Docket # 768

THE COMMONWEALTH OF MASSACHUSETTS
William Francis Galvin
Secretary of the Commonwealth

Regulation Filing *To be completed by filing agency*

CHAPTER NUMBER: **780 CMR 13.00**

CHAPTER TITLE: **Energy Efficiency**

AGENCY: State Board of Building Regulations and Standards

SUMMARY OF REGULATION: *State the general requirements and purposes of this regulation.*

The proposed changes to the regulations at this time amend Chapters 13, 51, and 115.AA to the latest IECC 2015 and ASHRAE 90.1-2013 energy standards to lower consumption requirements, modernize building envelope, ventilation, insulation systems and other measures, and promote cost savings for builders, owners, and residents through offsets and improved efficiency.

REGULATORY AUTHORITY: **G.L. c. 143 s. 94**

AGENCY CONTACT: **Stephen Carley** PHONE: **617-727-3200**

ADDRESS: **One Ashburton Place, Room 1301, Boston, MA 02108**

Compliance with M.G.L. c. 30A

EMERGENCY ADOPTION - *If this regulation is adopted as an emergency, state the nature of the emergency.*

PRIOR NOTIFICATION AND/OR APPROVAL - *If prior notification to and/or approval of the Governor, Legislature or others was required, list each notification, and/or approval and date, including notice to the Local Government Advisory Commission.*

LGAC notified April 22, 2016
Executive Order 562 approval received April 21, 2016

PUBLIC REVIEW - *M.G.L. c. 30A sections 2 and/or 3 requires notice of the hearing or comment period, including a small business impact statement, be filed with the Secretary of the Commonwealth, published in appropriate newspapers, and sent to persons to whom specific notice must be given at least 21 days prior to such hearing or comment period.*

Date of public hearing or comment period: **June 14-26, 2016**

FISCAL EFFECT - *Estimate the fiscal effect of the public and private sectors.*

For the first and second year: _____

For the first five years: _____

No fiscal effect: _____

SMALL BUSINESS IMPACT - *M.G.L. c. 30A section 5 requires each agency to file an amended small business impact statement with the Secretary of the Commonwealth prior to the adoption of a proposed regulation. If the purpose of this regulation is to set rates for the state, this section does not apply.*

Date amended small business impact statement was filed: **July 27, 2016**

CODE OF MASSACHUSETTS REGULATIONS INDEX - *List key subjects that are relevant to this regulation:*

Energy
Building Code
Efficiency
Stretch Code

PROMULGATION - *State the action taken by this regulation and its effect on existing provisions of the Code of Massachusetts Regulations (CMR) or repeal, replace or amend. List by CMR number:*

This amendment to 780 CMR 13.00: Energy Efficiency replaces the previous 780 CMR 13.00 in its entirety.

ATTESTATION - *The regulation described herein and attached hereto is a true copy of the regulation adopted by this agency.* ATTEST:

SIGNATURE: _____ DATE: 7/28/16

Publication - *To be completed by the Regulations Division*

MASSACHUSETTS REGISTER NUMBER: 1319 DATE: 8/12/16

EFFECTIVE DATE: 8/12/16

CODE OF MASSACHUSETTS REGULATIONS

Remove these pages:	*Insert these pages:*
71, 72	71 - 74.2

A TRUE COPY ATTEST
WILLIAM FRANCIS GALVIN
SECRETARY OF THE COMMONWEALTH
DATE 7/28/16 CLERK CM

780 CMR: MASSACHUSETTS AMENDMENTS TO THE *INTERNATIONAL BUILDING CODE 2009*

CHAPTER 13: ENERGY EFFICIENCY

1300.1 Add the following sections as follows:

1300.1 Adoption. Buildings shall be designed and constructed in accordance with the 2015 International Energy Conservation Code (IECC), as amended by 780 CMR 13.00.

Concurrency. Applications for building permits and related construction and other documents filed through January 1, 2017, may comply either with 780 CMR 13.00, 51.00: *Massachusetts Residential Code* and 115.00: *Appendix AA* effective August 12, 2016, or with the versions of those provisions in effect immediately prior to August 12, 2016, but not a mix of both. After January 1, 2017, concurrency with the prior versions ends, and all applications for building permits and related construction and other documents shall comply with the amended provisions only.

1301.1.1 Revise subsection as follows:

[E] 1301.1.1 Criteria. Buildings shall be designed and constructed in accordance with the 2015 International Energy Conservation Code (IECC) with Massachusetts Amendments in 780 CMR 13.00. These amendments apply to the IECC and to ANSI/ASHRAE/IESNA 90.1-2013.

Exception. Temporary structures, as regulated by Section 3103, do not need to comply with the building envelope requirements of Chapter 13.

C401.2 Revise section as follows:

C401.2 Application. Commercial buildings shall comply with one of the following:
1. The requirements of ANSI/ASHRAE/IESNA 90.1-2013, as modified by C401.2.2 if following APPENDIX G and otherwise by C406.1.
2. The requirements of Sections C402 through C405. In addition, commercial buildings shall comply with Section C406 and tenant spaces shall comply with Section C406.1.1.
3. The requirements of Sections C402.5, C403.2, C404, C405.2, C405.3, C405.4, C405.6 and C407. The building energy cost, or the total annual energy use on either a site or source energy basis, shall be equal to or less than 85% of the standard reference design building. Source energy calculations shall comply with C401.2.2.1
4. Residential use buildings up to five stories may elect to comply with the energy provisions of Section N1106 found in 780 CMR 51.00: *Massachusetts Residential Code*, provided all units are separately rated, separately metered, individually heated and cooled and have kitchens.

C401.2.2 through C401.2.2.2 Add subsection as follows:

C401.2.2 Performance Rating Method for Source Energy. Add exception to ANSI/ASHRAE/IESNA 90.1-2013 APPENDIX G PERFORMANCE RATING METHOD, Section G1.1.

Exception: When APPENDIX G is used for the comparison of building energy consumption only, the comparison may be performed on site energy and/or on a source energy basis.

C401.2.2.1 Source Energy Method. For the purpose of quantifying the projected Source Energy consumption of a building the Site to Source Fuel Conversion factors in Table 401.2.2 shall apply.

13.00: continued

Table 401.2.2 Site to Source Fuel Conversion Factors

Load Type	Factor
Electric power use at the utility meter	3.01
Natural Gas	1.09
Fuel Oil	1.13
LPG	1.12
Purchased District Heating	
Hot Water	1.35
Steam	1.45
Purchased District Cooling	0.99
Fossil fuels not listed	1.1
Purchased Combined Heat and Power District Heat	*

* A source fuel conversion for purchased district heat supplied by a combined heat and power central utility will be published by the Massachusetts Department of Energy Resources on a per district system basis.

C401.2.2.2 Approved Software for Source Energy Calculation with Combined Heat and Power.

1. Determination of the source energy consumption and usage intensity when using purchased combined heat and power district heat shall be performed as an exceptional calculation using the Department of Energy Resources (DOER) approved Excel worksheet.
2. Determination of the source energy consumption and usage intensity for heat generated by a combined heat and power system located on-site shall be performed using software meeting the requirements of ASHRAE 90.1-2013 Normative Appendix G Performance Rating Method, Section G 2.2 Simulation Program, and has an explicitly stated capability to determine both the site and source energy use intensity for combined heat and power systems without the requirement for exceptional calculations as defined in ASHRAE 90.1-2013 Appendix G Section G2.5.

C402.2.5 Delete the Exception

C402.3 through C402.3.1 Reserved

C402.6 Add section as follows:

C402.6 Approved Calculation Software Tools. The following software tools are sufficient to demonstrate compliance with Section C401.2:

1. COMcheck: Version 4.0.4, or later. Can be accessed at: https://www.energycodes.gov/
2. Any other software tool approved by the Board of Building Regulations and Standards.

C405.1 Revise section as follows:

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

Exception: Dwelling units within commercial buildings shall not be required to comply with Sections C405.2 through C405.5, provided that they comply with Section R404.1. Walk-in coolers, walk-in freezers, refrigerated warehouse coolers, and refrigerated warehouse freezers shall comply with Section C403.2.15 or C403.2.16.

C405.10 Reserved

13.00: continued

C406.1 Revise section as follows:

C406.1 Requirements. Buildings shall comply with at least two of the following:

1. More efficient HVAC performance in accordance with Section C406.2.
2. Reduced lighting power density system in accordance with Section C406.3.
3. Enhanced lighting controls in accordance with Section C406.4.
4. On-site supply of renewable energy in accordance with Section C406.5.
5. Provision of a dedicated outdoor air system for certain HVAC equipment in accordance with Section C406.6.
6. High-efficiency service water heating in accordance with Section C406.7.

Exception 1: Buildings in municipalities not served by a participating Mass Save investor-owned gas or electric utility provider shall comply with at least one of the requirements in Section C406.1.

Exception 2: Buildings being designed utilizing ANSI/ASHRAE/IESNA 90.1-2013 must comply with Item 2 of C406.1 as well as at least one of the remaining items listed in C406.1.

C406.5 Revise section as follows:

C406.5 On-site Renewable Energy. Total minimum ratings of on-site renewable energy systems shall comply with one of the following:

1. Provide not less than 0.50 watts per square foot (5.4 W/m^2) of conditioned floor area.
2. Provide not less than 3% of the design energy used within the building for building mechanical and service water heating equipment and lighting regulated in Chapter 4.
3. Provide not less than 65% of the total annual energy used within the building for building space and service water heating with biomass fuel using direct vented combustion mechanical equipment rated at a minimum of 80 AFUE. The biomass fuel shall meet the eligible fuel and emission criteria under M.G.L. c. 25A, § 11F½ (Massachusetts alternative energy portfolio standard).
4. Provide not less than 65% of the total annual energy used within the building for building space and service water heating using a geothermal heat pump system with a coefficient of performance of not less than four.

C407.6.1.1 through C407.6.1.5 Add subsections as follows:

C407.6.1.1 Approved Alternative Energy Performance Methods. The requirements of this section are approved performance methods to demonstrate compliance with Section C407 without calculation of a standard reference design:

1. **RESNET Approved Software for Home Energy Rating System (HERS).** For residential units within a building up to five stories above grade plane, and with independent unit-level heating and cooling systems, a HERS rater verified Index Score of 55 or less for the finished units together with a completed and HERS rater verified ENERGY STAR Rater Field Checklist may be used. Compliance with this section requires that the criteria of C402.4, C403.2, C404, and C405 are met.
2. **Passive House Institute US (PHIUS) Approved Software.** PHIUS+ 2015: Passive Building Standard - North America, or another approved software by PHIUS, where Specific Space Heat Demand, as modeled by a Certified Passive House Consultant, is less than or equal to 10 kBTU/ft^2/year. Compliance with this section requires that the criteria of C402.4, C403.2, C404, and C405 are met.
3. **ENERGY STAR Homes 3.1 path.** New residential structures, or additions to existing residential structures, or portions thereof, as certified to conform with the ENERGY STAR Certified Homes standard, Version 3.1.
4. Any other software and/or rating standard approved by the Board of Building Regulations and Standards.

C407.6.1.2 Documentation. The following documentation is required for energy code compliance under subsection C407.6.1.1, Item 1:

13.00: continued

1. If using HERS Index software:
   a. Prior to the issuance of a building permit, the following items must be provided to the Building Official:
      i. a HERS compliance report which includes a proposed HERS Index Score of 55 or lower;
      ii. a description of the unit's energy features; and
      iii. a statement that the rating index is "based on plans".
   b. Prior to the issuance of a certificate of occupancy, the following items must be provided to the building official:
      i. a copy of the final certificate indicating that the HERS Index Score for each unit is verified to be 55 or less, with a completed HERS rater verified ENERGY STAR Rater Field Checklist is to be submitted to the building official. The HERS rating compliance shall be determined before electrical renewable energy systems are credited; and
      ii. a certificate, as required by Section R401.3 for each unit, that lists the HERS Index Score of the dwelling unit.
2. If using the PHIUS software:
   a. Prior to the issuance of a building permit, the following items must be provided to the Building Official:
      i. A list of compliance features; and
      ii. A statement that the estimated Specific Space Heat Demand is "based on plans".
   b. Prior to the issuance of a certificate of occupancy, the following item must be provided to the building official:
      i. A copy of the final report, submitted on a form that is approved to document compliance with PHIUS+ 2015 standards. Said report must indicate that the finished building achieves a Certified Passive House Consultant-verified Specific Space Heat Demand of less than or equal to 10kBTU/ft^2/year.
3. If using ENERGY STAR Homes, Version 3.1 path:
   a. Prior to the issuance of a building permit, the following items must be provided to the Building Official:
      i. A copy of the preliminary HERS rating, based on plans;
      ii. A copy of the ENERGY STAR v 3.1 Home Report; and
      iii. A copy of the Rater Design Review Checklist.
   b. Prior to the issuance of a certificate of occupancy, the following items must be provided to the Building Official:
      i. A copy of the certified HERS rating; and
      ii. A copy of the signed ENERGY STAR Rater Field Checklist.

C407.6.1.3 Energy Rating Index. The Energy Rating Index (ERI) shall be a numerical integer value that is based on a linear scale constructed such that the ERI reference design has an Index value of 100 and a residential building that uses no net purchased energy has an Index value of zero. Each integer value on the scale shall represent a 1% change in the total energy use of the rated design relative to the total energy use of the ERI reference design. The ERI shall consider all energy used in the residential building. The RESNET Home Energy Rating System (HERS) index is the approved ERI approach in Massachusetts.

C407.6.1.4 ERI-based Compliance. Compliance based on an ERI analysis requires that the rated design be shown to have an ERI less than, or equal to, the appropriate value listed in Table C407.6.1.4, when compared to the ERI reference design prior to issuance of any credit for onsite renewable electric generation.

C407.6.1.4.1 Trade-off for Onsite Renewable Energy Systems. New construction following C407.6.1.3, and existing buildings and additions following C501.4 may use any combination of the following renewable trade-offs to increase the maximum allowable HERS Index Score for each unit separately served by any combination of the following:

1. Solar photovoltaic array, rated at 2.5kW or higher, shall offset five HERS points;

13.00: continued

2. Clean Biomass Heating System, solar thermal array, or ground source heat pump, or a combination of these systems, operating as the primary heating system shall offset five HERS points; and
3. Solar thermal array for primary domestic hot water heating or Clean Biomass Stove shall offset two HERS points.

Note: a Clean Biomass Stove offset may not be combined with a primary heating system offset.

Table C407.6.1.4 Maximum HERS Index Scores with Onsite Renewable Energy Systems

Renewable Energy Source	Maximum HERS Index Score	
	New Construction	Whole House Renovations; Additions
None	55	65
Solar PV > 2.5 kW; or Renewable primary heating system	60	70
Solar PV & solar thermal DHW; or Renewable primary heating & solar thermal DHW	62	72
Solar PV & Renewable primary heating & solar thermal DHW	67	77

C407.6.1.5 Verification by Approved Agency. Verification for compliance with Section C407.6.1 through C407.6.1.4.1 shall be completed by an approved third party. For compliance using a HERS Index rating or ENERGY STAR for Homes v. 3.1 certification, verification of compliance shall be completed by a certified HERS rater. For compliance with PHIUS+ 2015, compliance shall be completed by a certified Passive House consultant.

NON-TEXT PAGE

Docket # 769

THE COMMONWEALTH OF MASSACHUSETTS
William Francis Galvin
Secretary of the Commonwealth

Regulation Filing *To be completed by filing agency*

CHAPTER NUMBER: **780 CMR 51.00**

CHAPTER TITLE: **Massachusetts Residential Code**

AGENCY: State Board of Building Regulations and Standards

SUMMARY OF REGULATION: *State the general requirements and purposes of this regulation.*

The proposed changes to the regulations at this time amend Chapters 13, 51, and 115.AA to the latest IECC 2015 and ASHRAE 90.1-2013 energy standards to lower consumption requirements, modernize building envelope, ventilation, insulation systems and other measures, and promote cost savings for builders, owners, and residents through offsets and improved efficiency.

REGULATORY AUTHORITY: **G.L. c. 143 s. 94**

AGENCY CONTACT: **Stephen Carley** PHONE: **617-727-3200**

ADDRESS: **One Ashburton Place, Room 1301, Boston, MA 02108**

Compliance with M.G.L. c. 30A

EMERGENCY ADOPTION - *if this regulation is adopted as an emergency, state the nature of the emergency.*

PRIOR NOTIFICATION AND/OR APPROVAL - *If prior notification to and/or approval of the Governor, Legislature or others was required, list each notification, and/or approval and date, including notice to the Local Government Advisory Commission.*

LGAC notified April 22, 2016
Executive Order 562 approval received April 21, 2016

PUBLIC REVIEW - *M.G.L. c. 30A sections 2 and/or 3 requires notice of the hearing or comment period, including a small business impact statement, be filed with the Secretary of the Commonwealth, published in appropriate newspapers, and sent to persons to whom specific notice must be given at least 21 days prior to such hearing or comment period.*

Date of public hearing or comment period: **June 14-26, 2016**

FISCAL EFFECT - *Estimate the fiscal effect of the public and private sectors.*

For the first and second year: _____

For the first five years: _____

No fiscal effect: _____

SMALL BUSINESS IMPACT - *M.G.L. c. 30A section 5 requires each agency to file an amended small business impact statement with the Secretary of the Commonwealth prior to the adoption of a proposed regulation. If the purpose of this regulation is to set rates for the state, this section does not apply.*

Date amended small business impact statement was filed: **July 27, 2016**

CODE OF MASSACHUSETTS REGULATIONS INDEX - *List key subjects that are relevant to this regulation:*

Energy
Building Code
Efficiency
Stretch Code

PROMULGATION - *State the action taken by this regulation and its effect on existing provisions of the Code of Massachusetts Regulations (CMR) or repeal, replace or amend. List by CMR number:*

This amendment to 780 CMR 51.00: Massachusetts Residential Code replaces the previous Section 11 of 780 CMR 51.00 in its entirety.

ATTESTATION - *The regulation described herein and attached hereto is a true copy of the regulation adopted by this agency.* ATTEST:

SIGNATURE: _____ DATE: 7/28/16

Publication - *To be completed by the Regulations Division*

MASSACHUSETTS REGISTER NUMBER: 1319 DATE: 8/12/16

EFFECTIVE DATE: 8/12/16

CODE OF MASSACHUSETTS REGULATIONS

Remove these pages:	*Insert these pages:*
221 - 224 235, 236	221 - 224 235, 236

A TRUE COPY ATTEST
WILLIAM FRANCIS GALVIN
SECRETARY OF THE COMMONWEALTH
DATE 7/28/16 CLERK CM

51.00: continued

R403.1.6 Add the designation "A 307 or other applicable steel" before the word "anchor bolt" in the first sentence of the second paragraph. Also, after the words "anchor bolts" insert the text "installed in accordance with the manufacturer's printed instructions."

R404.1.7 Add a last sentence as follows:

Backfill material shall be free draining and free of organic materials, construction debris, cobbles and boulders, shall be placed in lifts not exceeding 12-inches and shall be mechanically compacted.

R406.2 After the last paragraph (on membranes) add this paragraph:

Through-wall formwork ties shall be removed from both faces of the foundation walls which enclose basements, cellars, below-grade garages or any space having the potential to be converted to useable or occupied space. Remaining holes shall be patched with hydraulic cement.

R408.7 Delete the exception.

R501.3 Add new subsection.

R501.3 Fire Protection of Floors. Floor assemblies not using dimension lumber or structural composite lumber equal to or greater than 2-inch nominal dimension, shall be provided with a ½ inch gypsum wallboard membrane, ⅝ inch wood structural panel membrane, or equivalent on the underside of the floor framing member unless required elsewhere in this code to be fire resistance rated.

Exceptions:

1. Other approved floor assemblies demonstrating equivalent fire performance.
2. Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA13D, or other approved equivalent sprinkler system.
3. Floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances.
4. One room or alcove per story not exceeding 80 square feet, when supported between structural walls.

R502.2.2 At the end of this paragraph add this text "and no live load acting on the interior span."

R502.3 At the end of the second sentence add this text:

"or the American Wood Council (AWC) *Maximum Span Calculator for Wood Joists & Rafters* found at http://www.awc.org/calculators/span/calc/timbercalcstyle.asp"

R502.11.1 Replace "registered professional" with "registered design professional".

R506.1.1 Add subsection, exception, and associated table:

R506.1.1 Control Joints. Slabs shall be constructed with control joints having a depth of at least one quarter of the slab thickness but not less than one inch (25 mm). Joints shall be spaced at intervals not greater than 30 feet (9144 mm) in each direction. Control joints shall be placed at locations where the slab width or length changes.

Exception. Control joints may be omitted when the slab is reinforced in accordance with Table R506.1.1. Reinforcement shall be placed at the mid-depth of the slab or two inches (51 mm) from the top of slabs greater than four inches (102 mm) in thickness.

Table R506.1.1

Maximum Dimension of Slab or Distance Between Control Joints (ft.)						WWF Wire Spacing (in.)	WWF Wire Size Designation (in.)
Slab Thickness (in.)							
3.5	4	4.5	5.0	5.5	6		
42	36	32	29	26	24	6 x 6	W1.4 x W1.4
59	52	46	42	38	35	6 x 6	W2.0 x W2.0
86	75	67	60	55	50	6 x 6	W2.9 x W2.9

51.00: continued

R602.10 Add a second exception as follows:

Exception 2. Unconditioned single story rooms, of areas less than 600 sq. ft., where the main dwelling is connected to the room via an exterior door or slider and no other openings between the main dwelling and room exist (*i.e.* thermally isolated).

702.3.5.1 Add subsection:

702.3.5.1 Ceiling attachment. Only designs or methods that use mechanical fasteners in accordance with Table R702.3.5 shall be used for attaching gypsum board to ceilings in buildings governed by this code including manufactured buildings. Alternative designs, such as using adhesive only, are not permitted.

R802.4 Add this text to the end of the second sentence:

'or utilize the American Wood Council (AWC) *Maximum Span Calculator for Wood Joists & Rafters* found at http://www.awc.org/calculators/span/calc/timbercalcstyle.asp

R802.5 Add this text to the end of the second sentence:

'or utilize the American Wood Council (AWC) *Maximum Span Calculator for Wood Joists & Rafters* found at http://www.awc.org/calculators/span/calc/timbercalcstyle.asp

R901.1 Add a final sentence as follows:

In roofing and reroofing, the energy conservation requirements of Chapter 11 must also be satisfied.

R905.1 Add a final sentence as follows:

Where there is a discrepancy between the requirements of this section and the manufacturer's printed instructions or code evaluation report, the manufacturer's printed instructions or code evaluation report shall govern.

R906.1 Add a final sentence as follows:

In roofing and reroofing, the energy conservation requirements of Chapter 11 must also be satisfied.

R1001.1 Add a second sentence that reads:

Chimneys shall be structurally sound, durable, smoke tight and capable of conveying flue gases to the exterior safely.

R1003.11 Add a second sentence that reads:

Liner size, length and installation shall be in accordance with this code or the appliance manufacturer's requirements as applicable.

N1100.1 Add the following sections as follows:

1100.1 Adoption. Buildings shall be designed and constructed in accordance with the 2015 International Energy Conservation Code (IECC), as amended by 780 CMR 51.00 sections N1100.1 through N1111.2.

Concurrency. Applications for building permits and related construction and other documents filed through January 1, 2017, may comply either with 780 CMR 13.00: *Energy Efficiency*, 51.00 and 115.00: *Appendix AA* effective August 12, 2016, or with the versions of those provisions in effect immediately prior to August 12, 2016, but not a mix of both. After January 1, 2017, concurrency with the prior versions ends, and all applications for building permits and related construction and other documents shall comply with the amended provisions only.

51.00: continued

N1101.1 Revise the section as follows:

N1101.1 Scope. This chapter regulates the energy efficiency for the design and construction of buildings regulated by 780 CMR. Municipalities which have adopted the Stretch Energy Code shall use the energy efficiency requirements of 780 CMR 115.00: *Appendix AA*.

N1101.6 (R202) Add and/or revise the following defined terms:

CLEAN BIOMASS STOVE. Wood- or pellet-fired stoves that are EPA certified; and have a particulate matter emissions rating of no more than 3.5 g/hr for non-catalytic wood and pellet stoves; or 2.0 g/hr for catalytic wood and pellet stoves.

CLEAN BIOMASS HEATING SYSTEMS. Wood-pellet fired central boilers and furnaces where the equipment has a thermal efficiency rating of 80% (higher heating value) or greater; and a particulate matter emissions rating of no more than 0.15 lb/MMBtu PM heat output.

N1101.13 Revise the section as follows:

N1101.13 (R401.2) Compliance. Projects shall comply with one of the following:

1. Sections N1101.14 through N1104.
2. Section N1105 and the provisions of Sections N1101.14 through N1104 labeled "Mandatory."
3. An energy rating index (ERI) approach, or approved alternative energy performance rating method in Section N1106 and the provisions of Sections N1101.14 through N1104 labeled "Mandatory".

Qualifying approaches under N1106 include the following:

a. Certified RESNET HERS rating with Massachusetts amendments.
b. Certified Energy Star Homes, Version 3.1.
c. Certified Passivehaus performance method.

N1101.14 (R401.3) Add the following to the end of the paragraph:

"The Certificate shall list the final HERS Index Score when applicable."

Table N1102.1.2 (R402.1.2) Revise the table as follows:

Climate Zone 5 and Marine 4 Fenestration U Factor shall be "0.30".

Table N1102.1.4 (R402.1.4) Revise the table as follows:

Climate Zone 5 and Marine 4 Fenestration U Factor shall be "0.30".

N1102.1.5.1 Add the subsection as follows:

N1102.1.5.1 Approved Software for Total UA Alternative. The following software is approved for demonstrating Total UA compliance:

1. REScheck Version 4.6.2 or later, available at http://www.energycodes.gov/rescheck
2. REScheck-Web available at https://energycode.pnl.gov/REScheckWeb/

N1103.3.3 (R403.3.3) Add the following paragraph before the exception:

Post-construction or rough-in testing and verification shall be done by a HERS Rater, HERS Rating Field Inspector, or an applicable BPI Certified Professional.

N1103.6 (R403.6) Replace the section as follows:

N1103.6 (R403.6) Mechanical Ventilation (Mandatory). Each dwelling unit of a residential building shall be provided with continuously operating exhaust, supply or balanced mechanical ventilation that has been site verified to meet a minimum airflow per:

51.00: continued

1. the Energy Star Homes' Version 3.1;
2. ASHRAE 62.2-2013; or
3. the following formula for one- and two-family dwellings and townhouses of three or fewer stories above grade plane:

$$Q = .03 \times CFA + 7.5 \times (N_{br} + 1) - 0.052 \times Q_{50} \times S \times WSF$$

Where: CFA is the conditioned floor area in sq ft
N_{br} is the number of bedrooms
Q_{50} is the verified blower door air leakage rate in cfm measured at 50 Pascals
S is the building height factor determined by this table:

Stories Above Grade Plane	1	2	3
S	1.00	1.32	1.55

WSF is the shielded weather factor as determined by this table:

County	WSF
Barnstable	0.60
Berkshire	0.52
Bristol	0.54
Dukes	0.59
Essex	0.58
Franklin	0.52
Hampden	0.49
Hampshire	0.59
Middlesex	0.55
Nantucket	0.61
Norfolk	0.52
Plymouth	0.53
Suffolk	0.66
Worcester	0.59

N1103.6.2 (R403.6.2) through N1103.6.6 (R403.6.6) Add the subsections as follows:

N1103.6.2 (R403.6.2) Verification. Installed performance of the mechanical ventilation system shall be tested and verified by a HERS Rater, HERS Rating Field Inspector, or an applicable BPI Certified Professional, and measured using a flow hood, flow grid, or other airflow measuring device in accordance with either RESNET Standard Chapter 8 or ACCA Standard 5.

N1103.6.3 (R403.6.3) Air-moving Equipment, Selection and Installation. As referenced in ASHRAE Standard 62.2-2013, Section 7.1, ventilation devices and equipment shall be tested and certified by AMCA (Air Movement and Control Association) or HVI (Home Ventilating Institute) and the certification label shall be found on the product. Installation of systems or equipment shall be carried out in accordance with manufacturers' design requirements and installation instructions. Where multiple duct sizes and/or exterior hoods are standard options, the minimum size shall not be used.

51.00: continued

N1103.6.4 (R403.6.4) Sound Rating. Sound ratings for fans used for whole building ventilation shall be rated at a maximum of 1.0 sone.

Exception: HVAC air handlers and remote-mounted fans need not meet sound requirements. There must be at least 4 feet of ductwork between the remote-mounted fan and intake grille.

N1103.6.5 (R403.6.5) Documentation. The owner and the occupant of the dwelling unit shall be provided with information on the ventilation design and systems installed, as well as instructions on the proper operation and maintenance of the ventilation systems. Ventilation controls shall be labeled with regard to their function, unless the function is obvious.

N1103.6.6 (R403.6.6) Air Inlets and Exhausts. All ventilation air inlets shall be located a minimum of ten feet from vent openings for plumbing drainage systems, appliance vent outlets, exhaust hood outlets, vehicle exhaust, or other known contamination sources; and shall not be obstructed by snow, plantings, or any other material. Outdoor forced air inlets shall be covered with rodent screens having mesh openings not greater than ½ inch. A whole house mechanical ventilation system shall not extract air from an unconditioned basement unless approved by a registered design professional. Where wall inlet or exhaust vents are less than seven feet above finished grade in the area of the venting, including but not limited to decks and porches, a metal or plastic identification plate shall be permanently mounted to the exterior of the building at a minimum height of eight feet above grade directly in line with the vent terminal. The sign shall read, in print size no less than ½ inch in size, "MECH. VENT DIRECTLY BELOW. KEEP CLEAR OF ALL OBSTRUCTIONS".

Exceptions:

1. Ventilation air inlets in the wall ≥ three feet from dryer exhausts and contamination sources exiting through the roof.
2. No minimum separation distance shall be required between local exhaust outlets in kitchens/bathrooms and windows.
3. Vent terminations that meet the requirements of the National Fuel Gas Code (NFPA 54/ ANSI Z223 .1) or equivalent.

N1104.3 (R404.2) Reserved.

N1106.1 (R406.1) through N1106.1.2 Revise and/or add the section and subsections as follows:

N1106.1 (R406.1) Scope. This section establishes criteria for compliance using an Energy Rating Index (ERI) analysis, or approved alternative energy performance rating methods.

N1106.1.1 (R406.1.1) Approved alternative energy performance methods. The following rating threshold criteria are sufficient to demonstrate energy code compliance under section N1106 without calculation of a standard reference design. The mandatory provisions of subsection N1106.2 also apply:

1. **ENERGY STAR Homes 3.1 Path.** New buildings shall be certified to conform to the ENERGY STAR Certified Homes, Version 3.1 standard.
2. **Passive House Institute US (PHIUS) Approved Software.** PHIUS+ 2015: Passive Building Standard - North America, or another approved software by PHIUS, where Specific Space Heat Demand, as modeled by a Certified Passive House Consultant, is less than or equal to 10 kBTU/ft^2/year. Compliance with this section requires that the criteria of C402.4, C403.2, C404 and C405 are met.
3. Any other software and/or rating standard approved by the Board of Building Regulations and Standards.

N1106.1.2 (R406.1.2) Documentation. The following documentation is required for energy code compliance under subsection N1106.1.1:

51.00: continued

1. If using ENERGY STAR Homes, Version 3.1 path:
   a. Prior to the issuance of a building permit, the following items must be provided to the Building Official:
      i. A copy of the preliminary HERS rating, based on plans;
      ii. A copy of the ENERGY STAR v. 3.1 Home Report; and
      iii. A copy of the Rater Design Review Checklist.
   b. Prior to the issuance of a certificate of occupancy, the following items must be provided to the Building Official:
      i. A copy of the certified HERS rating; and
      ii. A copy of the signed ENERGY STAR Rater Field Checklist.
2. If using the PHIUS software:
   a. Prior to the issuance of a building permit, the following items must be provided to the Building Official:
      i. A list of compliance features; and
      ii. A statement that the estimated Specific Space Heat Demand is "based on plans".
   b. Prior to the issuance of a certificate of occupancy, the following item must be provided to the building official:
      i. A copy of the final report, submitted on a form that is approved to document compliance with PHIUS+ 2015 standards. Said report must indicate that the finished building achieves a Certified Passive House Consultant-verified Specific Space Heat Demand of less than or equal to 10kBTU/ft^2/year.

N1106.3 (R406.3) Add the following sentence to the end of the paragraph:

"The RESNET Home Energy Rating System (HERS) Index is the approved ERI approach in Massachusetts."

51.00: continued

N1106.4 (R406.4) Revise the section as follows:

N1106.4 (R406.4) ERI-based Compliance. Compliance based on an ERI analysis requires that the rated design be shown to have an ERI less than or equal to the appropriate value listed in Table N1106.4 when compared to the ERI reference design prior to credit for onsite renewable electric generation.

N1106.4.1 (R406.4.1) Add the subsection, and associated table, as follows:

N1106.4.1 (R406.4.1) Trade-off for Onsite Renewable Energy Systems. New construction following N1106.3 or existing buildings and additions following N1107.4 may use any combination of the following renewable energy trade-offs to increase the maximum allowable HERS Index Score for each unit separately served by any combination of the following:

1. Solar photovoltaic array rated at 2.5kW or higher shall offset five HERS points.
2. Clean Biomass Heating System, solar thermal array, or ground source heat pump, or a combination of these systems, operating as the primary heating system shall offset five HERS points.
3. Solar thermal array for primary domestic hot water heating or Clean Biomass Stove shall offset two HERS points.

Note: A Clean Biomass Stove offset may not be combined with a primary heating system offset.

Table N1106.4.1 (R406.4.1). Maximum HERS Index Scores with Onsite Renewable Energy Systems.

Renewable Energy Source	Maximum HERS Index	
	New Construction	Whole House Renovations; Additions
None	55	65
Solar PV > 2.5 kW; or Renewable primary heating system	60	70
Solar PV & solar thermal DHW; or Renewable primary heating & solar thermal DHW	62	72
Solar PV & Renewable primary heating & solar thermal DHW	67	77

N1106.5 (R406.5) Revise the section as follows:

N1106.5 (R406.5) Verification by Approved Agency. Verification of compliance with Section N1106 shall be completed by an approved third party. For compliance using a HERS rating or Energy Star Homes 3.1 certification, verification of compliance shall be completed by the certified HERS rater. For compliance using PHIUS+ 2015, verification of compliance shall be completed by a certified Passive House consultant.

N1108.1.2 (R502.1.2) Add an exception to the subsection as follows:

Exception: Alternatively, the addition and any alterations that are part of the project shall comply with N1106 and shall achieve a maximum HERS Index Score using Table N1106.4.1.

M1201.1 Add a final sentence as follows:

In this chapter where the design, installation, maintenance, alteration and/or inspection of mechanical systems is controlled by one of the *specialized codes* (*see* Chapter 1) the requirements of the *specialized codes* govern and enforcement shall be by a person other than the *building official*.

51.00: continued

M1301.1 Add a final sentence as follows:

In this chapter where the design, installation, maintenance, alteration and/or inspection of mechanical systems is controlled by one of the *specialized codes* (*see* Chapter 1) the requirements of the *specialized codes* govern and enforcement shall be by a person other than the *building official.*

M1303.2 Add subsection:

M1303.2 Solid Fuel-burning Appliance Labeling. Solid fuel-burning appliances (*see* Subsection M1303.3 for Central Heating Appliances) shall bear a permanent and legible factory-applied label supplied to the manufacturer and controlled by an approved testing agency; such label shall contain the following information:

1. Manufacturer's name and trademark;
2. Model and/or identification number of the appliance;
3. Type(s) of fuel(s) approved;
4. Testing laboratory's name or trademark and location;
5. Date tested;
6. Clearances to combustibles:
   a. Above top
   b. From front
   c. From back
   d. From sides
7. Floor protection*;
8. National test (listing) standard(s); and
9. Label serial number.

*If floor protection information is not on the label, it will be acceptable if contained with the User/Installation Manual.

M1303.3 Add subsection:

M1303.3 Solid Fuel-burning Central Heating Appliance Labeling. Solid fuel-burning boilers or warm air furnaces shall bear a permanent and legible factory-applied label supplied to the manufacturer and controlled by an approved testing agency; such label shall contain Subsection M1303.2 items 1. to 9. and the following information:

10. Type of appliance (boiler or warm air furnace);
11. Boilers, pressure vessels, and pressure relief devices must be stamped in accordance with M.G.L. c. 146, §§ 24 and 34.

M1401.1 Add a final sentence as follows:

In this chapter where the design, installation, maintenance, alteration and/or inspection of mechanical systems is controlled by one of the *specialized codes* (*see* Chapter 1) the requirements of the *specialized codes* govern and enforcement shall be by a person other than the *building official.*

M1401.6 Add subsection:

M1401.6 Solid Fuel-Burning Heating Appliances. Solid fuel-burning heating appliances include, but are not limited to: room heaters and stoves, fireplace inserts, furnaces and boilers. The fuel for such appliances includes, but is not limited to: wood, wood pellets, coal, nut shells, and corn. Solid fuel-burning appliances shall be tested and listed by approved agencies and installed, operated and maintained in accordance with such listing, the manufacturers' requirements and otherwise conform to the requirements of this chapter or those found in the *International Mechanical Code.*

Notes:

1. No solid fuel-burning appliance shall be installed in Massachusetts unless such appliance conforms to all applicable requirements of this chapter, including the testing and listing of all clearances to combustibles and identification of required floor protection.

51.00: continued

AJ401.4 Replace as follows:

AJ401.4 Structural. Unreinforced masonry townhouse buildings shall have parapet bracing and wall anchors installed at the roofline whenever a reroofing *permit* is issued if required by 780 CMR 34.00: *Existing Structures*. Such parapet bracing and wall anchors shall be of an *approved* design. Where renovations may decrease the structural performance of the existing building, such proposed activities shall be evaluated by a *registered design professional* for adequacy, prior to such actual structural renovation.

AJ501.4 Add a final sentence as follows:

"Where alterations may decrease the structural performance of the existing building, such proposed activities shall be evaluated by a *registered design professional* for adequacy, prior to such actual structural alterations".

AJ501.5 Replace this subsection in its entirety as follows:

AJ501.5 Electrical Equipment and Wiring. *See* 527 CMR 12.00: *Massachusetts Electrical Code (Amendments)*.

AJ601.5. Add subsection:

AJ601.5 Structural. Where reconstruction may decrease the structural performance of the existing building, such proposed activities shall be evaluated by a *registered design professional* for adequacy, prior to such actual structural reconstruction.

AJ701 Add section:

SECTION AJ701
HISTORIC BUILDINGS

AJ701.1 General. For historic building requirements *see* 780 CMR 34.00: *Existing Buildings*.

APPENDIX K - SOUND TRANSMISSION

Massachusetts adopts this Appendix without amendment.

APPENDIX L - PERMIT FEES

Massachusetts does not adopt this Appendix. *See* 801 CMR 4.00: *Rates*, as applicable.

APPENDIX M - HOME DAY CARE -- R-3 OCCUPANCY

Delete

APPENDIX N - VENTING METHODS

Delete.

APPENDIX O - GRAY WATER RECYCLING SYSTEMS: Reserved.

APPENDIX P - SIZING OF WATER PIPING SYSTEM

Delete.

APPENDIX Q - ICC INTERNATIONAL RESIDENTIAL CODE ELECTRICAL PROVISIONS/NATIONAL ELECTRICAL CODE CROSS-REFERENCE

Delete.

APPENDIX U: Reserved

NON-TEXT PAGE

Docket # 770

THE COMMONWEALTH OF MASSACHUSETTS
William Francis Galvin
Secretary of the Commonwealth

Regulation Filing *To be completed by filing agency*

CHAPTER NUMBER: **780 CMR 115.00**

CHAPTER TITLE: Appendices

AGENCY: State Board of Building Regulations and Standards

SUMMARY OF REGULATION: *State the general requirements and purposes of this regulation.*

The proposed changes to the regulations at this time amend Chapters 13, 51, and 115.AA to the latest IECC 2015 and ASHRAE 90.1-2013 energy standards to lower consumption requirements, modernize building envelope, ventilation, insulation systems and other measures, and promote cost savings for builders, owners, and residents through offsets and improved efficiency.

REGULATORY AUTHORITY: **G.L. c. 143 s. 94**

AGENCY CONTACT: **Stephen Carley** PHONE: **617-727-3200**

ADDRESS: **One Ashburton Place, Room 1301, Boston, MA 02108**

Compliance with M.G.L. c. 30A

EMERGENCY ADOPTION - *if this regulation is adopted as an emergency, state the nature of the emergency.*

PRIOR NOTIFICATION AND/OR APPROVAL - *If prior notification to and/or approval of the Governor, Legislature or others was required, list each notification, and/or approval and date, including notice to the Local Government Advisory Commission.*

LGAC notified April 22, 2016
Executive Order 562 approval received April 21, 2016

PUBLIC REVIEW - *M.G.L. c. 30A sections 2 and/or 3 requires notice of the hearing or comment period, including a small business impact statement, be filed with the Secretary of the Commonwealth, published in appropriate newspapers, and sent to persons to whom specific notice must be given at least 21 days prior to such hearing or comment period.*

Date of public hearing or comment period: **June 14-26, 2016**

FISCAL EFFECT - *Estimate the fiscal effect of the public and private sectors.*

For the first and second year: _____

For the first five years: _____

No fiscal effect: _____

SMALL BUSINESS IMPACT - *M.G.L. c. 30A section 5 requires each agency to file an amended small business impact statement with the Secretary of the Commonwealth prior to the adoption of a proposed regulation. If the purpose of this regulation is to set rates for the state, this section does not apply.*

Date amended small business impact statement was filed: **July 27, 2016**

CODE OF MASSACHUSETTS REGULATIONS INDEX - *List key subjects that are relevant to this regulation:*

Energy
Building Code
Efficiency
Stretch Code

PROMULGATION - *State the action taken by this regulation and its effect on existing provisions of the Code of Massachusetts Regulations (CMR) or repeal, replace or amend. List by CMR number:*

This amendment to 780 CMR 115.00: Appendix AA (Stretch Energy Code) replaces the previous 780 CMR 115.00: Appendix AA in its entirety.

ATTESTATION - *The regulation described herein and attached hereto is a true copy of the regulation adopted by this agency.* ATTEST:

SIGNATURE: _____ DATE: 7/28/16

Publication - *To be completed by the Regulations Division*

MASSACHUSETTS REGISTER NUMBER: 1319 DATE: 8/12/16

EFFECTIVE DATE: 8/12/16

CODE OF MASSACHUSETTS REGULATIONS

Remove these pages:	*Insert these pages:*
305 - 324	305, 306

A TRUE COPY ATTEST
WILLIAM FRANCIS GALVIN
SECRETARY OF THE COMMONWEALTH
DATE 7/28/16 CLERK CM

115.00: continued

G801.2 through 5 Delete subsections.

G901.3 Floodway Encroachment Reserved.

G1001.1 Replace the words "International Building Code" with "this code".

G1001.6 Replace as follows:

G1001.6 Protection of Mechanical and Electrical Systems in a Flood-hazard Zone: New and replacement electrical, heating, ventilating, air conditioning and other service equipment in a *flood-hazard area* shall either be placed above the *base flood elevation* or protected so as to prevent water from entering or accumulating within the system components during floods up to the *base flood elevation* in accordance with the mechanical code listed in Chapter 1.0. Installation of electrical wiring and outlets, switches, junction boxes and panels below the *base flood elevation* shall conform to the provisions of 527 CMR 12.00: *2008 Massachusetts Electrical Code (Amendments)* listed in Chapter 1.0 for location of such items in wet locations. Duct insulation subject to water damage shall not be installed below the *base flood elevation*.

APPENDIX H: Adopted in its entirety

APPENDIX I: Adopted in its entirety.

APPENDIX J: Amend as follows:

J101.1 At the end of the first sentence add this text:

'when directly associated with the construction, alteration, repair, or demolition of buildings or structures.'

APPENDIX K: ADMINISTRATIVE PROVISIONS Reserved, not adopted.

APPENDIX AA:

APPENDIX AA: STRETCH ENERGY CODE

AA101 Purpose and Adoption. The purpose of the stretch energy code is to provide a more energy efficient code alternative for new buildings. The stretch energy code may be adopted or rescinded by any municipality in the commonwealth in the manner prescribed by law.

AA102 Applicability. Municipalities that have adopted the stretch energy code shall use the energy efficiency requirements of this appendix as provided below. These requirements replace all previous stretch energy code requirements.

Concurrency. Applications for building permits and related construction and other documents filed through January 1, 2017, may comply either with 780 CMR 13.00: *Energy Efficiency*, 51.00: *Massachusetts Residential Code* and 115.00: *Appendix AA* effective August 12, 2016, or with the versions of those provisions in effect immediately prior to August 12, 2016, but not a mix of both. After January 1, 2017, concurrency with the prior versions ends, and all applications for building permits and related construction and other documents shall comply with the amended provisions only.

AA103 New Buildings.

AA 103.1 R-use Buildings. In all R-use buildings, of four stories or fewer above grade plane with one or more dwelling units, each dwelling unit shall comply with Section N1106 of 780 CMR 51.00: *Massachusetts Residential Code*.

AA103.2 Large Area and High Energy Use Buildings. All buildings over 100,000 sq ft, and new supermarkets, laboratories and conditioned warehouses over 40,000 sq. ft. shall comply with 780 CMR 13.00: *Energy Efficiency* and shall demonstrate energy use per square foot at least 10% below the energy requirements of ANSI/ASHRAE/IESNA 90.1--2013 APPENDIX G Performance Rating Method on either a site or source energy basis.

115.00: continued

AA103.3 Other New Buildings. New buildings not covered in AA103.1 and AA103.2 shall comply with 780 CMR 13.00: *Energy Efficiency* or 51.00: *Massachusetts Residential Code*, Sections N1100.1 through N1111.2, as applicable based on the use and occupancy of the building.

AA104 Existing Buildings. For alterations, renovations, additions or repairs of existing buildings in these municipalities the energy efficiency requirements of 780 CMR 13.00: *Energy Efficiency* or 51.00: *Massachusetts Residential Code*, Sections N1100.1 through N1111.2, shall be used as applicable based on the use and occupancy of the building.