



Montgomery County Building Regulations

FORM 2: 2013 RESIDENTIAL CODE OF OHIO SECTIONS 1101 THROUGH 1104 SUMMARY

Based upon 2013 RCO, Sections 1101-1104, Zone 5 Requirements, and the International Energy Conservation Code

Job address _____ Date _____

Building Envelope Requirements									
Zone	Maximum		Minimum Insulation R-Value						
	Window and Glass Door U-Factor ⁴	Skylight Glazing U-Factor	Ceiling ⁹	Wood Frame Wall	Mass Wall ⁵	Floor ⁸	Basement Wall ^{6,7}	Slab Perimeter ³	Crawlspace Wall ^{2,6}
5	.35	.60	R-38	R-20 or R-13 + 5 ¹	R-13/17	R-30	R-10 / 13	R-10 / 15	R-10 / 13
Thermally Isolated Sunrooms (greater than 40% glazing). ^{10,11}									
5	.50	.75	R-24	R-13	R-13	R-30	R-10 / 13	R-10 / 15	R-10 / 13

1. Exterior wall R-value includes insulation in wall and exterior continuous sheathing. "13+5" means R-13 cavity insulation plus R-5 insulated sheathing. If structural sheathing covers 25 percent or less of the exterior, insulating sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2. Make sure the structure is capable of being insulated per this table and show the required R-values on the construction documents. For example, 2x4 walls will not hold R-19 batt insulation. Submit manufacturer's insulation R-values for the sheathing if this option is used. R-19 batt compressed into a 2x6 wall shall have a compressed rating of R-18
2. Per 1102.2.9: As an alternative to insulating floors over crawl spaces, crawl space walls shall be permitted to be insulated when the crawl space is not vented to the outside. Crawl space wall insulation shall be permanently fastened to the wall and extend downward from the floor to the finished grade level and then vertically and/or horizontally for at least an additional 24 inches (610 mm). Exposed earth in unvented crawl space foundations shall be covered with a continuous vapor retarder. All joints of the vapor retarder shall overlap 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.
3. Slab perimeter insulation depth is 2 feet minimum, from the top of the slab. Use R-15 for heated slabs. A heated slab is defined as a slab-on-grade construction in which the heating elements, hydronic tubing, or hot air distribution system is in contact with, or placed within or under the slab.
4. Submit documentation from the manufacturer to verify window and glass door U-factors.
5. Mass walls for the purposes of this form shall be considered walls of concrete block, concrete, insulated concrete form (ICF), masonry cavity, brick (other than brick veneer), earth (adobe, compressed earth block, rammed earth) and solid timber/logs. The second R-value applies when more than half the insulation is on the interior of the mass wall.
6. The first R-value applies to continuous insulation, the second to framing cavity insulation; either insulation meets the requirement.
7. 1102.2.7 Basement walls. Exterior walls associated with conditioned basements shall be insulated from the top of the basement wall down to 10 feet (3048 mm) below grade or to the basement floor, whichever is less. Walls associated with unconditioned basements shall meet this requirement unless the floor overhead is insulated in accordance with Sections 1102.1 and 1102.2.6.
8. May be less than R-30 if floor joist depth is insufficient, but must completely fill the framing cavity. R-19 minimum. Floor insulation shall be installed to maintain permanent contact with the underside of the subfloor decking.
9. Per 1102.2.1 in ceilings with attic spaces, R-30 shall be deemed to satisfy the requirement for R-38 wherever the full height of uncompressed R-30 insulation extends over the wall top plate at the eaves. Per 1102.2.2 in ceilings without attic spaces, when 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 of insulation from the requirements shall be limited to 500 sq. ft. of ceiling area or twenty per cent of the total insulated ceiling area, whichever is less.
10. Per 1102.2.11, when using the >40% category the sunroom must be thermally isolated from the rest of the house. New walls, doors and windows separating the sunroom from the conditioned space shall meet the building thermal envelope requirements.
11. Sunroom glazing determination. Use this formula only if using sunroom requirements. Determine percent of glass in the exterior wall envelope:

A = Gross exterior wall area, including window and door rough openings. A = _____ Sq. Ft.

B = Total area of windows, skylights and glass doors rough openings. B = _____ Sq. Ft.

Formula to determine percent of window area = $(B \div A) \times 100$

$$B \text{ _____ } \div A \text{ _____ } = \text{ _____ } \times 100 = \text{ _____ } \%$$

Example: 300 ÷ 600 = .5 x 100 = 50 %

Summary of additional requirements:

1102.2.3 Access hatches and doors. Access doors from conditioned spaces to unconditioned spaces (e.g., attics and crawl spaces) shall be weatherstripped and insulated to a level equivalent to the insulation on the surrounding surfaces. Access shall be provided to all equipment, which prevents damaging or compressing the insulation. A wood framed or equivalent baffle or retainer is required to be provided when loose fill insulation is installed, the purpose of which is to prevent the loose fill insulation from spilling into the living space when the attic access is opened and to provide a permanent means of maintaining the installed R-value of the loose fill insulation.

1102.2.8 Slab-on-grade floors. Slab-on-grade floors with a floor surface less than 12 inches below grade shall be insulated in accordance with Table 1102.1. The insulation shall extend downward from the top of the slab on the outside or inside of the foundation wall. Insulation located below grade shall be extended the distance provided in Table 1102.1 by any combination of vertical insulation, insulation extending under the slab or insulation extending out from the building. Insulation extending away from the building shall be protected by pavement or by a minimum of 10 inches (254 mm) of soil. The top edge of the insulation installed between the exterior wall and the edge of the interior slab shall be permitted to be cut at a 45-degree (0.79 rad) angle away from the exterior wall.

1102.4.1 The building thermal envelope shall be durably sealed to limit infiltration. Including all joints and penetrations, site build window doors and skylights, openings between window and door assemblies, utility penetrations, dropped ceiling and chases adjacent to the thermal envelope, knee walls, walls and ceilings separating garage from conditioned spaces, behind tubs and showers on exterior walls, common walls between dwelling units, attic access openings, rim joist junctions and other sources of leakage.

1102.4.2 Air sealing and insulation. Building envelope air tightness and insulation installation shall be demonstrated to comply with one of the following options given by Section 1102.4.2.1 or 1102.4.2.2.

1102.4.2.1 Testing option. Tested air leakage is less than 7 ACH when tested with a blower door at a pressure of 50 pascals (0.007 psi). Testing shall occur after rough in and after installation of penetrations of the building envelope, including penetrations for utilities, plumbing, electrical, ventilation and combustion appliances.

1102.4.2.2 Visual inspection option. The items listed in Table 1102.4.2, applicable to the method of construction, are field verified.

1102.4.3 Fireplaces. New wood-burning fireplaces shall have gasketed doors and outdoor combustion air.

1102.4.5 Recessed lighting. Recessed luminaires installed in the building thermal envelope shall be sealed to limit air leakage between conditioned and unconditioned spaces. All recessed luminaires shall be IC-rated and labeled as meeting ASTM E 283 when tested at 1.57 psi pressure differential with no more than 2.0 cfm of air movement from the conditioned space to the ceiling cavity. All recessed luminaires shall be sealed with a gasket or caulk between the housing and the interior wall or ceiling covering.

1103.1.1 Programmable thermostat. Where the primary heating system is a forced air furnace, at least one thermostat per dwelling unit shall be capable of controlling the heating and cooling system on a daily schedule to maintain different temperature set points at different times of the day. This thermostat shall include the capability to set back or temporarily operate the system to maintain zone temperatures down to 55°F or up to 85°F. The thermostat shall initially be programmed with a heating temperature set point no higher than 70°F and a cooling temperature set point no lower than 78°F.

1103.1.2 Heat pump supplementary heat. Heat pumps having supplementary electric-resistance heat shall have controls that, except during defrost, prevent supplemental heat operation when the heat pump compressor can meet the heating load.

1103.2.1 Duct Insulation. Supply ducts in attics shall be insulated to a minimum of R-8. All other ducts shall be insulated to a minimum of R-6. Exception: Ducts or portions thereof located completely inside the building thermal envelope.

1103.2.2 Sealing. Ducts, air handlers, filter boxes and building cavities used as ducts shall be sealed. Joints and seams shall comply with Section M1601.4. Duct tightness shall be verified by either of the following where outside the insulated envelope:

1. Post-construction test: Leakage to outdoors shall be less than or equal to 8 cfm per 100 ft² of conditioned floor area or a total leakage less than or equal to 12 cfm per 100 ft² of conditioned floor area when tested at a pressure differential of 0.1 inch w.g. across the entire system, including the manufacturer's air handler end closure. 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 6 cfm per 100 ft² of conditioned floor area when tested at a pressure differential of 0.1 inch w.g. across the roughed in system, including the manufacturer's air handler enclosure. All register boots 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 4 cfm per 100 ft² of conditioned floor area.

1103.2.3 Building cavities. Building framing cavities shall not be used as supply ducts.

1103.3 Mechanical system piping insulation. Mechanical system piping capable of carrying fluids above 105°F or below 55°F shall be insulated to a minimum of R-3.

1103.4 Circulating hot water systems. All circulating service hot water piping shall be insulated to at least R-2. Circulating hot water systems shall include an automatic or readily accessible manual switch that can turn off the hot water circulating pump when the system is not in use.

1103.5 Mechanical ventilation. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.

1103.7 Snow melt system controls. Snow-and ice-melting systems supplied through energy service to the building shall include automatic controls capable of shutting off the system when the pavement temperature is above 50°F and no precipitation is falling and an automatic or manual control that will allow shutoff when the outdoor temperature is above 40°F.

1104.1 Lighting equipment. A minimum of 50 percent of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps.