



Hardin County

Planning and Development Commission

Building Code Clarification Handout, October 2014

Crawlspace & Basement Requirements

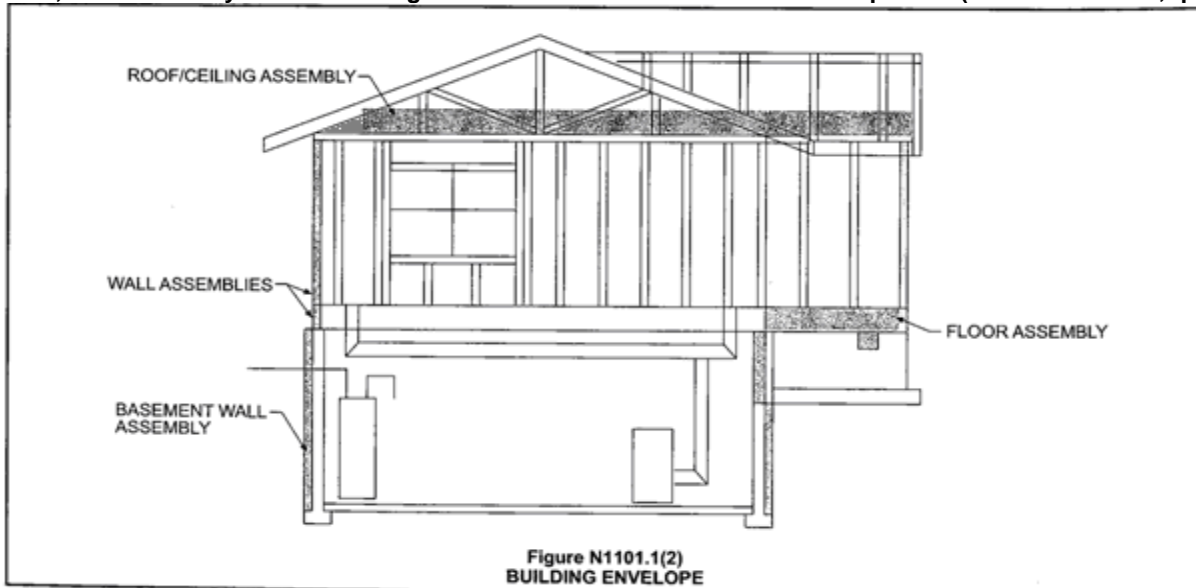
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The following building code requirements are the current minimum code standards, as taken from the IRC Code & Commentary 2012, required for crawlspaces in One and Two family dwellings, and based on Kentucky Amendments to the 2013 Kentucky Residential Code, Second Edition, **February 2014**, Chapter 11, Energy Efficiency.

Disclaimer: This is not a listing of all code sections involving building or utilities which involve this subject, but only the sections most often questioned. Refer to the 2013 Kentucky Residential Code book for information not listed in this handout and for other requirements of the building code.

ENERGY CODE REQUIREMENTS

1. **Location by Climate Zone:** Hardin County per Table N1101.2, and the entire state of Kentucky, is located in Climate Zone 4, the HDD is 4,000 to 4,999.
2. **Chapter 11, Energy Efficiency.** Per N1101.2.1, The energy efficiency for the design and construction of buildings shall comply by either meeting the requirements of the *International Energy Conservation Code* or meeting the requirements of this chapter.
3. **Building Thermal Envelope.** (N1102). The Building Thermal Envelope is the basement walls, exterior walls, floor, roof and any other building element that enclose conditioned spaces. (KRC Definitions, pg. 10).



1. **Insulation and fenestration criteria.** (N1102.1) The building thermal envelope shall meet the requirements of based on Climate Zone 4 as specified in Table N1101.2. The term fenestration refers to opaque doors and the light-transmitting areas of a residential building's wall, floor or roof, generally window, skylight, and non-opaque door products.
2. **Fenestration U-Factor.** (Table N1102.1) Provide Fenestration maximum **U-Factor 0.35. (Effective 1-6-12). The maximum u-factor number approved for windows in heated or cooled buildings cannot be more than U.35. (A U-factor number higher than U.35 is not approvable).**

CRAWLSPACE AREA

1. **Floors of a conditioned space over outdoor air or unconditioned areas.** (Table N1102.1) Minimum insulation required is Floor R-Value **R-19.**

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2. **Basement Walls. (N1102.2.6) Minimum insulation required is R-10 for continuous insulation or R-13 for cavity wall insulation.** Because the rim joist between floors is a part of the building envelope, this must be insulated also if the basement is conditioned, or when the floor is not insulated. Exterior walls associated with conditioned basements shall be insulated from the top of the basement wall down to 10 feet below grade or to the basement floor, whichever is less.
3. **Walls associated with unconditioned basements** shall meet this requirement unless the floor overhead is insulated in accordance with Sections N1102.1 and N1102.2.5. *The last part of this section allows insulating unconditioned basement walls as an alternative to insulating the floors above the unconditioned basement. Although not required, insulating the unconditioned basement walls makes a good deal of sense if a basement is likely to be conditioned at some time after construction. The code does not specify whether the insulation is to be placed on the inside or outside of a basement wall.*
4. **Slab edge width/depth. (Table N1102.1).** Minimum insulation required is **R-4, for a depth of 2 ft.** (Note in Zone 4, for slabs that incorporate heating duct or a pipe, or a heated slab, the minimum insulation required is R-5 for a depth of 2 ft. The required R-value shall extend down to the frost line (24”).
5. **Crawl space wall. (N1102.2.8). As an alternative to insulating floors over crawlspaces, insulation of crawl space walls when the crawl space is not vented to the outside is permitted.** Insulation shall be permanently fastened to the wall & extend downward from the floor to the finished grade level and then vertically and/or horizontally for at least an additional 24 inches. **Minimum insulation required is R-10 for continuous insulation or R-13 for cavity wall insulation.** Exposed earth in unvented crawl space foundations shall be covered with a 6-mil continuous vapor retarder with all joints overlapped by 6 inches and be sealed or taped. The edges of the vapor retarder shall extend at least 6 inches up the stem wall and shall be attached to the stem wall. **To comply with this provision, the crawlspace must be mechanically vented or supplied with conditioned air from the living space. (R408.3).**
6. **Masonry Veneer. (N1102.2.9).** Insulation shall not be required on the horizontal (flat) portion of the foundation that supports a masonry veneer. For slab edge insulation installed on the exterior of the slab, the code allows the insulation to start at the bottom of the masonry veneer and extend downward. *[This is essentially a matter of practicality and accommodates the construction of a “brick ledge” without the need for insulating the foundation at the point where the masonry would bear on it.]*
7. **Protection of foundation insulation. (N1101.6.1).** Insulation applied to the exterior of basement walls, crawlspace walls, and the perimeter of slab-on-grade floors shall have a rigid, opaque and weather resistant protective covering to prevent the degradation of the insulation's thermal performance. The protection shall cover the exposed exterior insulation and shall extend at least 6 inches below finished grade. Plastic foam insulation used below grade shall comply with ASTM C 578.
8. **Sealing Required. (IECC 503.3.3.4.3).** All joints, longitudinal and transverse seams, and connections in ductwork, shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded fabric systems or tapes. **Tapes and mastics used to seal ductwork shall be listed and labeled in accordance with UL 181A or UL 181B.** Duct connections to flanges of air distribution system equipment shall be sealed and mechanically fastened. Unlisted duct tape is not permitted as a sealant on any metal ducts.
9. **Balancing. (IECC 503.3.3.7).** The HVAC system design shall provide means for balancing air and water systems. Balancing mechanisms shall include, but not be limited to, dampers, temperature and pressure test connections, and balancing valves.
10. **Mass Wall. Table (N1102.1.) Minimum insulation required is R-5.**
11. **Certificate Required. (N1101.8)** A permanent certificate shall be posted on or in the electrical distribution panel by the building inspector at time of framing inspection. **It shall be completed by the builder or registered design professional.** The certificate shall list the predominant R-values of insulation installed in or on ceilings/roof, walls, foundation (slab, basement wall, crawlspace wall and/or floor) and ducts outside conditioned spaces; and U-factors for fenestration. Where there is more than one value for each component, list the value covering the largest area. The certificate shall list the type and efficiency of heating, cooling, and service water heating equipment. *The certificate is meant to provide the housing owner, occupant, or buyer with a simple-to-understand overview of the home's energy efficiency.* When calculating the energy efficiency obtain the equivalent U-factors in Table N1102.1.2

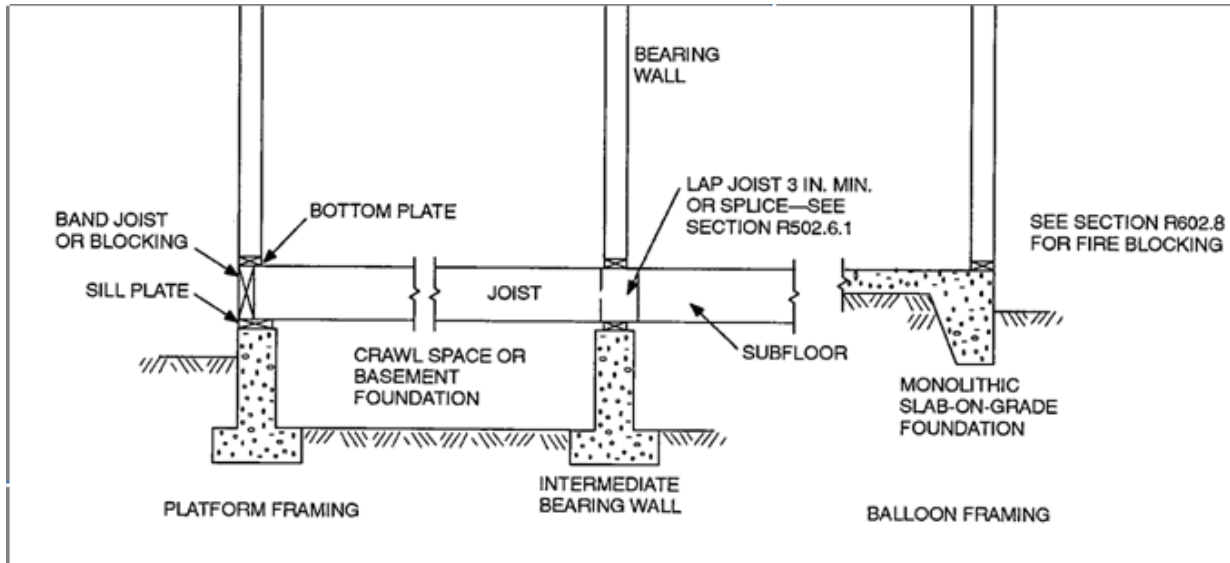
BUILDING CODE REQUIREMENTS:
Under-Floor Space.

1. **Access Opening. (R408.4).** Provide an access opening 18 inches by 24 inches to the under-floor space. See Section M306.4 for access requirements where mechanical equipment is located under floors. Under floor spaces containing appliances requiring access shall be provided with an access opening and unobstructed passageway large enough to remove the largest appliance.

Hardin County, KY	
Insulation Values in Home	
Climate Zone 4	
Date:	
LOCATION	INSTALLED VALUE
FENESTRATION U-FACTOR	
SKYLIGHT U-FACTOR	
GLAZED FENESTRATION SHGC	
CEILING R-FACTOR	
WOOD FRAME R-FACTOR	
MASS WALL R-VALUE	
FLOOR R-VALUE	
BASEMENT WALL R-VALUE	
SLAB R-VALUE	
SLAB DEPTH IN FEET	
CRAWL SPACE R-VALUE	
TYPE & EFFICIENCY OF HEATING SYSTEM	
TYPE & EFFICIENCY OF HOT WATER HEATER	
GENERAL CONTRACTOR	
INSULATION CONTRACTOR	
FORM COMPLETED BY	

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- 2. **Removal of debris. (R408.5)** The under floor grade shall be cleaned of all vegetation and organic material. All wood forms used for placing concrete shall be removed before a building is occupied for any purpose. All construction materials shall be removed before a building occupied or used for any purpose.
- 3. **Finished grade. (R408.6)** The finished grade of under floor surface may be located at the bottom of the footings; however, where there is evidence that the groundwater table can rise to within 6 inches of the finished floor at the building perimeter or where there is evidence that the surface water does not readily drain from the building site, the grade in the under floor space shall be as high as the outside finished grade, unless an approved drainage system is provided.
- 4. **Required Ground Clearance. (R319.1)** Maintain required ground clearance of 12" minimum below beams and girders and 18" minimum below floor joists and the wood structural floor.



- 5. **Ventilation. (R408.1)** The under-floor space between the bottom of the floor joists and the earth under any building (except space occupied by a basement or cellar) shall be provided with ventilation openings through foundation walls or exterior walls. **The minimum net area of ventilation openings shall not be less than 1 square foot for each 150 square feet of under-floor space area. One such ventilating opening shall be within 3 feet of each corner of said building.**



Ventilation openings shall be covered for their height and width with any of the following materials provided that the least dimension of the covering shall not exceed 1/4": perforated sheet metal plates, expanded sheet metal plates, cast-iron grill or grating, extruded load-bearing brick vents, hardware cloth, corrosion resistant wire mesh.

Exception.

- a. The total area of ventilation openings may be reduced to 1/1,500 of the under-floor area where the ground surface is treated with an approved vapor retarder material (e.g. 6 mil poly) and the required openings are placed so as to provide cross ventilation of the space. The installation of operable louvers shall not be prohibited. (R408.1)
- b. Ventilation openings are not required where continuously operated mechanical ventilation is provided at a rate of 1.0 cfm for each 50 square feet of under floor space floor area and ground is covered with an approved vapor retarder material. (R408.2).
- c. **Unvented Crawl Spaces. (R408.3)** Ventilation openings are not required where:

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1. The exposed earth is covered with a 6-mil continuous vapor retarder with all joints overlapped by 6 inches and at shall be sealed or taped. The edges of the vapor retarder shall extend at least 6 inches up the stem wall and shall be attached to the stem wall; AND
2. One of the following is provided for the under-floor space:
 - 2.1. Continuously operated mechanical exhaust ventilation at a rate equal to 1 cfm for each 50 square feet of crawlspace floor area, including an air pathway to the common area (such as a duct or transfer grille), and perimeter walls are insulated in accordance with Section N1102.2.8.;
 - 2.2. Conditioned air supply sized to deliver at a rate equal to 1 cfm for each 50 square feet of under-floor area, including a return air pathway to the common area (such as a duct or transfer grille), and perimeter walls are insulated in accordance with Section N1102.2.8;
 - 2.3. Plenum complying with Section M1601.4, if under-floor space is used as a plenum.