

Existing Building Energy Code FAQ - Residential

Renovations and additions to existing buildings are the most common type of building permit requested in Massachusetts. This document answers 12 frequently asked energy code question regarding existing residential 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 [RE] or 780 CMR.

GENERAL REQUIREMENTS

Q Is a HERS Rating required for an addition or alteration project in a Stretch Code Community?

A No. 780 CMR Appendix AA Stretch Energy Code states that alterations, renovations, additions or repairs of existing buildings should comply with 780 CMR Chapter 11. This chapter of the *Massachusetts Residential Code* allows for the use of either the prescriptive, performance, or ERI compliance path. Thus, the energy code requirements for alterations, renovations, additions, and repairs are no different in Stretch Code Communities versus non-stretch communities. In addition, per RESNET standards, HERS Ratings are not permissible on additions or alterations other than gut rehabs. Since 780 CMR Chapter 11 contains only Massachusetts amendments, all additional energy code requirements are found in IRC Chapter 11, including sections N1107 through N1111, which contain requirements and exceptions for additions, alterations, repairs, and changes of occupancy or use.

References: 780 CMR AA104, 780 CMR Chapter 11, IRC N1107-N111

Q Does an alteration or addition project need to comply with the solar-ready provisions?

A Section AU101.1 states that, “These provisions shall be applicable for new construction, except additions”. Thus, solar-ready provisions apply only to new construction. Existing buildings and additions are exempt.

Reference: AU101.1

Q Is blower door testing required for additions, alterations, or changes in space conditioning?

A For additions, Section N1108.1.1.1 (Building envelope) and Section N1109.2 (Change in space conditioning) require compliance with Section N1102.4 (Air leakage) in its entirety, including blower door testing.

Interpretation: Despite the lack of an exception for blower door testing for additions, performing a blower door test on an addition may be impossible or extremely impractical. For single-room additions there is generally no door frame in which to install blower door equipment for testing, making a blower door test impossible. Thus, blower door testing for single room additions should not be required. For multiple-room additions that are isolated from and connected to the existing building with one or more door frames, blower door testing should be required. Additions and changes in space conditioning must comply with all other air sealing requirements of Section N1102.4 as applicable.

References: N1108.1.1.1 (R502.1.1.1) & N1109.2 (R503.2) with interpretation

For alterations, Section N1109.1.1 requires only sections N1102.4.3 (Fenestration air leakage) and N1102.4.5 (Recessed lighting); therefore, blower door testing is not required.

Reference: N1109.1.1 (R503.1.1)

MECHANICAL SYSTEMS

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

A Alterations to existing HVAC systems must comply with the energy code just like they would for new construction, although unaltered portions of the systems may be left in their existing condition. According to IRC Chapter 11, alterations to a building system or portion thereof shall conform to the provisions of IRC Chapter 11 as they relate to new construction without requiring unaltered portions of the system to comply.

Reference: N1109.1 (R503.1)

New heating, cooling and duct systems that are part of an alteration must comply with the energy code as they relate to new construction. This includes IRC Chapter 11 sections that cover controls, hot water boiler temperature setback (boilers only), ducts, and mechanical ventilation. One exception is that new ducts associated with an existing HVAC system may extend up to 40 linear feet into unconditioned space before they are required to be tested for leakage.

References: N1108.1.1.2 (R502.1.1.2), N1109.1.2 (R503.1.2)

New domestic/service hot water systems that are part of an alteration shall comply with Section N1103.5 (service water heating) as they relate to new construction, including heated water circulation and temperature maintenance systems, demand recirculation systems, hot water pipe insulation, and drain water heat recovery.

References: N1108.1.1.3 (R502.1.3), N1109.1.3 (R503.1.3)

Note: Whole-house mechanical ventilation is not required for alteration projects. The provisions in Section N1103.6 (Mechanical ventilation) only apply *when* whole-house mechanical ventilation is required. The IRC requires whole-house mechanical ventilation only for dwelling units that have been tested and demonstrated to have an air leakage rate of 5.0 ACH50 or less; thus, unless the existing building is tested and is below 5.0 ACH50, whole-house mechanical ventilation is not required when performing alterations to existing buildings. See Question 3 for information on blower door testing as it relates to existing buildings.

BUILDING ENVELOPE

Q If I am remodeling a home and ceiling, wall, or floor cavities that are part of the thermal envelope are exposed, do I need to install the insulation R-values that are required for new construction?

A No, the full R-value as required for new construction is not required for alterations, but the cavity must be filled with insulation. If a cavity is exposed and there is no insulation, or the existing insulation does not fill the cavity, insulation must be installed to fill the cavity. If a cavity is exposed and it is already filled with insulation, no further insulation needs to be added. This applies to any exposed ceiling, wall, or floor cavity. As with any alteration, work performed on the building assembly must not increase the energy use of the house.

Reference: N1109.1.1 (R503.1.1), Exception 2

Q If I am reroofing a home and the rafter bays are exposed, do I need to install insulation in those bays?

A If the roof cavity that is exposed is a part of the building thermal envelope, the cavity must be filled with insulation. Alternatively, continuous insulation may be added above the sheathing.

Reference: N1109.1.1 (R503.1.1), Exception 5

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 the roofs live load due to increased snow accumulation. This increase in live load may require additional evaluation by a design professional prior to issuance of permit.

Reference: AJ501.4

Q What are the energy code requirements if I want to finish an unfinished basement or attic space?

A Finishing a basement or attic usually involves converting the space from an *unconditioned* space to a *conditioned* space, or what the IRC and IECC refer to as a *change in space conditioning*. For these cases, the IRC states that, “any nonconditioned or low-energy space that is altered to become conditioned space shall be required to be brought into full compliance with this code.” In other words, the building thermal envelope must meet all energy code requirements as they related to new construction. This includes meeting the insulation R-values specified by IRC Table N1102.1.2 (IECC Table 402.1.2) or complying based on the UA Alternative (REScheck). All other building thermal envelope sections, including air leakage, must be met. (For a discussion of the applicability of blower door testing to changes in space conditioning, see Question 3.) In addition, mechanical, hot water, and lighting systems must comply like new construction. Alternatively, the Simulated Performance Alternative (N1105) may be used for energy code compliance for all systems. Under this path, projects may have a modeled annual energy cost of 110% of the standard reference design.

Reference: N1109.2 (R503.2)

Q If I choose to add insulation to my attic without doing any other alterations, do I need to meet any specific R-value?

A No, if no other work is being done then the added insulation can be installed to any R-value. This is a voluntary energy efficiency upgrade and is therefore not required to meet the R-value for new construction.

Reference: BBRS Interpretation

Q Is the U-factor requirement of 0.30 applicable for replacement doors and windows? Are there any other energy code requirements for replacement doors or windows?

A Section N1109.1.1.1 states that replacement fenestration must meet the U-factor and SHGC requirements of Table N1102.1.2 (just like new construction); therefore, the maximum U-factor of 0.30 applies to replacement doors and windows. There are no SHGC requirements for Climate Zone 5, which encompasses all of Massachusetts.

Reference: N1109.1.1.1 (R503.1.1.1)

Glass-only replacements in an existing sash or frame are considered repairs and are therefore not required to meet the requirements for new construction.

Reference: N1110.2 (R504.2)

Q What are the insulation R-value requirements for alterations to existing buildings where there are uninsulated masonry walls with no framing?

A If the project constitutes a change of space conditioning or change of occupancy that will increase the demand for fossil fuel, the entire dwelling unit must meet the energy code as it applies to new construction. This means the walls must meet the R-value requirements of Table N1102.1.2 or the R-values as determined using REScheck or a Simulated Performance Alternative analysis. When using the Simulated Performance Alternative, the dwelling unit may have up to 110 percent the energy cost of the reference home.

References: N1109.2 (R503.2) & N1111.1 (R505.1)

For alterations that do not constitute a change of space conditioning or change of occupancy that results in an increase in energy demand, no insulation is required to be added because no building cavities are exposed.

Reference: N1109.1.1 (R503.1.1), exception 3

HISTORIC OR RELOCATED BUILDINGS

Q Do I need to comply with the energy code when working with a historic building?

A In general, historic buildings are exempt from energy code requirements for construction, repair, alteration and movement of structures, and change of occupancy; however, this is only the case when meeting an energy code requirement would “threaten, degrade, or destroy the historic form, fabric or function of the building.” To document this, a report must be provided to the authority having jurisdiction (AHJ) signed by the owner, a registered professional or a Representative of the State Historic Preservation Office or the historic preservation AHJ.

Reference: N1107.6 (R501.6)

Q What are the energy code compliance options for relocated houses?

A There are no energy code requirements for components of a home that were built legally under a previous code and then relocated to a different site. Any new construction associated with the relocation (e.g. basement walls, additions, mechanical systems, etc.) must meet the energy code like new construction.

Any alterations, repairs, or change in space conditioning to the relocated home must comply with the IRC existing buildings chapter (N1107), just like any other residential alteration, and Appendix J to 780 CMR 51.00: Massachusetts Residential Code for non-energy-related items. Any new system must comply as far as practicable with the requirements for new structures, including the siting and fire separation distance requirements for new structures.

Reference: [MA] R102.7 and N1107 (R501)