## CHAPTER 1 [CE]
## SCOPE AND ADMINSTRATION

## SECTION C101
## SCOPE AND GENERAL REQUIREMENTS

**C101.1 Title.** This code shall be known as the *Illinois Energy Conservation Code* or "this Code" and shall mean:

With respect to the State facilities covered by 71 Ill. Adm. Code 600.Subpart B:

This Part, all additional requirements incorporated within Subpart B (including the 2018 International Energy Conservation Code, including all published errata but excluding published supplements that encompass ASHRAE 90.1-2016), and any statutorily authorized adaptations to the incorporated standards adopted by CDB are effective July 1, 2019.

With respect to the privately funded commercial facilities covered by 71 Ill. Adm. Code 600.Subpart C:

This Part, all additional requirements incorporated within Subpart C (including the 2018 International Energy Conservation Code, including all published errata and excluding published supplements that encompass ASHRAE 90.1-2016), and any statutorily authorized adaptations to the incorporated standards adopted by CDB, are effective July 1, 2019.

**C101.1.2 Adoption.** The Board shall adopt amendments to this Code within 12 months after publication of changes to the International Energy Conservation Code. Any such update in this Code shall take effect within 6 months after it is adopted by the Board and shall apply to any new building or structure in this State for which a building permit application is received by a municipality or county, except as otherwise provided by the EEB Act.

**C101.1.3 Adaptation.** The Board may appropriately adapt the International Energy Conservation Code to apply to the particular economy, population, distribution, geography and climate of the Sate and construction within the State, consistent with the public policy objectives of the EEB Act.

**C101.5 Compliance.** *Commercial buildings* shall meet the provisions of the *Illinois Energy Conservation Code* covered by 71 Ill. Adm. Code 600.Subpart C. The local authority having jurisdiction (AHJ) shall establish its own procedures for enforcement of the Illinois Energy Conservation Code. Minimum compliance shall be demonstrated by submission of:

1. Compliance forms published in the ASHRAE 90.1 User's Manual; or
2. Compliance Certificates generated by the U.S. Department of Energy's COMcheck™ Code compliance tool; or
3. Other comparable compliance materials that meet or exceed, as determined by the AHJ, the compliance forms published in the ASHRAE 90.1 User's Manual or the U.S. Department of Energy's COMcheck™ Code compliance tool; or
4. The seal of the architect/engineer as required by Section 14 of the Illinois Architectural Practice Act [225 ILCS 305], Section 12 of the Structural Engineering Licensing Act [225 ILCS 340] and Section 14 of the Illinois Professional Engineering Practice Act [225 ILCS 325].

## SECTION C102
## ALTERNATIVE MATERIALS, DESIGN AND METHODS OF CONSTRUCTION AND EQUIPMENT

**C102.1.1 Above code program.** No unit of local government, including any home rule unit, may apply energy efficient building standards to privately funded commercial facilities in a manner that is less stringent than the Code as described in 71 Ill. Adm. Code 600. Subpart C. However, nothing in the EEB Act or Subpart C prevents a unit of local government from adopting an energy efficiency code or standards that are more stringent than this Code. The requirements identified as "mandatory" in Chapter 4 shall be met.

### SECTION C109
### BOARD OF APPEALS

**C109.1 General.** In order to hear and decide appeals of orders, decisions or determinations made by the *code official* relative to the application and interpretation of this Code, there may be created a board of appeals. The *code official* shall be an ex officio member of the board of appeals but shall not have a vote on any matter before the board. The board of appeals shall be appointed by the governing body and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business, and shall render all decisions and findings in writing to the appellant with a duplicate copy to the *code official.*

**C109.3 Qualifications.** The board of appeals shall consist of members who are qualified by experience and training.

## CHAPTER 2 [CE]
## DEFINITIONS

## SECTION C202
## GENERAL DEFINITIONS

**ADD THE FOLLOWING Definitions:**

**AUTHORITY HAVING JURISDICTION or AHJ.** The organization, officer or individual responsible for approving equipment, materials, an installation or procedure.

**BOARD.** The Illinois Capital Development Board.

**COUNCIL.** The Illinois Energy Conservation Advisory Council whose purpose is to recommend modifications to the *Illinois Energy Conservation Code.*

**EEB ACT.** The Energy Efficient Building Act [20ILCS 3125].

**ROOF MEMBRANE PEEL AND REPLACEMENT.** Where an existing weather resisting roof membrane alone is removed, exposing insulation or sheathing and only a new weather resisting roof membrane is installed.

## CHAPTER 4 [CE]
## COMMERCIAL ENERGY EFFICIENCY

## SECTION C402
## BUILDING ENVELOPE REQUIREMENTS

**C402.5.1 Air barriers.** A continuous air barrier shall be provided throughout the building thermal envelope. The air barriers shall be permitted to be located on the inside or outside of the building envelope, located within the assemblies composing the envelope, or any combination thereof. The air barrier shall comply with

Sections C402.5.1.1 and C402.5.1.2. For roof air barriers on existing buildings, refer to Section C503.1 or C504.2.

**Exception:** Air barriers are not required in buildings located in *Climate Zone* 2B.

**C402.5.1.1 Air barrier construction.** The *continuous air barrier* shall be constructed to comply with the following:

1. The air barrier shall be continuous for all assemblies that are the thermal envelope of the building and across the joints and assemblies.

2. Air barrier joints and seams shall be sealed, including sealing transitions at joints between dissimilar materials. The joints and seals shall be securely installed in or on the joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to resist positive and negative pressure from wind, stack effect and mechanical ventilation.

3. Penetrations of the air barrier shall be caulked, gasketed or otherwise sealed in a manner compatible with the construction materials and location. Sealing shall allow for expansion, contraction and mechanical vibration. Paths for air leakage from the building to the space between the roof deck and roof covering used as an air barrier, shall be caulked, gasketed or otherwise covered with a moisture vapor-permeable material. Joints and seams associated with penetrations shall be sealed in the same manner or taped. Sealing materials shall be securely installed around the penetration so as not to dislodge, loosen or otherwise impair the penetrations' ability to resist positive and negative pressure from wind, stack effect and mechanical ventilation. Sealing of concealed fire sprinklers, where required, shall be in a manner that is recommended by the manufacturer. Caulking or other adhesive sealants shall not be used to fill voids between fire sprinkler cover plates and walls or ceilings.

4. Recessed lighting fixtures shall comply with Section C402.5.8. Where similar objects are installed that penetrate the air barrier, provisions shall be made to maintain the integrity of the air barrier.

## SECTION C405
## ELECTRICAL POWER AND LIGHTING SYSTEMS

**C405.1 General (Mandatory).** This section covers lighting system controls, the maximum lighting power for interior and exterior applications and electrical energy consumption.

No less than 90% of the permanently installed lighting serving *dwelling units* shall be provided by lamps with an efficacy of not less than 65 lm/W or light fixtures with an efficacy of not less than 55 lm/W, or with Sections C405.2.4 and C405.3. *Sleeping units* shall comply with Section C405.2.4, and with Section R404.1 or C405.3. Lighting installed in walk-in coolers, walk-in freezers, refrigerated warehouse coolers and refrigerated warehouse freezers shall comply with the lighting requirements of Section C403.10.1 or C403.10.2.

## CHAPTER 5 [CE] EXISTING BUILDINGS

### SECTION C503
### ALTERATIONS

**C503.1 General.** *Alterations* to any *building* or structure shall comply with the requirements of Section C503 and the code for new construction. *Alterations* shall be such that the existing *building* or structure is not less conforming to the provisions of this code than the existing *building* or structure was prior to the *alteration*. *Alterations* to an existing *building, building* system or portion thereof shall conform to the provisions of this code as those provisions relate to new construction without requiring the unaltered portions of the existing *building* or *building* system to comply with this code. *Alterations* shall not create an unsafe or hazardous condition or overload existing *building* systems.

*Alterations* complying with ANSI/ASHRAE/IESNA 90.1. need not comply with Sections C402, C403, C404 and C405.

**Exceptions:** The following *alterations* need not comply with the requirements for new construction, provided the energy use of the building is not increased:

1. Storm windows installed over existing *fenestration.*

2. Surface-applied window film installed on existing single-pane *fenestration* assemblies reducing solar heat gain, provided the code does not require the glazing or *fenestration* to be replaced.

3. Existing ceiling, wall or floor cavities exposed during construction, provided that these cavities are filled with insulation.

4. Construction where the existing roof, wall or floor cavity is not exposed.

5. *Roof recover.*

6. *Roof Membrane Peel and Replacement*

7. *Air barriers* shall not be required for *roof recover* and roof replacement where the *alterations* or renovations to the *building* do not include *alterations*, renovations or *repairs* to the remainder of the building envelope.

8. Roof replacements for roof systems 2:12 slope or less shall comply with the low slope roof insulation requirements unless the installation of insulation above the structural roof deck, and necessary to achieve the code-required R-Value, is deemed infeasible by the code official to accommodate the added thickness of insulation above the roof deck. Conditions of infeasibility due to flashing heights presented by existing rooftop conditions include, but are not limited to, HVAC or skylight curb, low door or glazing, parapet, weep holes, drainage patterns, cricket or saddle construction. These conditions are subject to manufacturer's specifications, manufacturers installation instructions and code official approval.

## CHAPTER 1 [RE]
## SCOPE AND ADMINISTRATION

### SECTION R101
### SCOPE AND GENERAL REQUIREMENTS

**R101.1 Title.** This code shall be known as the *Illinois Energy Conservation Code* or "this Code", and shall mean:

With respect to the residential buildings covered by 71 Ill. Adm. Code 600.Subpart D:

This Part, all additional requirements incorporated within Subpart D (including the 2018 International Energy Conservation Code, including all published errata but excluding published supplements) and any statutorily authorized adaptations to the incorporated standards adopted by CDB is effective July 1, 2019).

**R101.1.2 Adoption.** The Board shall adopt amendments to this Code within 12 months after publication of changes to the International Energy Conservation Code. Any such update in this Code shall take effect within 6 months after it is adopted by the Board and shall apply to any new building or structure in this State for which a building permit application is received by a municipality or county, except as otherwise provided by the EEB Act.

**R101.1.3 Adaptation.** The Board may appropriately adapt the International Energy Conservation Code to apply to the particular economy, population distribution, geography, and climate of the State and construction within the State, consistent with the public policy objectives of the EEB Act.

**R101.5 Compliance.** *Residential buildings* shall meet the provisions of the *Illinois Energy Conservation Code* covered by 71 Ill. Adm. Code 600. Subpart D. The local authority having jurisdiction (AHJ) shall establish its own procedures for enforcement of the Illinois Energy Conservation Code. Minimum compliance shall be demonstrated by submission of:

1. Compliance Certificates generated by the U.S. Department of Energy's REScheck™ code compliance tool; or

2. Other comparable compliance materials that meet or exceed, as determined by the AHJ, the U.S. Department of Energy's REScheck™ code compliance tool; or

3. The seal of the architect/engineer as required by Section 14 of the Illinois Architectural Practice Act [225 ILCS 305], Section 12 of the Structural Engineering Licensing Act [225 ILCS 340] and Section 14 of the Illinois Professional Engineering Practice Act [225 ILCS 325]

### SECTION R102
### ALTERNATIVE MATERIALS, DESIGN AND METHODS OF CONSTRUCTION AND EQUIPMENT

**R102.1.1 Above code programs.** No unit of local government, including any home rule unit, may regulate energy efficient building standards for residential building in a manner that is either less or more stringent than the standards established pursuant to this Code. The requirements identified as "mandatory" in Chapter 4 shall be met.

However, the following entities may regulate energy efficient building standards for residential buildings in a manner that is more stringent than the provisions contained in this Code:

i) A unit of local government, including a home rule unit, that has, on or before May 15, 2009, adopted or incorporated by reference energy efficient building standards for residential buildings that are equivalent to or more stringent than the 2006 International Energy Conservation Code;

ii) A unit of local government, including a home rule unit that has, on or before May 15, 2009, provided to the Capital Development Board, as required by Section

10.18 of the Capital Development Board Act, an identification of an energy efficient building code or amendment that is equivalent to or more stringent than the 2006 International Energy Conservation Code; and

iii) A municipality with a population of 1,000,000 or more.

## SECTION R109
## BOARD OF APPEALS

**R109.1 General.** In order to hear and decide appeals of orders, decisions or determinations made by the *code official* relative to the application and interpretation of this code, there may be created a board of appeals. The *code official* shall be an ex officio member of the board of appeals but shall not have a vote on any matter before the board. The board of appeals shall be appointed by the governing body and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business, and shall render all decisions and findings in writing to the appellant with a duplicate copy to the *code official.*

**R109.3 Qualifications.** The board of appeals shall consist of members who are qualified by experience and training.

## CHAPTER 2 [RE] DEFINITIONS

## SECTION R202
## GENERAL DEFINITIONS

**ADD THE FOLLOWING Definitions:**

**AUTHORITY HAVING JURISDICTION or AHJ.** The organization, officer or individual responsible for approving equipment, materials, an installation or procedure.

**BOARD.** T he Illinois Capital Development Board.

**COUNCIL.** The Illinois Energy Conservation Advisory Council whose purpose is to recommend modifications to the *Illinois Energy Conservation Code.*

**EEB ACT.** The Energy Efficient Building Act [20ILCS 3125].

**HIGH-EFFICACY LAMPS.** Compact fluorescent lamps, light-emitting diode (LED) lamps, T-8 or smaller diameter linear fluorescent lamps, or other lamps with an efficacy of not less than 65 lumens per watt or light fixtures of not less than 55 lumens per watt.

**LOCAL EXHAUST.** An exhaust system that uses one or more fans to exhaust air from a specific room or rooms within a dwelling.

**RESIDENTIAL BUILDING.** Means a detached one-family or two-family dwelling or any building that is three stories or less in height above grade that contains multiple dwelling units, in which the occupants reside on a primarily permanent basis, such as a townhouse, a row house, an apartment house, a convent, a monastery, a rectory, a fraternity or sorority house, a dormitory, and a rooming house; provided, however, that when applied to a building located within the boundaries of a municipality having a population of 1,000,000 or more, the term "RESIDENTIAL BUILDING" means a building containing one or more dwelling units, not exceeding four (4) stories above grade, where occupants are primarily permanent.

**ROOF MEMBRANE PEEL AND REPLACEMENT.** Where an existing weather resisting roof membrane alone is removed, exposing insulation or sheathing and only a new weather resisting roof membrane is installed.

**WHOLE HOUSE MECHANICAL VENTILATION SYSTEM.** An exhaust system, supply system, or combination thereof that is designed in accordance with Section R403.6 to mechanically exchange indoor air with outdoor air when operating continuously or through a programmed intermittent schedule to satisfy the whole house ventilation rate. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.

## CHAPTER 4 [RE] RESIDENTIAL ENERGY EFFICIENCY

## SECTION R402 BUILDING THERMAL ENVELOPE

### TABLE R402.1.2
### INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

| CLIMATE ZONE | FENESTRATION *U*-FACTOR[b] | SKYLIGHT[b] *U*-FACTOR | GLAZED FENESTRATION SHGC[b,e] | CEILING *R*-VALUE | WOOD FRAME WALL *R*-VALUE | MASS WALL *R*-VALUE[i] | FLOOR *R*-VALUE | BASEMENT[c] WALL *R*-VALUE | SLAB[d] *R*-VALUE & DEPTH | CRAWL SPACE[c] WALL *R*- |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | NR | 0.75 | 0.25 | 30 | 13 | 3/4 | 13 | 0 | 0 | 0 |
| 2 | 0.40 | 0.65 | 0.25 | 38 | 13 | 4/6 | 13 | 0 | 0 | 0 |
| 3 | 0.32 | 0.55 | 0.25 | 38 | 20 or 13+5[h] | 8/13 | 19 | 5/13[f] | 0 | 5/13 |
| 4 except Marine | 0.32 | 0.55 | 0.40 | 49 | 20 or 13+5[h] | 8/13 | 19 | 10/13 | 10, 2 ft | 10/13 |
| 5 and Marine 4 | 0.30 | 0.55 | NR | 49 | 20 or 13+5[h] | 13/17 | 30[g] | 10/13 | 10, 2 ft | 15/19 |
| 6 | 0.30 | 0.55 | NR | 49 | 20+5 or 13+10[h] | 15/20 | 30[g] | 15/19 | 10, 4 ft | 15/19 |
| 7 and 8 | 0.30 | 0.55 | NR | 49 | 20+5 or 13+10[h] | 19/21 | 38[g] | 15/19 | 10, 4 ft | 15/19 |

NR = Not Required
For SI: 1 foot = 304.8 mm

[a] *R*-values are minimums. *U*-factors and SHGC are maximums. Where insulation is installed in a cavity that is less than the label or design thickness of the insulation, the installed *R*-value of the insulation shall not be less than the *R*-value specified in the table.

[b] The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration. **Exception**: In Climate Zones 1 through 3, skylights shall permitted to be excluded from glazed fenestration SHGC requirements provided that the SHGC for such skylights does not exceed 0.30.

[c] "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.
"15/19" means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. Alternatively, compliance with "15/19" shall be R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home.

[d] R-5 insulation shall be provided under the full slab area of a heated slab in addition to the required slab edge insulation *R*-value for slabs, as indicated in the table. The slab edge insulation for heated slabs shall not be required to extend below the slab.

[e] There are no SHGC requirements in the Marine Zone.

[f] Basement wall insulation is not required in warm-humid locations as defined by Figure R301.1 and Table R301.1.

[g] Alternatively, insulation sufficient to fill the framing cavity and providing not less than an *R*-value of R-19.

[h] The first value is cavity insulation, the second value is continuous insulation. Therefore, as an example, "13+5" means *R*-13 cavity insulation plus *R*-5 continuous insulation.

[i] Mass walls shall be in accordance with Section R402.2.5. The second *R*-value applies when more than half the insulation is on the interior of the mass wall.

**TABLE R402.1.4**
**EQUIVALENT U-FACTORS[a]**

| CLIMATE ZONE | FENES-TRATION *U*-FACTOR | SKYLIGHT *U*-FACTOR | CEILING *U*-FACTOR | FRAME WALL *U*-FACTOR | MASS WALL *U*-FACTOR[b] | FLOOR *U*-FACTOR | BASEMENT WALL *U*-FACTOR | CRAWL SPACE WALL *U*-FACTOR |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.50 | 0.75 | 0.035 | 0.084 | 0.197 | 0.064 | 0.360 | 0.477 |
| 2 | 0.40 | 0.65 | 0.030 | 0.084 | 0.165 | 0.064 | 0.360 | 0.477 |
| 3 | 0.32 | 0.55 | 0.030 | 0.060 | 0.098 | 0.047 | 0.091[c] | 0.136 |
| 4 except Marine | 0.32 | 0.55 | 0.026 | 0.060 | 0.098 | 0.047 | 0.059 | 0.065 |
| 5 and Marine 4 | 0.30 | 0.55 | 0.026 | 0.060 | 0.082 | 0.033 | 0.059 | 0.055 |
| 6 | 0.30 | 0.55 | 0.026 | 0.045 | 0.060 | 0.033 | 0.050 | 0.055 |
| 7 and 8 | 0.30 | 0.55 | 0.026 | 0.045 | 0.057 | 0.028 | 0.050 | 0.055 |

[a] Nonfenestration U-factors shall be obtained from measurement, calculation or an approved source.

[b] Mass walls shall be in accordance with Section R402.2.5. When more than half the insulation is on the interior, the mass wall U-factors shall not exceed 0.17 in Climate Zone 1, 0.14 in Climate Zone 2, 0.12 in Climate Zone 3, 0.87 in Climate Zone 4 except Marine, 0.065 in Climate Zone 5 and Marine 4, and 0.057 in Climate Zones 6 through 8.

[c] In warm-humid locations as defined by Figure R301.1 and Table R301.1, the basement wall *U*-factor of 0.360

**R402.2.2 Ceilings without attic spaces.** Where Section R402.1.2 requires insulation *R*-values greater than R-30 in the ceiling and the design of the roof/ceiling assembly does not allow sufficient space for the required insulation, the minimum required insulation *R*-value for such roof/ceiling assemblies shall be R-30. Insulation shall extend over the top of the wall plate to the outer edge of such plate and shall not be compressed. This reduction of insulation from the requirements of Section R402.1.2 shall be limited to 500 square feet (46 $m^2$) or 20 percent of the total insulated ceiling area, whichever is less. This reduction shall not apply to the *U*-factor alternative approach in Section R402.1.4 and the Total UA alternative in Section R402.1.5.

**Exception:**

For roofs on existing buildings with slope less than 2 units vertical in 12 units horizontal (2:12), refer to Section R503.1.1.

**R402.2.9 Basement walls.** 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 within six-inches (152 mm) of the basement floor, whichever is less. Walls associated with unconditioned basements shall comply with this requirement except where the floor overhead is insulated in accordance with Sections R402.1.2 and R402.2.8.

**Exception:** Walls associated with conditioned basements may be insulated from the top of the *basement wall* down to 4 feet (1219 mm) below

grade when the Basement Wall R-value is at least 15/19, (Basement Wall U-Factor of 0.050).

**R402.4.1.2 Testing**. The *building* or *dwelling unit* shall be tested and verified as having an air leakage rate of not exceeding ~~five~~ four air changes per hour (ACH) in *Climate Zones* 4 and 5. The building or dwelling unit shall be provided with a whole – house mechanical ventilation system as designed in accordance with Section R403.6. Testing shall be conducted in accordance with RESNET/ICC 380, ASTM E779 or ASTM E1827 and reported at a pressure of 0.2 inches w.g. (50 Pascals). Where required by the *code official*, testing shall be conducted by an *approved* third party. A written report of the results of the test, indicating the ACH, 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* have been sealed.

**Exceptions:**

1. For *additions*, *alterations*, renovations or *repairs* to existing buildings, building envelope tightness and insulation installation shall be considered acceptable when the items in Table R402.4.1.1, applicable to the method of construction, are field verified. Where required by the *code official*, an *approved* third party independent from the installer, shall inspect both air barrier and insulation installation criteria.

2. For heated attached private garages and heated detached private garages accessory to one- and two-family dwellings and townhouses not more than three stories above grade plane in height, building envelope tightness and insulation installation shall be considered acceptable when the items in Table R402.4.1.1, applicable to the method of construction, are field verified. Where required by the *code official*, an *approved* third party independent from the installer, shall inspect both air barrier and insulation installation criteria. Heated attached private garage space and heated detached private garage space shall be thermally isolated from all other habitable, conditioned spaces.

3. For low-rise multifamily buildings, *dwelling units* shall be tested and verified as having a leakage rate of not exceeding 0.25 cubic feet per minute (CFM) per square foot of enclosure area (all six sides of the dwelling unit) in *Climate Zones* 1 through 8. Testing shall be conducted with an unguarded blower door at a pressure of 0.2 inches w.g. (50 Pascal). 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. For buildings with more than seven 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 allowable 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.

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping 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, where installed at the time of the test, shall be open.
4. Exterior or interior terminations for continuous ventilation systems shall be sealed.
5. Heating and cooling systems, where installed at the time of the test, shall be turned off.
6. Supply and return registers, where installed at the time of the test, shall be fully open.

**R402.4.4 Rooms containing fuel-burning appliances.** Removed from the Illinois Energy Conservation Code.

## SECTION R403
## SYSTEMS

**R403.3 Ducts.** Ducts and air handlers shall be insulated, sealed, tested and installed in accordance with Sections R403.3.1 through R403.3.7. Where required by the *code official*, duct 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.*

**R403.3.3 Duct testing (Mandatory).** Ducts shall be pressure tested to determine air leakage by one of the following methods:

1. Rough-in test: Total leakage shall be measured with a pressure differential of 0.1 inch w.g. (25 Pa) across the system, including the manufacturer's air handler enclosure if installed at the time of the test. Registers shall be taped or otherwise sealed during the test.
2. Postconstruction test: Total leakage shall be measured with a pressure differential of 0.1 inch w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. Registers shall be taped or otherwise sealed during the test.

**Exceptions:**

1. A duct air-leakage test shall not be required where the ducts and air handlers are located entirely within the *building thermal envelope.*
2. A duct air-leakage test shall not be required for ducts serving heat or energy recovery ventilators that are not integrated with ducts serving heating or cooling systems.

**R403.6 Mechanical ventilation (Mandatory).** The building or *dwelling unit* shall be provided with ventilation that complies with the requirements of this section or the *International Mechanical Code*, as applicable, or with other *approved* means of ventilation. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.

**R403.6.2 Recirculation of air.** Exhaust air from bathrooms and toilet rooms shall not be recirculated within a residence or circulated to another *dwelling unit* and shall be exhausted directly to the outdoors. Exhaust air from bathrooms, toilet rooms and kitchens shall not discharge into an *attic*, crawl space or other areas inside the building. (M1505.2, 2018 IRC)

**R403.6.3 Exhaust equipment.** Exhaust equipment serving single *dwelling units* shall be *listed* and *labeled* as providing the minimum required airflow in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51. (M1505.3, 2018 IRC)

**R403.6.4 Whole-house mechanical ventilation system.** Whole-house mechanical ventilation systems shall be designed in accordance with Sections R403.6.4.1 through R403.6.4.4. (M1505.4, 2018 IRC)

**R403.6.4.1 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. (M1505.4.1, 2018 IRC)

**R403.6.4.2 System controls.** The whole-house mechanical ventilation system shall be provided with controls that enable manual override. (M1505.4.2, 2018 IRC)

**R403.6.6 Mechanical ventilation rate.** The whole-house mechanical ventilation system shall provide outdoor air at a continuous rate as determined in accordance with Table R403.6.4.3(1) or Equation 4-1. (M1505.4.3, 2018 IRC)

**Exceptions:**

1. 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 R403.6.4.3(1) is multiplied by the factor determined in accordance with Table R403.6.4.3(2).

2. The total required outdoor air ventilation rate ($Q_{tot}$) shall be as specified in Table 403.6.4.3(1) or calculated in accordance with Equation 4-1.

$$CFMtotal = 0.01CFA + 7.5(Nbr + 1)$$ **(Equation 4-1)**

Where:
*CFMtotal* = total required ventilation rate, (cfm)
*CFA* = conditioned floor area of residence, ($ft^2$)
*Nbr* = number of bedrooms (not to be less than 1)

**R403.6.4.3.1 Different Occupant Density.** Table R403.6.4.3(1) assumes two persons in a dwelling unit and an additional person for each additional bedroom. Where higher occupant densities are known, the airflow rate shall be increased by 7.5 cfm (3.5 L/s) for each additional person. Where *approved* by the *authority having jurisdiction*, lower occupant densities may be used.

**R403.6.4.3.2 Airflow Measurement.** The airflow rate required is the quantity of outdoor ventilation air supplied and/or indoor air exhausted by the whole-house mechanical ventilation system installed, and shall be measured using a flow hood, flow grid, or other airflow measuring device. Ventilation airflow of systems with multiple operating modes shall be tested in all modes designed to meet Section R403.6.4.3. Where required by the *code official,* testing shall be conducted by an *approved* third party. A written report of the results of the test, indicating the verified airflow rate, shall be signed by the party conducting the test and provided to the *code official.*

**R403.6.4.4 Local exhaust rates.** Local exhaust systems shall be designed to have the capacity to exhaust the minimum air flow rate determined in accordance with Table R403.6.4.4. (M1505.4.4, 2018 IRC)

**TABLE R403.6.4.3(1)** (M1505.4.3(1), 2018 IRC)
**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 |
| | Airflow in CFM | | | | |
| < 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 $m^2$, 1 cubic foot per minute = 0.0004719 $m^3/s$

**TABLE R403.6.4.3(2)** (M1505.4.3(2), 2018 IRC)
**INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION RATE FACTORS[a], [b]**

| RUN-TIME PERCENTAGE IN EACH 4-HOUR SEGMENT | 25% | 33% | 50% | 66% | 75% | 100% |
|---|---|---|---|---|---|---|
| Factor [a] | 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.

**TABLE R403.6.4.4** (M1505.4.4, 2018 IRC)
**MINIMUM REQUIRED LOCAL EXHAUST RATES FOR ONE- AND TWO-FAMILY DWELLINGS**

| AREA TO BE EXHAUSTED | EXHAUST RATES |
|---|---|
| Kitchens | 100 cfm intermittent or 25 cfm continuous |
| Bathrooms-Toilet Rooms | Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous |

For SI: 1 cubic foot per minute = 0.0004719 m3/s

## SECTION R405
## SIMULATED PERFORMANCE ALTERNATIVE (PERFORMANCE)

### TABLE R405.5.2(1)
### SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

| BUILDING COMPONENT | STANDARD REFERENCE DESIGN | PROPOSED DESIGN |
|---|---|---|
| Air Exchange Rate | The air leakage rate at a pressure of 0.2 inch w.g. (50 Pa) shall be<br>Climate Zone 4 and 5: 4 air changes per hour.<br>The mechanical ventilation rate shall be in addition to the air leakage rate and shall be the same as in the *proposed design*, but no greater than 0.01 x $CFA$ + 7.5 x ($N_{br}$ + 1)<br>where:<br>$CFA$ = conditioned floor area, ft$^2$<br>$N_{br}$ = number of bedrooms<br>Energy recovery shall not be assumed for mechanical ventilation. | The measured air exchange rate[a].<br>The mechanical ventilation rate[b] shall be in addition to the air leakage rate and shall be as proposed. |

## CHAPTER 5 [RE]
## EXISTING BUILDINGS

### SECTION R502
### ADDITIONS

**R502.1.1.2 Heating and cooling systems.** New heating, cooling and duct systems that are part of the addition shall comply with Sections R403.

**Exception:** Where ducts from an existing heating and cooling system are extended to an addition, the new and existing duct systems shall not be required to be tested in accordance with Section R403.3.3. New duct systems shall be sealed in accordance with Section R403.3.2.

### SECTION R503
### ALTERATIONS

**R503.1.1 Building envelope.** *Building* envelope assemblies that are part of the *alteration* shall comply with Section R402.1.3 or R402.1.4, Sections R402.2.1 through R402.2.13, R402.3.1, R402.3.2, R402.4.3 and R402.4.5.

**Exceptions:** The following *alterations* shall not be required to comply with the requirements for new construction provided the energy use of the *building* is not increased:

1. Storm windows installed over existing fenestration.

2. Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation.

3. Construction where the existing roof, wall or floor cavity is not exposed.

4. *Roof re-cover.*

5. *Roof Membrane Peel and Replacement*

6. Roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated either above or below the sheathing.

7. For *roof replacement* on existing buildings with a roof slope of less than 2 units vertical in 12 units horizontal (2:12), and where the roof covering is removed and insulation remains, and where the required R-value cannot be provided due to thickness limitations presented by existing rooftop conditions, (including heating, ventilating and air-conditioning equipment, low door or glazing heights, parapet heights, weep holes, and roof flashing heights not meeting the manufacturer's specifications), the maximum thickness of insulation compatible with the available space and existing uses shall be installed. Insulation used shall be minimum R-3.5 per inch. In areas where flashing may be terminated a minimum of 8 inches above the roof covering (including required insulation) insulation shall be a minimum of R-20.

8. R-value for roof assemblies with tapered insulation above deck with slope greater than 1/8 units vertical in 12 units horizontal (1/8:12) shall average R-20.

9. Surface-applied window film installed on existing single pane fenestration assemblies to reduce solar heat gain provided the code does not require the glazing or fenestration assembly to be replaced.

**R503.1.2 Heating and cooling systems.** New heating, cooling and duct systems that are part of the *alteration* shall comply with Sections R403.

**Exception:** Where ducts from an existing heating and cooling system are extended, the new and existing duct systems shall not be required to be tested in accordance with Section R403.3.3. Altered duct systems shall be sealed in accordance with Section R403.3.2.

### SECTION R504
### REPAIRS

**R504.2 Application.** For the purposes of this code, the following shall be considered *repairs*:

1. Glass-only replacements in an existing sash and frame.

2. *Roof repairs.*

3. Insulation with new roof covering for roof slopes less than 2 units vertical in 12 units horizontal (2:12) inches only in areas where the tapered insulation is used above an existing roof covering to create slope between drains or upslope from obstructions to water flow.

4. *Repairs* where only the bulb, ballast or both within the existing luminaires in a space are replaced provided that the replacement does not increase the installed interior lighting power.

Sections M1505.2 (R403.6.2), M1505.3 (R403.6.3), M1505.4 (R403.6.4),
M1505.4.1 (R403.6.4.1), M1505.4.2 (R403.6.4.2), M1505.4.3 (R403.6.4.3), M1505.4.4 (R403.6.4.4)
Tables M1505.4.3(1) (R403.6.4.3(1)), M1505.4.3(2) (R403.6.4.3(2)), M1505.4.4 (R403.6.4.4)