

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, as amended.

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.

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:

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
Q₅₀ 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.

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 \geq 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/ft²/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:

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 10 kBTU/ft²/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.”

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 > 2.5kW, 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.

APPENDIX U: Reserved.

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