and similar openings.

42. **E3902.1.1 - All receptacles within 6 ft. of a tub or shower now required to be GFCI protected**

E3902.1.1 Bathtub or shower stall receptacles. Each 125-volt, single phase, and 20-ampere receptacle located within 6 feet of the outside edge of a bathtub or shower stall shall have ground-fault circuit interrupter protection for personnel.

43. **E3902.1.2 - Laundry areas receptacles now required to be GFCI protected**

E3902.1.2 Laundry areas. Each 125-volt, single-phase, 15- and 20-ampere receptacle installed in laundry areas shall have ground-fault interrupter protection for personnel.

44. **E3902.6.1 - Dishwasher circuits now required to be GFCI protected**

E3902.6.1 Kitchen dishwasher branch circuit. Ground-fault circuit-interrupter protection shall be provided for outlets that supply dishwashers in dwelling unit locations.

45. E3902.12 - AFCI protection required for all 15 and 20 amp branch circuits supplying outlets

E3902.12 Arc-fault circuit-interrupter protection. Branch circuits that supply 120-volt, single-phase, 15 and 20-ampere outlets installed in kitchens, family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, laundry areas and similar rooms or areas shall be protected by any of the following:

1. A listed combination-type arc-fault circuit interrupter, installed to provide protection of the entire branch circuit.
2. A listed branch/feeder-type AFCI installed at the origin of the branch-circuit in combination with a listed outlet branch-circuit type arc-fault circuit interrupter installed at the first outlet box on the branch circuit. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
3. A listed supplemental arc protection circuit breaker installed at the origin of the branch circuit in combination with a listed outlet branch-circuit type arc-fault circuit interrupter installed at the first outlet box on the branch circuit where all of the following conditions are met:
 - 3.1 The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
 - 3.2 The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 50 feet for 14 AWG conductors and 70 feet for 12 AWG conductors.
 - 3.3 The first outlet box on the branch circuit shall be marked to indicate that it is the first outlet on the circuit.
4. A listed outlet branch-circuit type arc-fault circuit interrupter installed at the first outlet on the branch circuit in combination with a listed branch-circuit overcurrent protective device where all of the following conditions are met:
 - 4.1 The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
 - 4.2 The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 50 feet for 14 AWG conductors and 70 feet for 12 AWG conductors.
 - 4.3 The first outlet box on the branch circuit shall be marked to indicate that it is the first outlet on the circuit.
 - 4.4 The combination of the branch-circuit overcurrent device and outlet branch circuit AFCI shall be identified as meeting the requirements for a system combination-type AFCI and shall be listed as such.
5. Where metal outlet boxes and junction boxes and RMC, IMC, EMT, Type MC or steel armored Type AC cables meeting the requirements of Section E3908.8, metal wireways or metal auxiliary gutters are installed for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, a listed outlet branch-circuit type AFCI installed at the first outlet shall be considered as providing protection for the remaining portion of the branch circuit.
6. Where a listed metal or nonmetallic conduit or tubing or Type MC cable is encased in not less than 2 inches of concrete for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, a listed outlet branch-circuit type AFCI installed at the first outlet shall be considered as providing protection for the remaining portion of the branch circuit.

Exception: AFCI protection is not required for an individual branch circuit supplying only a fire alarm system where the branch circuit is wired with metal outlet and junction boxes and RMC, IMC, EMT or steel-sheathed armored cable Type AC or Type MC meeting the requirements of Section E3908.8.

46. E3902.13 - AFCI protection is required when modifying, replacing, or extending a branch circuit

E3902.13 Arc-fault circuit interrupter protection for branch circuit extensions or modifications. Where branch-circuit wiring is modified, replaced, or extended in any of the areas specified in Section E3902.12, the branch circuit shall be protected by one of the following:

1. A combination-type AFCI located at the origin of the branch circuit.
2. An outlet branch-circuit type AFCI located at the first receptacle outlet of the existing branch circuit.

Exception: AFCI protection shall not be required where the extension of the existing conductors is not more than 6 feet in length and does not include any additional outlets or devices.

47. E4001.15 - Grounded conductor (neutral) required to be provided at the switch location

E4001.15 Switches controlling lighting loads. Where switches control lighting loads supplied by a grounded general-purpose branch circuit, the grounded circuit conductor for the controlled lighting circuit shall be provided at the switch location.

Exception: The grounded circuit conductor is not required to be provided at the switch enclosure where either of the following conditions apply:

1. The conductors enter the box through a raceway. The raceway shall have sufficient cross-sectional area to accommodate the extension of the grounded circuit conductor of the lighting circuit to the switch location whether or not the conductors in the raceway are required to be increased in size to comply with Section E3705.3.
2. Cable assemblies enter the box through a framing cavity that is open at the top or bottom on the same floor level, or through a wall, floor, or ceiling that is unfinished on one side.

48. E4002.14 - Receptacles located more than 5.5 ft. above the floor not required to be tamper resistant

E4002.14 Tamper-resistant receptacles. In areas specified in Section E3901.1, 125-volt, 15 and 20-ampere receptacles shall be listed tamper-resistant receptacles.

Exception: Receptacles in the following locations shall not be required to be tamper resistant:

1. Receptacles located more than 5.5 feet above the floor.
2. Receptacles that are part of a luminaire or appliance.
3. A single receptacle for a single appliance or a duplex receptacle for two appliances where such receptacles are located in spaces dedicated for the appliances served and, under conditions of normal use, the appliances are not easily moved from one place to another. The appliances shall be cord-and plug-connected to such receptacles in accordance with Section E3909.4.

49. APPENDIX F - Newly constructed homes require RADON mitigation preparation

AF 101.2 Radon Mitigation Preparation Construction Technique. All newly constructed detached one and two-family dwellings and townhouses shall be

provided with radon mitigation preparation construction in accordance with Section AF104 of this code.

Exceptions:

1. Radon-resistant construction technique complying with Section AF103 of this code.
2. Such systems shall not be required in existing buildings undergoing repair, addition or alteration. In the case of an addition to an existing building, this exception also applies to the new construction.

AF102.1 General. For the purpose of these requirements, the terms used shall be defined as follows:

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.

ENCLOSED CRAWL SPACE. A crawl space that is enclosed with foundation walls inclusive of any windows, doors, access openings and required vents.

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 polyethylene or other approved equivalent material used to retard the flow of soil gases into a dwelling.

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

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

VENT PIPE. Not less than a 3-inch diameter ABS or PVC gas-tight pipe extending from the gas permeable layer through the roof.

AF103 PASSIVE RADON-RESISTANT SYSTEM REQUIREMENTS

AF103.1 General. The following components of a passive submembrane or subslab depressurization system shall be installed during construction.

AF103.2 Entry routes. Potential radon entry routes shall be closed in accordance with Sections AF103.2.1 to AF103.2.7, inclusive, of this code.

AF103.2.1 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 expanding foam applied in accordance with the manufacturer's instructions.

AF103.2.2 Sumps. Sumps open to soil or serving as the termination point for subslab or exterior drain tile loops shall be covered with a gasketed or sealed lid. Sumps used as the suction point in a subslab 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.

AF103.2.3 Foundation walls. Hollow block masonry foundation walls shall be constructed with a continuous course of solid masonry, one course of masonry grouted solid, or a solid concrete beam at or above grade. Where a brick veneer or other masonry ledge is installed, the course immediately below that ledge shall be solid masonry, one course of masonry grouted solid, or a solid concrete beam. Joints, cracks or other openings around penetrations of both exterior and interior surfaces of foundation walls below grade shall be filled with polyurethane caulk.

AF103.2.4 Dampproofing. The exterior surfaces of foundation walls below grade shall be dampproofed in accordance with Section R406.

AF103.2.5 Air-conditioning systems. Entry points, joints or other openings into air conditioning systems in enclosed crawl spaces shall be sealed. Exception: Systems with gasketed seams or that are otherwise sealed by the manufacturer.

AF103.2.6 Ducts. Ductwork passing through or beneath a slab within a dwelling shall be of seamless material unless the air-conditioning system is designed to maintain continuous positive pressure within such ducting. Joints in such ductwork shall be sealed. Ductwork located in enclosed crawl spaces shall have seams and joints sealed by closure systems in accordance with Section M1601.4.1.

AF103.2.7 Crawl space access. Access doors and other openings or penetrations between basements and adjoining crawl spaces shall be closed, gasketed or sealed.

AF103.3 Basements or enclosed crawl spaces with floors. In dwellings with basements or enclosed crawl spaces with soil floors, the following components of a passive sub-membrane depressurization system shall be installed during construction.

Exception: Basements or enclosed crawl spaces that are provided with continuously operated mechanical exhaust system in accordance with Section R408.3.

AF103.3.1 Soil-gas-retarder. The soil in basements and enclosed crawl spaces shall be covered with a soil-gas-retarder. The soil-gas-retarder shall be lapped not less than 12 inches at joints and shall extend to foundation walls enclosing the basement or crawl space. The soil-gas-retarder shall fit closely around any pipe, wire or other penetrations of the material. Punctures or tears in the material shall be sealed or covered with additional sheeting.

AF103.3.2 "T" fitting and vent pipe. A 3 or 4-inch "T" fitting shall be inserted beneath the soil-gas-retarder and be connected to a vent pipe. The vent pipe shall extend through the conditioned space of the dwelling and terminate not less than 12 inches above the roof in a location not less than 10 feet away from any window or other opening into the conditioned spaces of the building that is less than 2 feet below the exhaust point. The vent pipe shall be the same diameter throughout its length and shall be supported in accordance with section P2605.

AF103.4 Basements or enclosed crawl spaces with concrete floors or other floor systems and slab-on-grade dwellings. The following components of a passive subslab depressurization system shall be installed during construction in slab-on-grade dwellings or in dwellings with basements or crawl spaces with concrete or other floor systems.

AF103.4.1 Sub-slab preparation. A layer of gas-permeable material shall be placed under concrete slabs and other floor systems that directly contact the ground and are within the walls of the dwelling.

AF103.4.2 Soil-gas-retarder. A soil-gas-retarder shall be placed on top of the gas permeable layer prior to casting the slab or placing the floor assembly. The soil-gas-retarder shall cover the entire floor area with separate sections lapped not less than 12 inches. The soil-gas-retarder shall fit closely around any, pipe, wire or other penetrations of the material. Punctures or tears in the material shall be sealed or covered.

AF103.4.3 "T" fitting and vent pipe. Before a slab is cast or other floor system is installed, a "T" fitting shall be inserted below the

slab or other floor system and the soil-gas-retarder. The "T" fitting shall be connected to a vent pipe. The vent pipe shall extend through the conditioned space of the dwelling and terminate not less than 12 inches above the roof in a location not less than 10 feet away from any window or other opening into the conditioned spaces of the building that is less than 2 feet below the exhaust point. The vent pipe shall be the same diameter throughout its length and shall be supported in accordance with section P2605. AF103.5 Drain tile and sump used for depressurization. As an alternative to inserting a vent pipe into a "T" fitting, a vent pipe may be inserted directly into an interior perimeter drain tile loop or through a sump cover where the drain tile or sump is exposed to the gas-permeable layer.

AF103.6 Multiple vent pipes. In dwellings where interior footings or other barriers separate the gas-permeable layer, each area shall be fitted with an individual vent pipe. Vent pipes shall connect to a single vent that terminates not less than 12 inches above the roof or each individual vent pipe shall terminate separately not less than 12 inches above the roof. The vent pipe shall be the same diameter throughout its length and shall be supported in accordance with section P2605.

AF103.7 Combination foundations. Where basement or crawl space floors are on different levels, each level shall have a separate vent pipe. Multiple vent pipes may be connected to a single vent pipe that terminates above the roof.

AF103.8 Vent pipe drainage. Components of the radon vent pipe system shall be installed to provide positive drainage to the ground beneath the soil gas-retarder.

AF103.9 Vent pipe identification. Exposed and visible interior vent pipes shall be identified with not less than one label on each floor and in accessible attics. The label shall read: "Radon Reduction Systems."

AF103.10 Power source and access for future radon fan. To provide for future installation of a radon fan, an electrical circuit terminated in an approved box shall be installed during construction in the anticipated location of the radon fans. An accessible clear space 24 inches in diameter by 3 feet in height adjacent to the vent pipe shall be provided at the anticipated location of a future radon fan.

AF104 RADON MITIGATION PREPARATION

AF 104.1 Soil-gas-retarder. A continuous membrane of 6-mil polyethylene or other approved equivalent material used to retard the flow of soil gases into a dwelling shall be installed under the floor slab in accordance with R506.2.3.

AF104.2 "T" fitting and vent pipe. Before a slab is cast or other floor system is installed, a 3-inch "T" fitting shall be inserted beneath the soil-gas-retarder. The "T" fitting shall be surrounded by aggregate consisting of material that will pass through a 2-inch sieve and be retained by a ¾ inch sieve not less than an 8-inch deep by 24-inch diameter hole. The aggregate shall be wrapped in filter fabric or equivalent material. The "T" fitting shall be connected to a 3-inch diameter ABS or PVC gas-tight pipe extending from the basement through the conditioned space of the dwelling and terminate not less than 12 inches above the roof in a location not less than 10 feet away from any window or other opening into the conditioned spaces of the building that is less than 2 feet below the exhaust point. The vent pipe shall be the same diameter throughout its length and shall be supported in accordance with section P2605.

AF104.2.1 Combination foundations. Where basement or crawl space floors are on different levels, each level shall have a separate vent pipe. Multiple vent pipes shall be permitted to be connected to a single vent pipe that terminates above the roof.

AF104.2.2 Drain tile and sump used for depressurization. As an alternative to inserting a vent pipe into a "T" fitting, a vent pipe shall be permitted to be inserted directly into an interior perimeter drain tile loop or through a sump cover.

AF104.3 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 expanding foam applied in accordance with the manufacturer's instructions. In addition, slab joints inclusive of cracks, penetrations, expansion joints and the slab to foundation connections, shall be filled with polyurethane caulk.

AF104.4 Sumps. Sumps open to soil or serving as the termination point for subslab or exterior drain tile loops shall be covered with a gasketed or sealed lid. Sumps used as the suction point in a subslab 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.

AF104.5 Waterproofing and dampproofing. The exterior surfaces of foundation walls below grade shall be waterproofed or dampproofed in accordance with Section R406.

AF104.6 Power source and access for future radon fan. To provide for future installation of a potential radon fan, a ¾ inch electrical compliant conduit from the basement or room or space that the electrical panel is located to the attic shall be installed during construction. This conduit is intended to and dedicated for accommodating electrical wiring should a radon mitigation fan be installed. The conduit shall be capped in both the basement and in the attic. An accessible clear space 24 inches in diameter by 3 feet in height adjacent to the vent pipe shall be provided in the attic or at an acceptable location of a potential radon fan.

AF104.7 Labeling. The ¾ inch electrical conduit shall be labeled at the top and bottom and specifically state: "Reserved for a Potential Radon Reduction Mechanical System". The 3-inch diameter ABS or PVC gas-tight pipe shall be labeled at the bottom and in the attic and shall specifically state: "Reserved for a Potential Radon Reduction Mechanical System".

50. Public Act 16-45 - Concrete Foundation Documentation

Prior to issuing a Certificate of Occupancy for a new building or an addition the Building Official will need to have received a document from the applicant (owner, contractor, etc.), and keep in building files for fifty (50) years, which contains the following information:

- 1.) Name of the concrete supplier
- 2.) Name of the concrete installer

Note: Information is for concrete used in foundations, not for site/hand mixed concrete or minor items like sountubes for decks and the like.

The End