The Commonwealth of Massachusetts

Office of Public Safety & Inspections

Board of Building Regulations and Standards

One Ashburton Place - Room 1301

Boston, MA 02108

780 CMR - MASSACHUSETTS BUILDING CODE - AMENDMENT PROPOSAL FORM

Code (Indicate with an 'x')	_ Ninth Edition Base X_ Ninth Edition One- and Two-Family Dwellings	*State Use Only*	
Date:	May 5, 2020	**Date Received:**	05/05/2021
Code Section:	AA104 and IECC Chapter 5 [RE]	**Code Change Number:**	05-06-2021
Name and company affiliation if any: Mike Turns, PSD (on behalf of the Massachusetts Program Administrators)			
Address: 40 W Evergreen Ave, Suite 110 Philadelphia, PA 19118		**Telephone:** 484-684-5625 **Email:** mturns@psdconsulting.com	

Indicate with an 'x' the type of amendment proposed:

X Change Section X Add new section X Delete section and substitute _Delete section; no substitute

___Other, Explain:

Please type below the proposed amendment. If you propose to change a section, please copy the original text from the appropriate 2015 I-code and\or Massachusetts amendment. Indicate with strike out the text you propose to delete and add new text in either *italic* or red font. Also you please provide justification of your proposal as a second page and include information on the **Introduction and Background** of your proposal, **Pro *and* Con Reasons for Adoption** of it, a summary of estimated **Costs for Building Owners**, and **Life Safety Benefits** for building occupants. Also, please indicate whether or not the proposal has been presented to the International Code Council (ICC) for consideration. If not, please explain why the proposal is unique to Massachusetts. When complete email this file to Cesar.Lastra@state.ma.us. Please use additional pages if necessary.

Please see attachment

Introduction and Background:

Pro *and* Con Reasons for Adoption: Pros: Cons:

Costs to Building Owners:

Life Safety Benefits:

Massachusetts Building Code Change Proposal:
"Additions and Alterations (Triple A) Stretch Code"

Part 1: Residential construction

This code change proposal is offered on behalf of Mass Save, a collaboration of Massachusetts' natural gas and electric utilities and energy efficiency service providers including Berkshire Gas, Cape Light Compact, Eversource, Liberty Utilities, National Grid and Unitil.

Introduction and Background:

Currently, the stretch code does not apply to additions or alterations, as Section AA refers code users to the Existing Buildings chapter, just like non-stretch communities. Thus, the efficiency requirements for additions and alterations in stretch code communities are not a stretch at all. Given the high volume of these projects, there is a significant energy savings opportunity for the Commonwealth to add requirements for these project types in the stretch code.

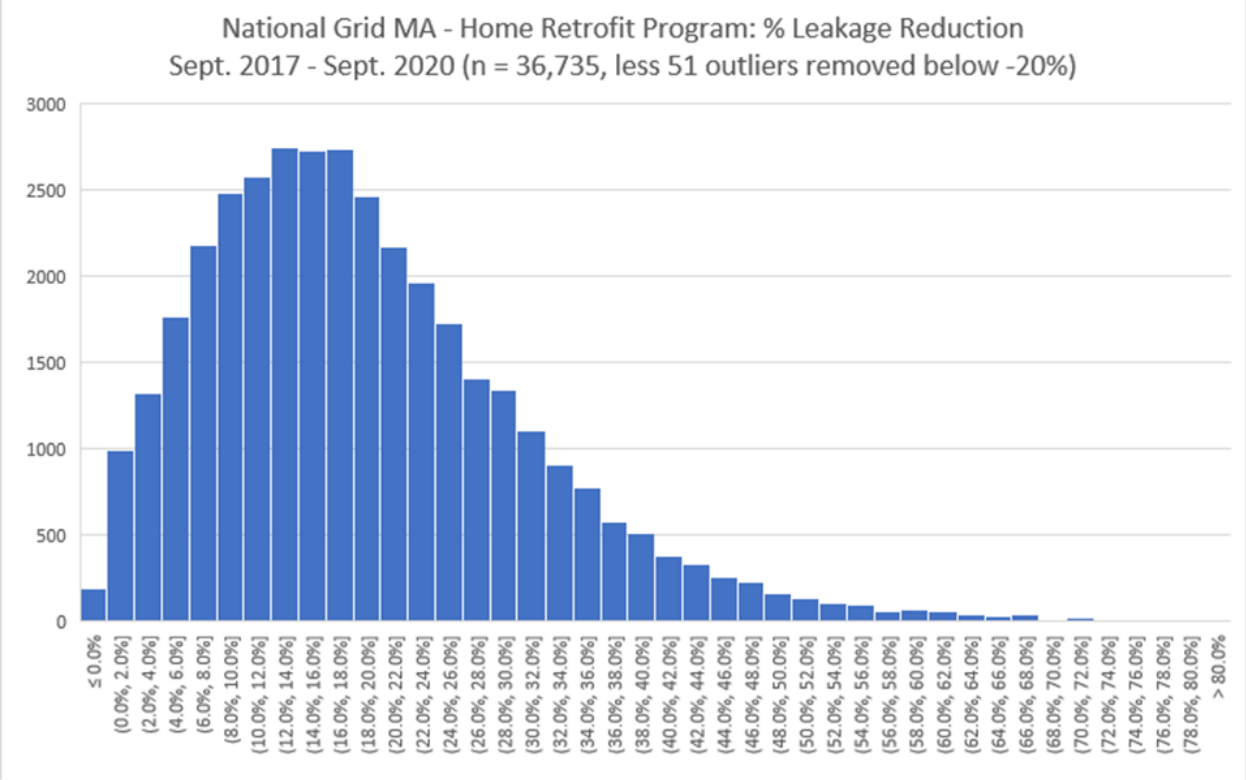
This proposal would improve the energy efficiency of homes undergoing additions or alterations in stretch code communities. The proposed modifications below integrate directly with the structure of Chapter 5 of the IECC Residential Provisions. The three main code sections are:

- R502 Additions
- R503 Alterations, and
- (new) R506 Extensive Alterations.

The elements of this proposal have been vetted and demonstrated to be cost effective. For instance, the building thermal envelope R-values and U-factors in this proposal have all been taken from either the 2021 IECC or NYStretch (the stretch code of New York State). For Climate Zone 5A, a NYSERDA study determined that NYStretch would save $351 per year for a single home with an incremental cost of construction of $2,202 for a simple payback of 6.3 years[1]. The baseline for this analysis was the 2016 Energy Conservation Construction Code of New York State, which is nearly identical to the 2015 IECC, the basis of the current Massachusetts energy code.

Further, local data sources were used to ensure the proposed requirements were appropriate for the Massachusetts construction market. First, a 2020 third-party study measuring industry standard practice for energy efficiency measures in renovations and additions across the state found that many of the provisions in this proposal are already being achieved in most projects[2]. In addition, the air tightness requirement for extensive alterations was chosen from the center of the distribution of blower door test results for over 36,000 homes participating in the Mass Save Home Energy Services / Residential Coordinated Delivery program from Sept 2017 - Sept 2020.

[1] www.nyserda.ny.gov/-/media/Files/Programs/energy-code-training/Residential-Cost-Analysis-Report.pdf
[2] http://ma-eeac.org/wordpress/wp-content/uploads/MARLPNC_1812_RenoAddMarketPotential_Report_Final_2020.03.30_Clean_v2.pdf



Pro and Con Reasons for Adoption:

Pros: Energy bill savings for homeowners and renters, increased thermal comfort for home occupants, positive health impacts for home occupants where less air infiltrates uncontrolled through building cavities that can be moldy or dusty, and reduced carbon footprint statewide.

Cons: Small increased cost of construction, but these are likely to be offset by homeowner savings.

Costs to Building Owners:

Small increased cost of construction (likely to be offset by homeowner savings)

Life Safety Benefits:

None

Note: The amendments mentioned in AA104.2 are addressed in a separate code change proposal that is specific to commercial buildings.

Amendment to R202

R202 Definitions

Add definition:

EXTENSIVE ALTERATION. Any alteration where the total work area exceeds 75 percent of the building or dwelling unit. Work areas in which the alteration work is exclusively plumbing, mechanical or electrical shall not be included in the computation of the total area of all work areas.

Amendment to Stretch Code AA104

AA104 Replace the section with the following:

AA104 Existing Buildings

For alterations, renovations, and additions of existing buildings in these municipalities, the energy efficiency requirements of ~~780 CMR 13.00: Energy Efficiency or Chapter 11 of 780 CMR 51.00 shall be used as applicable~~ AA104.1 through AA104.3 shall be met as applicable based on the use and occupancy of the building.

AA104.1 Existing Low-Rise Residential Buildings

Additions, alterations, repairs, and changes of occupancy or use in all one- and two-family dwellings and multiple single-family dwellings (townhouses), as well as Groups R-2, R-3, and R-4 of four stories or less above grade plane, shall comply with 780 CMR 51.00 Chapter 11 Sections R501 through R505 as amended below, and Sections R506 and R507.

AA104.2 Existing Commercial Buildings

Additions, alterations, repairs, and changes of occupancy or use in all non-residential and R-use buildings of more than four stories shall comply with 780 CMR 51.00 Chapter 11 Sections C501 through C505 as amended below.

AA104.3 Existing Large Area and High Energy Use Buildings: Reserved

[Note: The track changes notations below, highlighted in red, denote differences between the 2021 IECC and the proposed changes. This was done with the assumption that the 2021 IECC will become effective as the base code prior to or at the same time as this proposal.]

R502 Additions Amend section as follows:

R502.2 Change in space conditioning.

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~~ comply with Section R502, where all thermal envelope assemblies are considered new building envelope assemblies.

Exceptions:

~~1. Where the simulated performance option in Section R405 is used to comply with this section, the annual energy cost of the *proposed design* is permitted to be 110 percent of the annual energy cost otherwise allowed by Section R405.2.~~

~~2.~~ 1. Where the Total UA, as determined in Section R402.1.5, of the existing building and the *addition*, and any *alterations* that are part of the project, is less than or equal to the Total UA generated for the existing *building*.

~~3. Where complying in accordance with Section R405…~~

R502.3 Amend section as follows:

R502.3.1 Building envelope. New building envelope assemblies that are part of the *addition* shall comply with Sections R402.1, R402.2, R402.3.1 through R402.3.5, and R402.4, where Table R402.1.2 is replaced with Table R502.3.1(1) and Table R402.1.3 is replaced with Table R502.3.1(2), respectively. Projects using R402.1.5 to document compliance shall achieve 10% better than the currently adopted code using RES*check* or other approved software. [Alternatively, this could be built into MA-specific REScheck software.]

Exception: New envelope assemblies are exempt from the requirements of Section R402.4.1.2 [air leakage testing].

TABLE R502.3.1(1)
EQUIVALENT U-FACTORS[a]

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	GLAZED FENESTRATION SHGC[d, e]	CEILING U-FACTOR	WOOD FRAME WALL U-FACTOR	MASS WALL U-FACTOR[b]	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR	CRAWL SPACE WALL U-FACTOR
5	~~0.30~~ 0.27	~~0.55~~ 0.50	~~NR~~ 0.40	0.024	0.045	~~0.082~~ 0.056	0.033	0.050	~~0.055~~ 0.050

~~a.~~ Non-fenestration U-factors shall be obtained from measurement, calculation or an approved source.
~~b.~~ Mass wall shall be in accordance with Section R402.2.5. Where more than half the insulation is on the interior, the mass wall U-factor shall not exceed 0.056.

TABLE R502.1.1.1(2)
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION U-FACTOR[b, i]	SKYLIGHT U-FACTOR[b]	GLAZED FENESTRATION SHGC[b, e]	CEILING R-VALUE	WOOD FRAME	MASS WALL R-VALUE[d]	FLOOR R-VALUE	BASEMENT WALL R-VALUE[c, g]	SLAB[d] R-VALUE	CRAWL SPACE WALL R-

					WALL R-VALUE[g]				& DEPTH	VALUE[c, g]
5	~~0.30~~ 0.27	~~0.55~~ 0.50	0.40	60	20+5ci or 13+10ci or 0+15ci	~~13/17~~ 15ci/19ci	30	15ci or ~~19~~ 20 or 13 + 5ci	10, 4 ft	15ci or ~~19~~ 20 or 13 + 5ci

~~c. "5ci or 13" means R05 continuous insulation (ci) on the interior or exterior surface of the wall or R-13 cavity insulation on the interior side of the wall. "10ci or 13" means R-10 continuous insulation (ci) on the interior or exterior surface of the wall or R-13 cavity insulation on the interior side of the wall.~~ "15ci or ~~19~~ 20 or 13 + 5ci" means R-15 continuous insulation (ci) on the interior or exterior surface of the wall, or ~~R-19~~ 20 cavity insulation on the interior side of the wall, or R-13 cavity insulation on the interior of the wall in addition to R-5 continuous insultation on th interior or exterior surface of the wall.

~~e. There are no SHGC requirements in the Marine Zone.~~

~~f. Baseline wall insulation is not required on warm-humid locations as defined by Figure R301.1 and Table R301.1.~~

[All other footnotes are unamended.]

R502.3.2 Heating and cooling systems

~~HVAC~~ Heating and cooling system ducts newly installed as part of an *addition* shall comply with Section R403.

Exception: Where ducts from an existing heat and cooling system are extended to an addition, the new ducts shall only be required to comply with Sections R403.3.1, R403.3.2, and R403.3.7. Joints and seams shall comply with either the International Mechanical Code or International Residential Code, as applicable.

R503 Alterations

R503.1 Add text to end of section.

Extensive alterations shall comply with Section R506.

R503.1.1 Replace section with the following:

R503.1.1 Building envelope.

Building envelope assemblies that are part of the *alteration* shall comply with Section R402.1.2 or ~~R402.1.4~~ R402.1.3, where Table R402.1.2 is replaced with Table R503.1.1(1) below and Table R402.1.3 is replaced with Table R503.1.1(2). Building envelope assemblies that are part of the alteration shall also comply with Sections R402.2.1 through R402.2.12, 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 that 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 recover
5. ~~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~~

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

TABLE ~~R402.1.2~~ R503.1.1(1)
MAXIMUM ASSEMBLY U-FACTORS[a] AND FENESTRATION REQUIREMENTS FOR ALTERATIONS

VERTICAL FENESTRATION U-FACTOR[f]	SKYLIGHT U-FACTOR	GLAZED FENESTRATION SHGC[d, e]	CEILING U-FACTOR	WOOD FRAME WALL U-FACTOR	MASS WALL U-FACTOR[b]	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR	SLAB[d] F-FACTOR & DEPTH
~~0.30~~ 0.27	~~0.55~~ 0.50	~~NR~~ 0.40	0.24	~~0.045~~ 2x4 walls: 0.084 2x6 walls: 0.060	0.065 / 0.082	0.033	0.050	F-0.52

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. Where more than half the insulation is on the interior, the mass wall U-factors shall not exceed 0.17 in Climate Zones 0 and 1, 0.14 in Climate Zone 2, 0.12 in Climate Zone 3, 0.087 in Climate Zone 4 except Marine, 0.055 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 shall not exceed 0.360.~~

d. The SHGC column applies to all glazed fenestration.

~~**Exception:** In Climate Zones 0 through 3…~~

~~e. There are no SHGC requirements in the Marine Zone.~~

f. A maximum U-factor of 032 shall apply ~~in Climate Zones 3 through 8~~ to vertical fenestration products installed in buildings located either:

~~1. Above 4,000 feet in elevation, or~~

2. In windborne debris regions where protection of openings is required by Section R301.2.1.2 of the *International Residential Code*.

TABLE ~~R402.1.3~~ R503.1.1(2)
INSULATION REQUIREMENTS BY COMPONENT FOR ALTERATIONS[a]

VERTICAL FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR[b,i]	GLAZED FENESTRATION SHGC[b]	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE[f]	FLOOR R-VALUE[g]	BASEMENT[c, g] WALL R-VALUE	SLAB[d] R-VALUE & DEPTH	C SP W V
~~0.30~~ 0.27	~~0.55~~ 0.50	~~NR~~ 0.40	60j, k, l	~~20+5ci or 13+10ci or 0+15ci~~ 2x4 walls: 13 2x6 walls: 20	15ci/20ci	30	15ci or ~~R-19~~ R-20 or 13 + 5ci	10ci, 4 ft	15c R-2

For IS: 1 foot = 304.8 mm.

~~NR = Not Required~~

ci = Continuous insulation

a. R-values are minimums. 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 be not 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 0 through 3…~~

~~c. "5ci or 13" means R05 continuous insulation (ci) on the interior or exterior surface of the wall or R-13 cavity insulation on the interior side of the wall. "10ci or 13" means R-10 continuous insulation (ci) on the interior or exterior surface of the wall or R-13 cavity insulation on the interior side of the wall.~~ "15ci or ~~19~~ 20 or 13 + 5ci" means R-15 continuous insulation (ci) on the interior or exterior surface of the wall, or ~~R-19~~ 20 cavity insulation on the interior side of the wall, or R-13 cavity insulation on the interior of the wall in addition to R-5 continuous insultation on the interior or exterior surface of the wall.

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. Baseline wall insulation is not required on warm-humid locations as defined by Figure R301.1 and Table R301.1.

g. 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.

h. Mas walls shall be in accordance with Section R402.2.5. The second R-value applies where more than half of the insulation is on the interior side of the mass wall.

i. A maximum U-factor of 032 shall apply in Climate Zones 3 through 8 to vertical fenestration products installed in buildings located either:

3. Above 4,000 feet in elevation, or

4. In windborne debris regions where protection of openings is required by Section R301.2.1.2 of the *International Residential Code*.

j. When adding insulation to an existing attic, or where any portion the finished ceiling surface is removed, ceilings with attic spaces shall be insulated to R-60 across the entire assembly area, except that tapering at the eaves is permitted provided the maximum possible R-value is achieved between the attic floor and ventilation baffles.

k. Prior to insulation installation, seams between the exterior wall top plate and sheathing and exterior wall top plate and interior finished surface shall be caulked or otherwise sealed. Also prior to insulation installation, baffles shall be installed accordance with R402.2.3.

l. Installing R-49 over 100 percent of the ceiling area requiring insulation shall be deemed to satisfy the requirement for R-60 wherever the full height of uncompressed R-49 insulation extends over the wall top plate at the eaves. In ceilings without attic spaces where the cavity is exposed from the interior or the sheathing or insulation is exposed during reroofing, R-30 shall be deemed to comply in place of R-60.

R503.1.1.1 Ceilings with Attic Spaces

Where Section R402.1.3requires R-49 insulation in the ceiling or attic, installing R-38 over 100 percent of the ceiling or attic area requiring insulation shall satisfy the requirement for R-49 insulation wherever the full height of uncompressed R-38 insulation extends over the wall top plate at the eaves. Where Section R402.1.3 requires R-60 insulation in the ceiling, i Installing R-49 over 100 percent of the ceiling area requiring insulation shall be deemed to satisfy the requirement for R-60 wherever the full height of uncompressed R-49 insulation extends over the wall top plate at the eaves. This reduction shall not apply to the insulation and fenestration criteria in [sic] and the Total UA alternative in Section R402.1.5.

R503.1.1.2 Ceilings without Attic Spaces

Where Section R402.1.3 requires insulation R-values greater than R-30 in the interstitial space above a ceiling and below the structural roof deck, and the design of the roof/ceiling assembly does not allow sufficient space for the required R-60 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 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.

R503.1.2 Revise section as follows:

HVAC ducts newly installed as part of an alteration shall comply with Section R403.

Exception: Where ducts from an existing heat and cooling system are extended to an addition, the new ducts shall only be required to comply with Sections R403.3.1, R403.3.2, and R403.3.7. Joints and seams shall comply with either the International Mechanical Code or International Residential Code, as applicable.

R503.1.2 Add sub-section as follows:

R503.1.2.1 Existing ducts, plenums, air handlers, and filter boxes

When heating or cooling equipment is replaced, accessible existing ducts, plenums, air handlers, and filter boxes shall be insulated per R403.3.1 and sealed per R403.3.2. Where

insulation in ceilings with attic spaces is disturbed, insulation installation quality shall be returned to its original condition or better.

R503.1.4 Revise as follows:

R503.1.4 Lighting

~~New lighting systems that are part of the alteration shall comply with Section R404.1.~~

~~**Exception:** Alterations that replace less than 10 percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power.~~

For any alteration requiring a permit, including non-lighting alterations, all lamps in new and existing permanent fixtures shall be high efficacy lamps.

R503.1.4.1 Exterior lighting

For Group R buildings, exterior lighting alteration shall comply with Section C405.5.

Exception: Less than 10 percent of the exterior lighting fixtures on the property are being replaced.

R505 Change of occupancy or use

R505.1 Revise section as follows:

R505.1 General

Any space that is converted to a dwelling unit or portion thereof from another use or occupancy shall comply with ~~this code~~ Section R502.

~~**Exception:** Where the simulated performance option in Section R405 is used to comply with this section, the annual energy cost of the proposed design is permitted to be 110 percent of the annual energy cost allowed by Section R405.2.~~

R505.1.1 Unconditioned space.

Any unconditioned or low-energy space that is altered to become a conditioned space shall comply with Section R502.

R506 Add section as follows:

R506 Extensive Alterations

R506.1 Extensive Alteration Approved Energy Compliance Methods

Buildings or dwelling units undergoing *extensive alterations* shall meet the requirements of Sections R506.2, R506.3, or R506.4.

1. Prescriptive (R506.2)
2. ERI (R506.3)
3. Passive House Institute EnerPHit certification (R506.4)

R506.2 Prescriptive Compliance

For prescriptive compliance, buildings or dwelling units following this path shall comply with the requirements of Sections R506.2.1 through R506.2.5.

R506.2.1 Building envelope.

The building thermal envelope shall comply with the requirements of Sections R506.2.1.1 through R506.2.1.3.

R506.2.1.1 Insulation and fenestration criteria

Replacement fenestration and building cavities exposed during construction shall meet the requirements of Table R502.1.1.1(1) or Table R502.1.1.1(2).

R506.2.1.1.1 Ceilings with Attic Spaces

Each dwelling containing a vented attic shall have a minimum of R-60 ceiling insulation regardless of whether the ceiling is part of the alteration.

~~Where Section R402.1.3requires R-49 insulation in the ceiling or attic, installing R-38 over 100 percent of the ceiling or attic area requiring insulation shall satisfy the requirement for R-49 insulation wherever the full height of uncompressed R-38 insulation extends over the wall top plate at the eaves. Where Section R402.1.3 requires R-60 insulation in the ceiling, i~~

Exception: Installing R-49 over 100 percent of the ceiling area requiring insulation shall be deemed to satisfy the requirement for R-60 wherever the full height of uncompressed R-49 insulation extends over the wall top plate at the eaves. This reduction shall not apply to the insulation and fenestration criteria in and [*sic*] the Total UA alternative in Section R402.1.5.

R506.2.1.1.2 Ceilings without Attic Spaces

Where ~~Section R402.1.3 requires insulation R-values greater than R-30 in the interstitial space above a ceiling and below the structural roof deck, and~~ the design of the roof/ceiling assembly does not allow sufficient space for the required R-60 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 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.

R506.2.1.3 Air leakage

Each building or dwelling unit shall achieve a minimum 15 percent infiltration reduction as determined with pre-construction and post-construction blower door tests, or achieve a minimum infiltration rate of 7 ACH50, whichever results a lower final infiltration rate.

Exceptions:

1. Dwelling units where less than 50 percent of the building thermal envelope cavities are exposed during the alteration are exempt.
2. Pre-construction blower door testing and a 15 percent infiltration reduction are not required if a post-installation blower door test verifies the infiltration rate to be 3 ACH50 or lower.

R506.2.1.3.1 Mechanical ventilation

Where the final tested air leakage rate is 5 ACH50 or lower, whole-house mechanical ventilation shall be installed per the *International Energy Conservation Code Section* R403.6, as amended.

R506.2.2 Heating and cooling systems

R506.2.2.1 New heating systems, cooling systems, and associated distribution systems installed as part of an *extensive alteration* shall comply with Section R403.

Exception: Where ducts from an existing heat and cooling system are extended to an addition, the new ducts shall only be required to comply with Sections R403.3.1, R403.3.2, and R403.3.7. Joints and seams shall comply with either the International Mechanical Code or International Residential Code, as applicable.

R506.2.2.2 Existing ducts, plenums, air handlers, and filter boxes

When heating or cooling equipment is replaced, existing accessible ducts, plenums, air handlers, and filter boxes shall be sealed per R403.3.2. Existing accessible ducts shall also be insulated per R403.3.1. Where insulation is disturbed, the insulation installation quality shall be returned to its original condition or better.

R506.2.3 Service hot water systems

New service hot water systems that are part of the *extensive alteration* shall comply with Section R403.5.

R506.2.4 Interior Lighting

For any alteration requiring a permit, including non-lighting alterations, all lamps in new and existing permanent fixtures shall be high efficacy lamps.

R506.2.5 Exterior lighting

For Group R buildings, exterior lighting shall comply with Section C405.5.

R506.3 Energy Rating Index Alternative

Compliance with this section requires that the provisions of Sections C406.3 through C406.6 of CMR 780 51.00 are met. Maximum HERS Index values shall be in accordance with the *Whole House Renovations; Additions* column of Table R406.4.

R506.4 Passive House Institute EnerPHit certification

Compliance with this section requires that each building or dwelling unit meets the provisions of the Passive House Institute EnerPHit program. Pre-certification by a certified Passive House Consultant or certified Passive House Designer shall be provided to the code official prior to issuance of a permit and a verified “as-built” EnerPHit report shall be provided to the code official prior to issuance of the certificate of occupancy.

AA104.3 Existing Large Area and High Energy Use Buildings: Reserved