



Providing effective energy strategies for buildings and communities

2018 IECC for Existing Buildings

5.22.2019



Who we are

We assist buildings and communities in achieving energy efficiency, saving money, and becoming more sustainable.

We are an applied research program at University of Illinois, working in collaboration with 360 Energy Group.

Our goal: Reduce the energy footprint of Illinois.



SEDAC is the Illinois Energy Conservation Code Training Provider

This training program
is sponsored by
Illinois EPA
Office of Energy



Energy Code Assistance



- Technical support
 - 800.214.7954
 - energycode@sedac.org
- Online resources at sedac.org/energy-code
- Workshops
- Webinars
- Online on-demand training modules



Illinois Energy Conservation Code

Anticipated adoption date of 2018 IECC: July 1, 2019

In accordance with the **Energy Efficient Building Act**, the **Capital Development Board** (CDB) is required to review and adopt the most current version of the International Energy Conservation Code (IECC) within one year of its publication date. The Code will then become effective in Illinois within 6 months following its adoption by the CDB.

The CDB, in conjunction with the **Illinois Environmental Protection Agency** and the **Illinois Energy Conservation Advisory Council**, has initiated the cycle for the Illinois Energy Conservation Code to update from the 2015 IECC to the 2018 IECC. It is anticipated at this time that the updated Illinois Energy Conservation Code based on the 2018 IECC and Illinois Amendments will be effective on **July 1, 2019**.

You can access the 2018 IECC [here](#) and learn about the 2018 IECC updates in SEDAC's workshops and webinars.

The current Illinois Energy Code is based on the 2015 IECC, with Illinois amendments

The CDB, in conjunction with the **Department of Commerce & Economic Opportunity** (DCEO), updated the 2012 IECC to the 2015 IECC, and the 2015 IECC, with **Illinois Amendments**, became law in the State of Illinois on January 1, 2016.

On July 1, 2017, Illinois Executive Order 17-03 transferred responsibility for the Illinois Energy Conservation Code from the Illinois Department of Commerce and Economic Opportunity to the **Illinois Environmental Protection Agency** (IEPA).



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Energy Code Training

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Energy Code Training

SEDAC is the Illinois Energy Conservation Code training provider

The Smart Energy Design Assistance Center (SEDAC) is providing training to increase awareness of the Illinois Energy Conservation Code and to improve the energy efficiency of new construction and renovation in Illinois. Community code officials, construction professionals and trades, and design professionals such as architects and engineers are invited to participate. SEDAC will be offering [workshops](#), [webinars](#), [online training](#), [resources](#), and [technical support](#). This program is funded by the Illinois Environmental Protection Agency (IEPA), in compliance with Illinois law.

Smart Energy Design Assistance Center
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 Department of
LANDSCAPE ARCHITECTURE

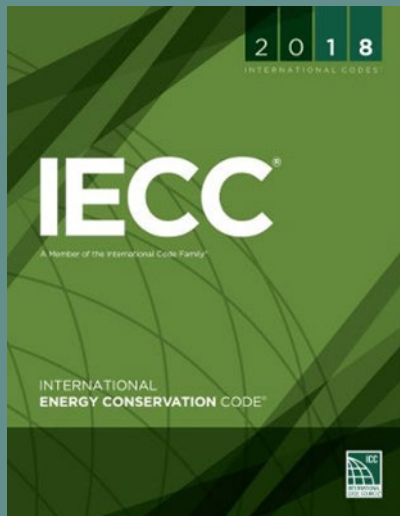
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What are the different I-Codes?



The International Code Council (ICC) family of codes covers all aspects of construction and includes (but is not limited to):

- International Existing Building Code (IEBC): Applies to existing buildings



- International Energy Conservation Code (IECC): Applies to new & existing buildings

Access to 2018 IECC & IEBC



Link to 2018 IECC and IEBC:

<https://codes.iccsafe.org/public/document/iecc2018>

<https://codes.iccsafe.org/content/IEBC2018>

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PREFACE

EFFECTIVE USE OF THE INTERNATIONAL ENERGY CONSERVATION CODE

IECC—COMMERCIAL PROVISIONS

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2018 IECC Arrangement

Chapters	Subjects
1-2	Administration and definitions
3	Climate zones and general materials requirements
4	Energy efficiency requirements
5	Existing buildings
6	Referenced standards



2018 IECC C501 General



2018 IECC Section C501 General

- C501.1 Scope
- C501.2 Existing Building
- C501.3 Maintenance
- C501.4 Compliance
- C501.5 New & Replacement Materials
- C501.6 Historic Building



C501.1 Scope

The provisions of this chapter shall control the *alteration, addition, and change of occupancy* of the existing buildings and structures.

When is new work considered an alteration vs. a repair? Is there a % of area/equipment requirement?

- Other than lighting projects, no limitations are set on minimum areas or amount of equipment being altered/repared to exempt work from the Code.
- Must pay close attention to definitions and exceptions in the code to identify when the code is applicable to work/modifications on a building.



C501.2 Existing Buildings

- Except as specified in this chapter, this code shall not be used to require the removal, alteration or abandonment of, nor prevent the continued use and maintenance of, an existing building or building system lawfully in existence at the time of adoption of this code.
- The code will permit an addition to be made to an existing building without requiring the existing, unmodified parts of the building to be brought up to the code.



C501.5 New and replacement materials

- Materials permitted by the applicable code for new construction should be used
- Like materials shall be permitted for repairs, provided that hazards to life, health or property are not created.
- Where materials now deemed hazardous (e.g. asbestos & lead paint) are involved in repair work, they may no longer be used.



Illinois Historic Buildings

Historic Building. Any building or structure that is one or more of the following:

1. Listed on the National Register of Historic Places
2. Listed on the Illinois Register of Historic Places
3. Designated by authorized personnel as historically significant



Historic Buildings

Historic Building. Any building or structure that is one or more of the following:

1. Listed or **certified as eligible for listing** by the State Historic Preservation Officer or the Keeper of the National Register of Historic Places, in the National Register of Historic Places.
2. Designated as historic under an applicable state or local law.
3. Certified as a contributing resource within a National Register-listed, state-designated or locally designated historic district.



C501.6 Historic Buildings

Provisions in this code relating to the construction, *repair*, *alteration*, restoration and movement of structures, and *change of occupancy* shall not be mandatory for *historic buildings* provided that a report has been submitted to the *code official* and signed by a *registered design professional*, or a representative of the State Historic Preservation Office or the historic preservation authority having jurisdiction, **demonstrating that compliance with that provision would threaten, degrade or destroy the historic form, fabric or function of the *building*.**



Addition to historic building

Addition has to be built to existing code, but historic building does not need to be upgraded to existing code.



2018 IECC C502 Additions



Definition

- Addition is “an extension or increase in the conditioned space floor area, number of stories or height of a building or structure.”
- Additions to an existing building, building system or portion thereof shall conform to the code as it relates to new construction without requiring the unaltered portion of the existing building or building system to comply.
- Additions should not create an unsafe condition or overload existing building systems.
- Additions can comply with the code alone, or as a whole with the existing building.
- Additions will need to comply with Sections C402-C405 and C502.2, or ANSI/ASHRAE/IESNA 90.1.



Section C502 - Additions

Any nonconditioned space that is altered to become conditioned space shall be required to be brought into full compliance with the code

Examples:

- Converting part of an unconditioned warehouse to office space
- Shell building tenant build-out
- Converting a garage to a family room



C502.2.1 Vertical Fenestration

- New addition vertical fenestration requirements are based on area of fenestration:
- For vertical fenestration area $\leq 30\%$ of gross above-grade wall area specified in Section **C402.4.1 Maximum area** shall comply with one of the following:
 - Section C402.1.5 – Component performance alternative
 - Section C402.4.3 – Maximum U-factor and SHGC specified in Table C402.4
 - Section C407 – Total Building Performance
- For vertical fenestration area $>30\%$ of gross above-grade wall area specified in Section C402.4.1 shall comply with the following for the addition only:
 - C402.4.1.1 – Increased vertical fenestration with daylight responsive controls.
 - Areas greater than that allowed in this Section will need to comply with Sections C402.1.5 or C407.



C502.2.2 Skylight

- New skylight area \leq specified in Section **C402.4.1 Maximum Area** shall comply with either:
 - C402.1.5 – Component Performance Alternative
 - C407 – Total Building Performance
- New skylight area $>$ specified in Section C402.4.1 shall comply with:
 - **C402.4.1.2 – Increased skylight area with daylight responsive controls**
 - Skylight areas greater than allowed in Section C402.4.1.2 will need to comply with C402.1.5 or C407.



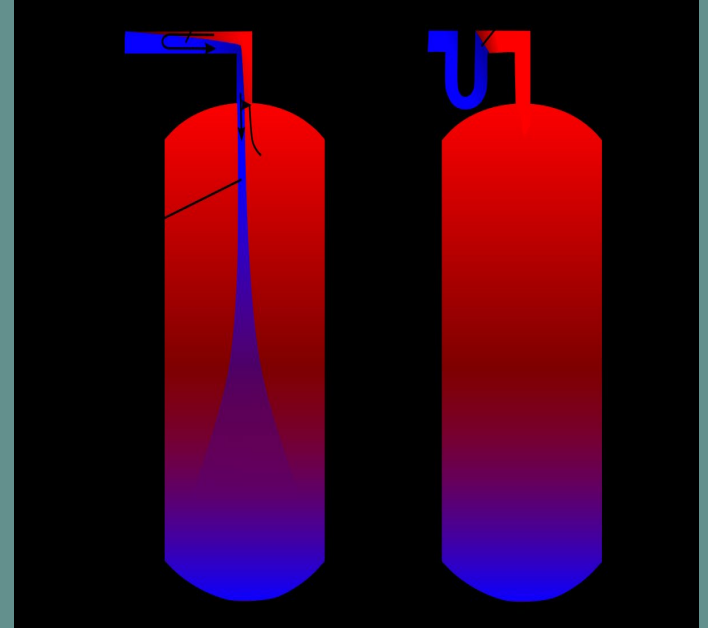
C502.2.3 Mechanical System

- Mechanical systems and equipment in an addition must comply with Section **C403 Building Mechanical Systems**, to meet the energy code.
- Includes all subsections of C403.
- For residential additions with extended ductwork from an existing system, extensions do not need to be tested in accordance with Section R403.3.3 per IL amendments, but must be sealed per Section R403.3.2



C502.2.4 Service Water Heating System

- Service water-heating systems and equipment in an addition must comply with Section **C404 Service Water Heating** to meet the energy code.
- This includes all subsections of C404: performance efficiency, heat traps, insulation of piping, maximum piping length, water temperature maintenance or recirculation systems, and pool equipment



C502.2.5 Pools & Inground permanently installed spas

- Service water-heating systems and equipment in an addition must comply with Section **C404.9 – Energy consumption of pools and permanent spas (Mandatory)**.
- C404.9.1 Heaters
- C404.9.2 Time switches
- C404.9.3 Covers



C502.2.6 Lighting Power & Systems

- Interior Lighting in either the addition alone, or as a whole with the existing building, should comply with:
 - **C405.3.2 – Interior Lighting Power Allowance** as determined in Tables C405.3.2(1) or C405.3.2(2)
- Exterior Lighting for either the addition alone, or as a whole with the existing building, should comply with:
 - **C405.4.2 – Exterior Lighting Power Allowance** as determined in Table C405.4.2(2) for areas designated in Table C405.4.2(1)



C502.2.6 Lighting Power & Systems

- IL Amendments specify lighting efficacy for no less than 90% of lamps are to be 65lm/W or greater, and fixtures are to be 55lm/W or greater. This applies to residential additions only
- This is on a residence basis and so the allowable low efficacy fixtures/lamps may differ depending on the other fixtures in the residence



Additions must comply with codes

Addition has to comply with whatever code is (e.g. insulation levels, fenestration U-values & SHGC, electrical, etc), but existing structure does not need to be upgraded to existing code.



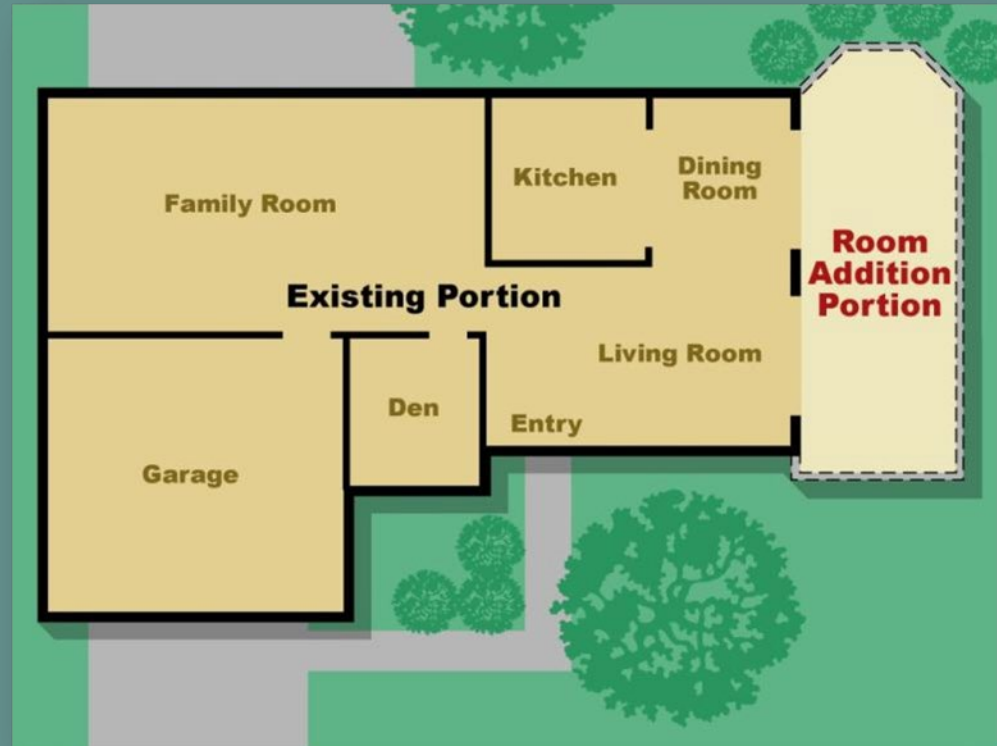
Section R502 - Additions

Additions must meet the prescriptive requirements in:

- Table R402.1.2 Insulation and fenestration criteria

or

- R402.1.4 U-factor alternative (*R-value computation or U-factor or total UA alternatives*)



Section R502 - Additions

Additions comply if any of the following is demonstrated

- The addition alone complies with the provisions of this code
- The existing building and addition together comply as a single building
- The existing building and addition together use no more energy than the existing building



C503

Alterations



Definition

- Alteration is “any construction, retrofit or renovation to an existing structure other than repair or addition. Also, a change in a building, electrical, gas, mechanical or plumbing system that involves an extension, addition or change to the arrangement, type or purpose of the original installation.”
- **Alterations shall be such that only manipulated parts of the building need be brought into compliance with the code,** provided existing unaltered structures and systems maintain their existing level of conformance with the code (cannot be made worse)



Section C503 - Alterations

Exceptions

- 1. Storm windows
- 2. Surface-applied window films
- 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. Air barrier is not 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



Change in Space Conditioning

Any unconditioned or low-energy space altered to become a conditioned space shall be brought into full compliance with the code.

- Exception 1: When using the component performance alternative in Section C402.1.5, total UA shall be $\leq 110\%$ of target UA.
- Exception 2: When using the total building performance alternative in Section C407, annual projected energy shall be $\leq 110\%$ of target annual energy cost permitted by C407.3 - Performance-based compliance.



Quonset hut converted to multi-use facility



Building Envelope

- Envelope assemblies part of the alteration shall comply with Sections C402.1 through C402.5 for prescriptive insulation, component UA, vertical fenestration, skylight, and air leakage requirements.
- Where the existing fenestration is $>30\%$ of gross above-grade wall area allowed in Section C402.4.1 prior to any alteration, that assembly is exempt from C402.4.1 provided fenestration area is not increased.



<https://passivetopositive.wordpress.com/projects/weinberg-commons/>



Roof Replacement

For roof replacement projects, where the roof assembly is part of the thermal envelope and contains insulation entirely above deck shall comply with one of the following:

- C402.1.3 – Insulation component R-value-based method
- C402.1.4 – Assembly U-factor, C-factor, or F-factor-based method
- C402.1.5 – Component performance method
- C407 – Total building performance method



Vertical Fenestration

- Where projects alter vertical fenestration, the requirements already noted for additions apply to alterations as well, with one additional provision:
- Where the fenestration area is not changed, when using the Section 407 – Total building performance method, using the existing fenestration area in the prior building instead of the area designated in Table C407.5.1(1) for the Standard Reference Design is permitted.
- Residential Section R503.1.1.1 adds in language that allows for area-weighted U-factor, SHGC, or both to be used for compliance instead of individual units having to comply.



Skylight Area

- Where projects alter skylight area, the requirements already noted for additions apply to alterations as well, with one additional provision:
- Where the skylight area is not changed, when using the Section 407 – Total building performance method, using the existing skylight area in the prior building instead of the area designated in Table C407.5.1(1) for the Standard Reference Design is permitted.



Heating & Cooling Systems

- Mechanical systems and equipment part of an alteration must comply with Section C403 to meet the energy code.
- Includes all subsections of C403.
 - New cooling systems that are installed shall have economizers added that comply with Section C403.5 – Economizers (Prescriptive)
- Residential Section R503.1.2 has an exception for the extension of duct systems leakage testing: if <40 linear feet of duct is in unconditioned space, the extension is not required to be tested in accordance with R403.3.3



Service Hot Water Systems

- Service water-heating systems and equipment that are altered must comply with Section C404 to meet the energy code.
- Includes all subsections of C404.



Lighting Systems

- Alterations to lighting systems shall comply with section C405 of the code
 - Alterations that replace <10% (<50% for residential) the luminaires in a space, provided the alterations do not increase the installed interior lighting power are exempt from being brought up to current energy code.



C504 Repairs



Definition

- Repair is “The reconstruction or renewal of any part of an existing building for the purpose of its maintenance or to correct damage.”

The following are defined as repairs:

- Glass-only replacements in an existing sash and frame
- Roof repairs
- Replacement of existing doors that separate conditioned space from the exterior shall not require the installation of a vestibule or revolving door, provided that an existing vestibule is not removed
- Repairs where only the bulb, the ballast, or both within the existing luminaires are replaced, provided that the replacement does not increase the installed interior lighting power



C505

Change of Occupancy or Use



Definition

- Change in occupancy is a change in use of a building or portion thereof that results in:
 - A change in occupancy classification
 - A change from one group to another group within an occupancy classification
 - Any change in use within a group for which there is a change in the application of the requirements of the code.



General

- Spaces that undergo a change in occupancy that increase the demand for fossil fuel or electricity shall be brought up to the code
- Where space use changes from one type to another in the Lighting Tables in C405.3.2(1) or C405.3.2(2), the new lighting wattage shall comply with the new occupancy type.
- As long as fenestration area is not changed or increased, change of occupancy does not necessitate compliance with Section C402.4.1 – Maximum area for fenestration
- When using component performance method for thermal envelope, if total UA is <110% of target UA, the change of occupancy is exempt from the code
- When using the total building performance method, if the total energy cost is <110% of the cost permitted by Section C407.3, the change in occupancy is exempt from the code.



Questions?

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