

Existing Building Energy Code FAQ - Commercial

Renovations and additions to existing buildings are the most common type of building permit requested in Massachusetts. This document answers 10 frequently asked energy code questions regarding existing commercial buildings. The information in this document reflects the interpretations of the Mass Save® Codes and Standards Compliance and Support (CSCS) Initiative and is intended to improve the uniformity of enforcement; however, it does not supersede the interpretations of the local code official.

All code references below reflect code sections found in the 2015 IECC [CE] or 780 CMR.

GENERAL REQUIREMENTS

Q Does the International Existing Buildings Code (IEBC) regulate the energy efficiency of work performed during an alteration?

A While Massachusetts has adopted the IEBC, Section 101.4.6 of the Massachusetts building code (780 CMR) states that, “780 CMR Chapter 13 [Energy Efficiency] shall apply to all matters governing the design and construction of buildings for energy efficiency”. Chapter 13 of CMR 780 requires that all buildings are designed and constructed in accordance with the 2015 International Energy Conservation Code (IECC) as amended by 780 CMR 13.00. IECC requirements and exceptions for commercial building additions, alteration, repairs, and changes of use or occupancy are found in Chapter 5 [CE].

Additional non-energy related requirements for existing buildings are found in the 2015 International Existing Buildings Code (IEBC).

Q What are the energy code requirements for existing commercial buildings in stretch code communities?

A Energy code requirements for existing buildings in stretch code communities are the same as in non-stretch communities. Massachusetts 780 CMR Appendix AA Stretch Energy Code states in Section AA104 Existing Buildings, “For alterations, renovations, additions or repairs of existing buildings in these municipalities the energy efficiency requirements of 780 CMR 13.00 [Commercial Energy Efficiency] or Chapter 11 of 780 CMR 51.00: *Massachusetts Residential Code* [Residential Energy Efficiency] shall be used as applicable based on the use and occupancy of the building.”

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780 CMR 13.00 states that buildings shall be designed and constructed to the International Energy Conservation Code (IECC) as amended by 780 CMR 13.00. Thus, alterations, additions, repairs, and changes of occupancy or use in stretch code communities must comply with IECC Chapter 5 [CE] and are treated no differently than existing buildings in non-stretch communities.

Reference: AA104

Q If I add an addition to an existing building, do I need to bring the existing building up to code?

A No. Unaltered portions of existing buildings are not required to be brought into compliance with the current energy code. IECC Section 501.2 states that, “this code shall not be used to require the removal, alteration or abandonment of...an existing building or building system lawfully in existence at the time of adoption of this code”. In addition, C502.1 states that additions must meet the requirements of the IECC, “without requiring the unaltered portion of the existing building or building system to comply with this code.”

When using building envelope tradeoffs in *COMcheck*, designers may choose to perform the analysis based on the addition alone or on the existing building plus the addition as a single building. The latter option would only be useful if the existing building is more efficient than the proposed addition. The addition shall be deemed in compliance if the addition alone complies with the energy code OR if the existing building and the addition comply with the energy code as a single building.

Reference: C502.1

Q A permit applicant is proposing to convert a building from one occupancy or use to another; is the project required to meet the energy code as it would for new construction?

A It depends. A change of occupancy or use requires compliance with the energy code as it would for new construction only if the change will result in an increase in fossil fuel or electrical energy demand. For example, the conversion of a warehouse to an office building would likely result in an increase in energy demand as there would be a higher average occupancy rate; thus, the envelope, mechanical systems, service hot water systems, and lighting and electric power systems would all have to meet the IECC like a new building. However, the code does not provide guidance on how to determine if a specific change in occupancy or use will result in an increase in energy demand and this decision must be made on a case-by-case basis. General indications of an increased energy demand include additional or increased capacity HVAC equipment and new or additional water heating systems.

Lighting is simpler because, to define a change in use, the IECC refers to the uses listed in the Lighting Power Density tables in Chapter 4. In this case, the permit applicant must demonstrate compliance with the maximum total connected lighting load for the new space type.

Reference: C505

MECHANICAL SYSTEMS

Q If part, or all, of a mechanical system is being replaced what is required to comply with the energy code?

A IECC Section C503.1 states that alterations must conform to the energy code like new construction, “without requiring the unaltered portions of the existing building or building system to comply with this code”. Thus, only parts of the system being modified or replaced need to comply with the provisions of the current energy code.

Mechanical system (and other) repairs must be performed in a manner that maintains compliance with the energy code under which the system was originally permitted.

Reference: C503.1 & C504.1

BUILDING ENVELOPE

Q What are the energy code requirements for roof reroofing?

A First, energy code requirements only apply when the roof being altered is part of the building thermal envelope (i.e. separates conditioned space from unconditioned space or the outside). Second, the term “reroofing” encompasses two different types of alterations, *roof recover* and *roof replacement*, which have different energy code requirements.

DEFINITIONS

Roof recover

According to the definition in Chapter 2 of the IBC and Chapter 2 of the IECC [CE], *roof recovers* include the process of installing an additional roof covering over an existing roof covering without removing the existing roof covering. IBC Chapter 2 defines *roof covering* as the covering applied to the roof deck for weather resistance, fire classification, or appearance. These materials commonly include shingles, metal roofing, built-up roofing (BUR) membranes, modified bitumen roofing, thermoplastic (PCV & TPO) roof membranes, and thermoset (EPDM) roof membranes. If this type of covering is not removed during the alteration, the assembly is exempt from energy code thermal envelope requirements, provided the energy use of the building is not increased.

Reference: IECC Ch. 2, IBC Ch. 2, C503.1 exemption 5

Roof replacement

Chapter 2 of the IECC [CE] defines a *roof replacement* as the process of removing the existing roof covering, repairing any damaged substrate and installing a new roof covering. There are four main scenarios when a roof is undergoing a roof replacement including: insulation is entirely above deck, insulation is between roof rafters, insulation is on the attic floor, or there is no visible insulation.

ROOF REPLACEMENT SCENARIOS

Roof replacement with insulation entirely above deck

For insulation entirely above deck, the IECC requires that insulation is installed to meet the prescriptive requirements for new construction (R-value or U-factor method). Thus, any time shingles, metal roofing, or other roofing membrane are removed during this type of alteration, R-30 continuous insulation or equivalent U-factor must be installed.

Reference: C503.3.1

Roof replacement with ceilings without attic spaces or unvented attics

This section applies to ceilings without an attic spaces (vaulted ceilings) that are part of the thermal envelope and ceilings that enclose an unvented attic. If a framing cavity is exposed and there is no insulation in the cavity, insulation must be installed to fill the cavities. If there is already insulation filling the cavity, no further action is required.

Reference: C503.1 exemption 3

Roof replacement with a vented attic

If the roof replacement involves removal of the roof sheathing of a vented attic and the top story ceiling is exposed, insulation must fill the ceiling cavities (i.e. between the joists on the attic floor). This means that if the existing ceiling cavities are already filled with insulation, no further action is required; however, if there is no insulation in the ceiling cavities, they must be filled with insulation.

Reference: C503.1 exemption 3

Roof replacement with no existing insulation and no existing cavities exposed

If no attic decking is replaced and the roof or attic cavity are not exposed during a roof replacement, then no additional insulation is required

Reference: C503.1 exemption 3

Roof replacements and the air barrier

Air barriers are not required for roof recovering or roof replacement where the alterations or renovations to the building do not include alterations, renovations or repairs to the remainder of the building envelope.

Reference: C503.1 exemption 6

Note: If the R-value of roof cavity or above-deck insulation is increased beyond its original R-value, this may cause an increase in a roofs live load. C503.1 states “Alterations shall not create an unsafe or hazardous condition or overload existing building systems.” The potential for an increase in live load may require additional evaluation by a design professional.

WINDOWS & DOOR REPLACEMENT SCENARIOS

Q When replacing windows and doors in an existing building, how do energy code requirements relate to the building's window-to-wall ratio (WWR)?

A

Window replacements within existing framing openings

New windows installed in an existing building that do not result in an increase in total building fenestration area may use any available compliance path, including prescriptive.

Reference: C503.3

Windows installed in new or expanded framing openings

New windows installed in an existing building that result in an increase in total building fenestration area, where the building WWR remains at 30 percent or less, must meet prescriptive U-factors and solar heat gain coefficients (SHGC).

New windows installed in an existing building that result in an increase in total building fenestration area, and the resulting WWR is greater than 30 percent, but not greater than 40 percent, must meet the prescriptive U-factors and solar heat gain coefficients (SHGC) and the daylighting requirements described in C402.4.1.1.

New windows installed in an existing building that result in an increase in total building fenestration area, and the resulting WWR exceeds 40 percent, must use the Total Building Performance (C407) method.

Summary:

Window area increase?	Resulting WWR	Required Compliance Path
No	Any	Any
Yes	≤30%	Prescriptive
Yes	>30%, but ≤40	Prescriptive + Daylighting
Yes	>40%	Performance

Reference: C503.3.2

Q Are replacement windows and doors required to meet the same U-factor requirements as new construction?

A Yes, replacement windows and doors must comply with the U-factor requirements of Table C402.4. U-factor requirements do not apply to glass only replacements in an existing sash and frame.

Reference: C503.3.2 and C504.2 exception 1

Q When replacing an exterior door, is the installation of a vestibule required?

A No. Provided an existing vestibule is not removed, a new vestibule is not required.

Reference: C504.2 exception 2

HISTORIC BUILDINGS

Q Are historic buildings exempt from energy code requirements?

A In general, alterations to historic buildings are exempt from the energy code. However, this exemption only applies if the permit applicant provides a report to the code official that is signed by a registered design professional, or a representative of the State Historic Preservation Office or the historic preservation authority having jurisdiction, that demonstrates that meeting an energy code requirement would threaten, degrade, or destroy the historic form, fabric, or function of the building.

Reference: C501.6