PSD

Part 1 - Overview

mass save

2025 Residential Stretch Code

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Cape Light Compact

EVERSOURCE

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Together, we make good happen for Massachusetts.

Your local electric and natural gas utilities and energy efficiency service provider are taking strides in energy efficiency: Berkshire Gas, Cape Light Compact, Eversource, Liberty, National Grid and Unitil.

As one, we form Mass Save®, with the common goal of helping residents and businesses across Massachusetts save money and energy, leading our state to a clean and energy efficient future.

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Presented by:

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Agenda

Introduction

Prescriptive Option

Base Code and Most Stretch Additions/Alterations

Stretch Code

Requirements

Formerly Known as Mandatory

Appendix RB Solar Ready

EV Ready

Municipal Opt-In Specialized Stretch Code

Summary

Learning Outcomes

Have knowledge of the Stretch Code and how it is adopted locally to improve energy efficiency over the base code.

Compare and contrast the compliance options available for new construction, such as Prescriptive, ERI, and Passive House

Learn the requirements of Appendix RB: Solar Ready as well as the EV Ready and its requirements

Define the Specialized Code and explain how it results in zero- or near-zero energy buildings

Poll Question #1

Which of the following best describes your field of work?

A. Builder

B. Architect

C. Code Official

D. HERS Rater

E. Passive House Consultant

2025 Massachusetts Residential Energy Code

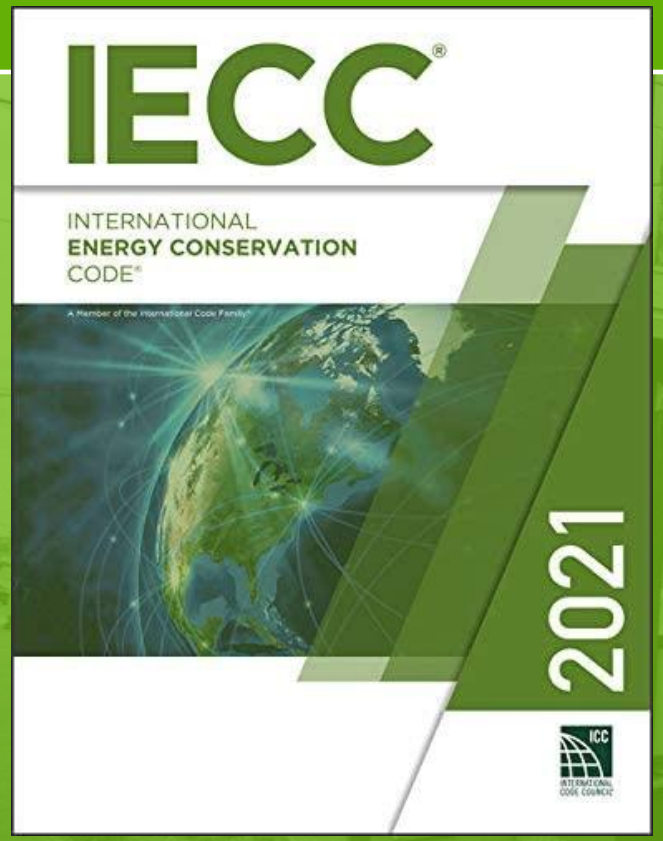
Base Code	Stretch Code	Specialized Code
2021 IECC w/MA Amendments; 780 CMR Chapter 11R (residential) & 780 CMR Chapter 13 (commercial) 780 CMR 10th Edition is the current MA Building Code	2021 IECC w/MA Amendments; 225 CMR Chapter 22 (residential) & 225 CMR Chapter 23 (commercial)	2021 IECC w/MA Amendments; 225 CMR Chapter 22 + Appendix RC (residential) & 225 CMR Chapter 23 + Appendix CC (commercial)

Source: MA DOER

Current Energy Code Options

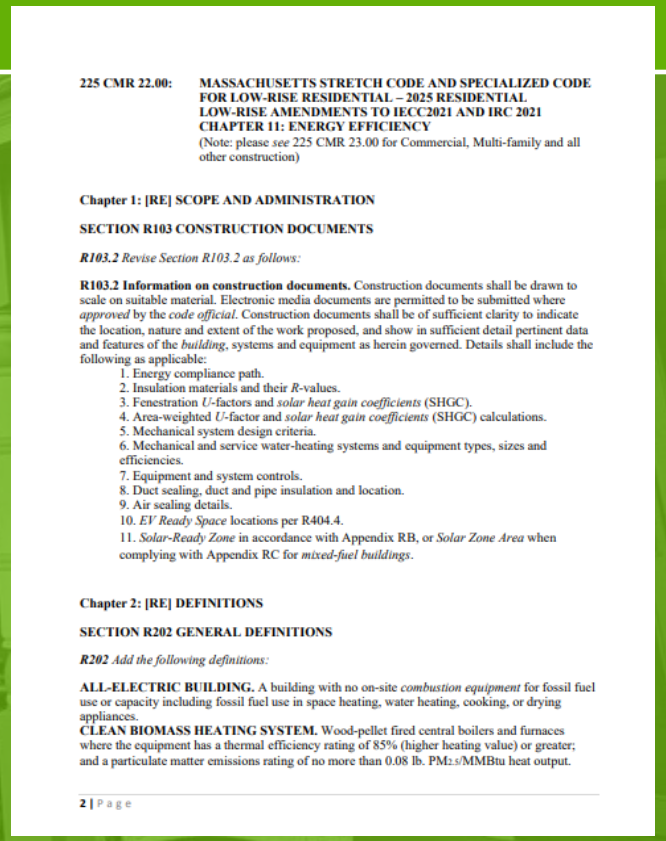
The 2025 Massachusetts Energy Code

The 2021 IECC



Source: ICC

Massachusetts Amendments



225 CMR 22.00: MASSACHUSETTS STRETCH CODE AND SPECIALIZED CODE FOR LOW-RISE RESIDENTIAL – 2025 RESIDENTIAL LOW-RISE AMENDMENTS TO IECC2021 AND IRC 2021 CHAPTER 11: ENERGY EFFICIENCY
(Note: please *see* 225 CMR 23.00 for Commercial, Multi-family and all other construction)

Chapter 1: [RE] SCOPE AND ADMINISTRATION

SECTION R103 CONSTRUCTION DOCUMENTS

R103.2 *Revise Section R103.2 as follows:*

R103.2 Information on construction documents. Construction documents shall be drawn to scale on suitable material. Electronic media documents are permitted to be submitted where *approved* by the *code official*. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed, and show in sufficient detail pertinent data and features of the *building*, systems and equipment as herein governed. Details shall include the following as applicable:

1. Energy compliance path.
2. Insulation materials and their *R*-values.
3. Fenestration *U*-factors and *solar heat gain coefficients* (SHGC).
4. Area-weighted *U*-factor and *solar heat gain coefficients* (SHGC) calculations.
5. Mechanical system design criteria.
6. Mechanical and service water-heating systems and equipment types, sizes and efficiencies.
7. Equipment and system controls.
8. Duct sealing, duct and pipe insulation and location.
9. Air sealing details.
10. *EV Ready Space* locations per R404.4.
11. *Solar-Ready Zone* in accordance with Appendix RB, or *Solar Zone Area* when complying with Appendix RC for *mixed-fuel buildings*.

Chapter 2: [RE] DEFINITIONS

SECTION R202 GENERAL DEFINITIONS

R202 *Add the following definitions:*

ALL-ELECTRIC BUILDING. A building with no on-site *combustion equipment* for fossil fuel use or capacity including fossil fuel use in space heating, water heating, cooking, or drying appliances.
CLEAN BIOMASS HEATING SYSTEM. Wood-pellet fired central boilers and furnaces where the equipment has a thermal efficiency rating of 85% (higher heating value) or greater; and a particulate matter emissions rating of no more than 0.08 lb. $PM_{2.5}$/MMBtu heat output.

Source: MA DOER

The 2025 Massachusetts Energy Code

Base Code

Stretch Code

Municipal Opt-In Specialized Stretch Code

Overview of Changes

July 2024

- Maximum HERS Index decreased from 52 to 42 for new construction

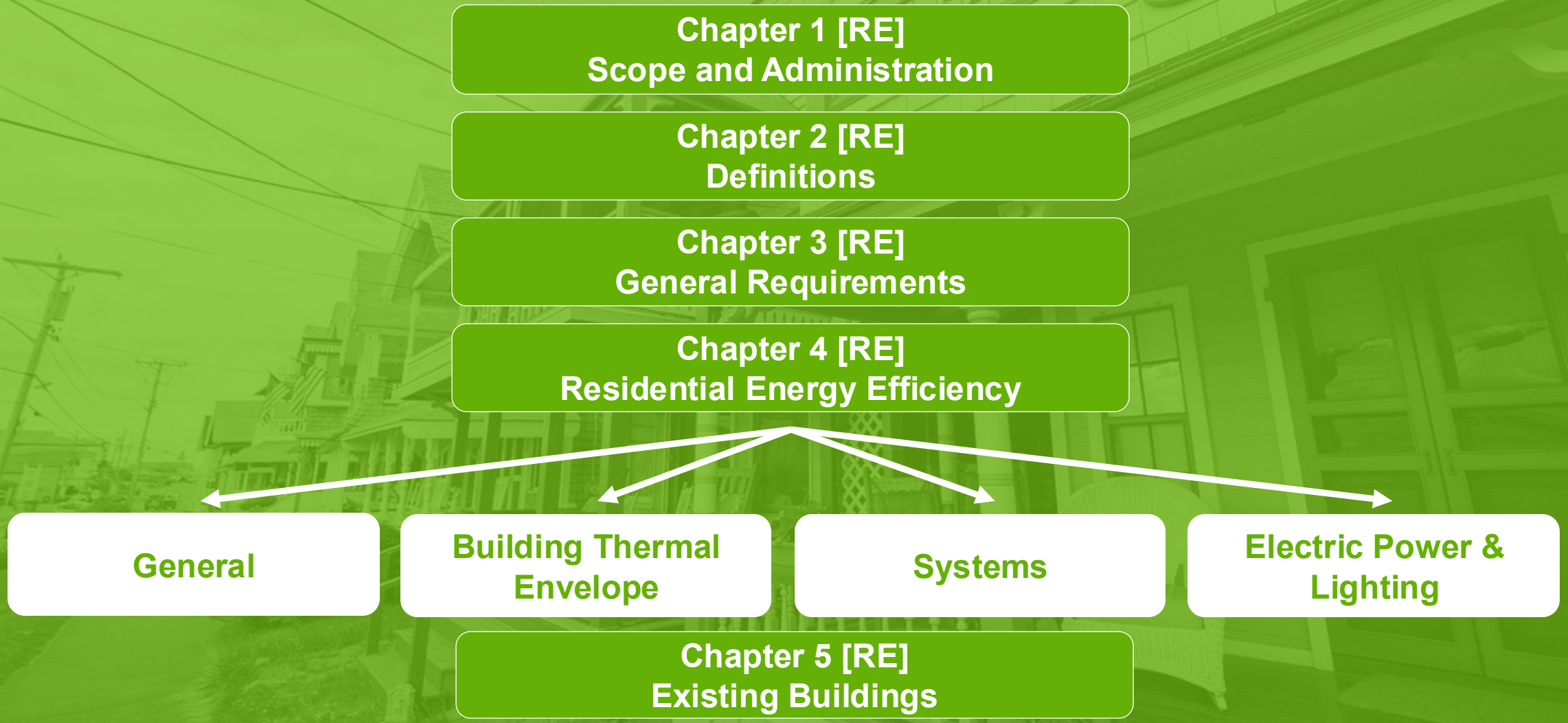
February 14, 2025

Update to Stretch code:

- Introduced new Embodied Carbon Credit for new construction
- Maximum HERS Index increased from 52 to 65 for large alterations and additions
- Added option for ADUs to Table R406.5

All-electric homes qualify for a three-point increase in maximum HERS Index

2021 IECC Format



Changes in Prescriptive Values

	2018 IECC	MA Amended 2021 IECC
FENESTRATION U-FACTOR	0.30	0.30
SKYLIGHT U-FACTOR	0.55	0.55
GLAZED FENESTRATION SHGC	NR	NR
CEILING R-VALUE	49	49
WOOD FRAME WALL R-VALUE	20 or 13+5	20&5ci or 13&10ci or 0&20ci
MASS WALL R-VALUE	13/17	13/17
FLOOR R-VALUE	30	30
BASEMENT WALL R-VALUE	15/19	15ci or 19 or 13+5ci
SLAB R-VALUE & DEPTH	10, 2ft.	10ci, 4 ft
CRAWL SPACE WALL R-VALUE	15/19	15ci or 19 or 13+5ci

Note: These minimum R-values and maximum U-factors are NOT applicable to ERI or Passive House

Poll Question #2

The new HERS score for new mixed fuel homes as of July 1, 2024, is?

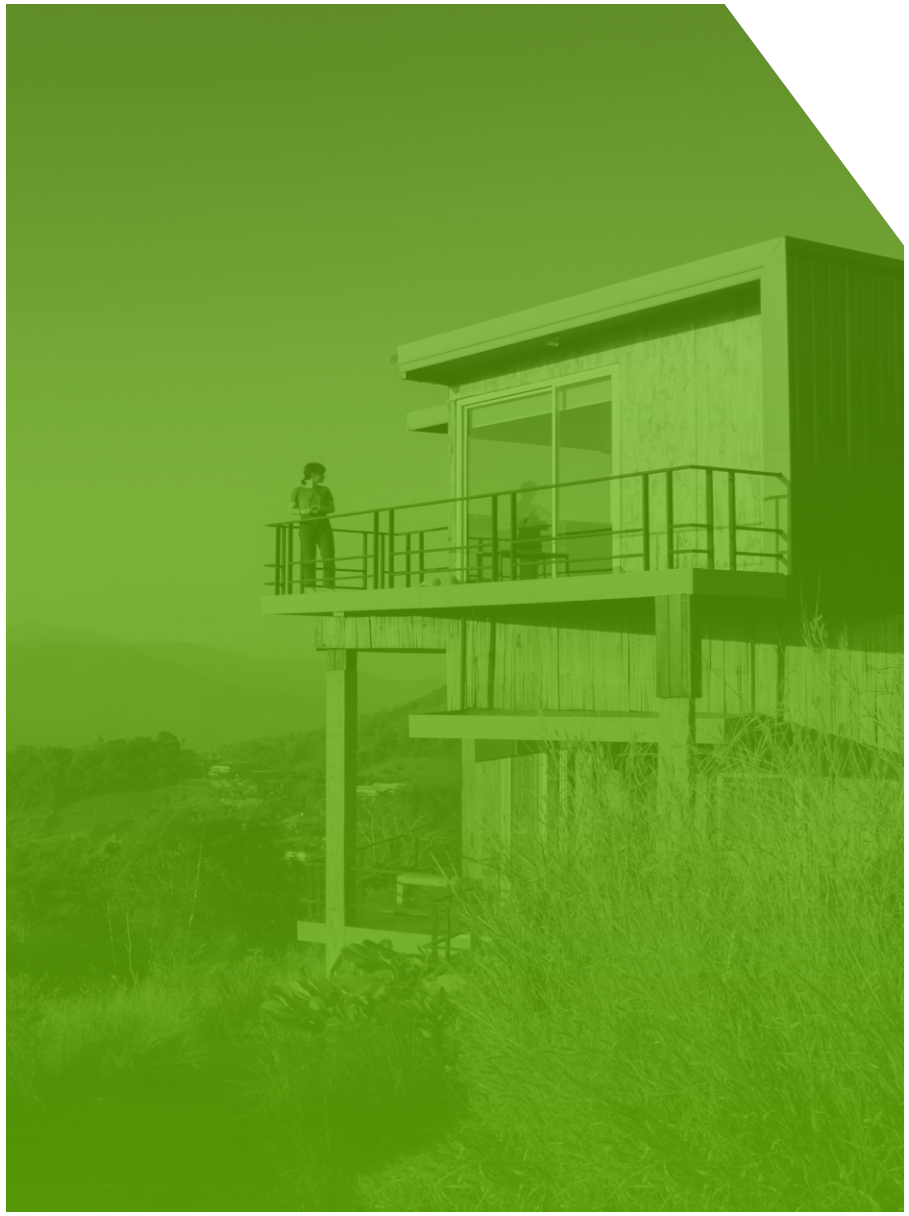
A. 55

B. 45

C. 52

D. 42

2025 Residential Stretch Code Overview



Green Communities Act

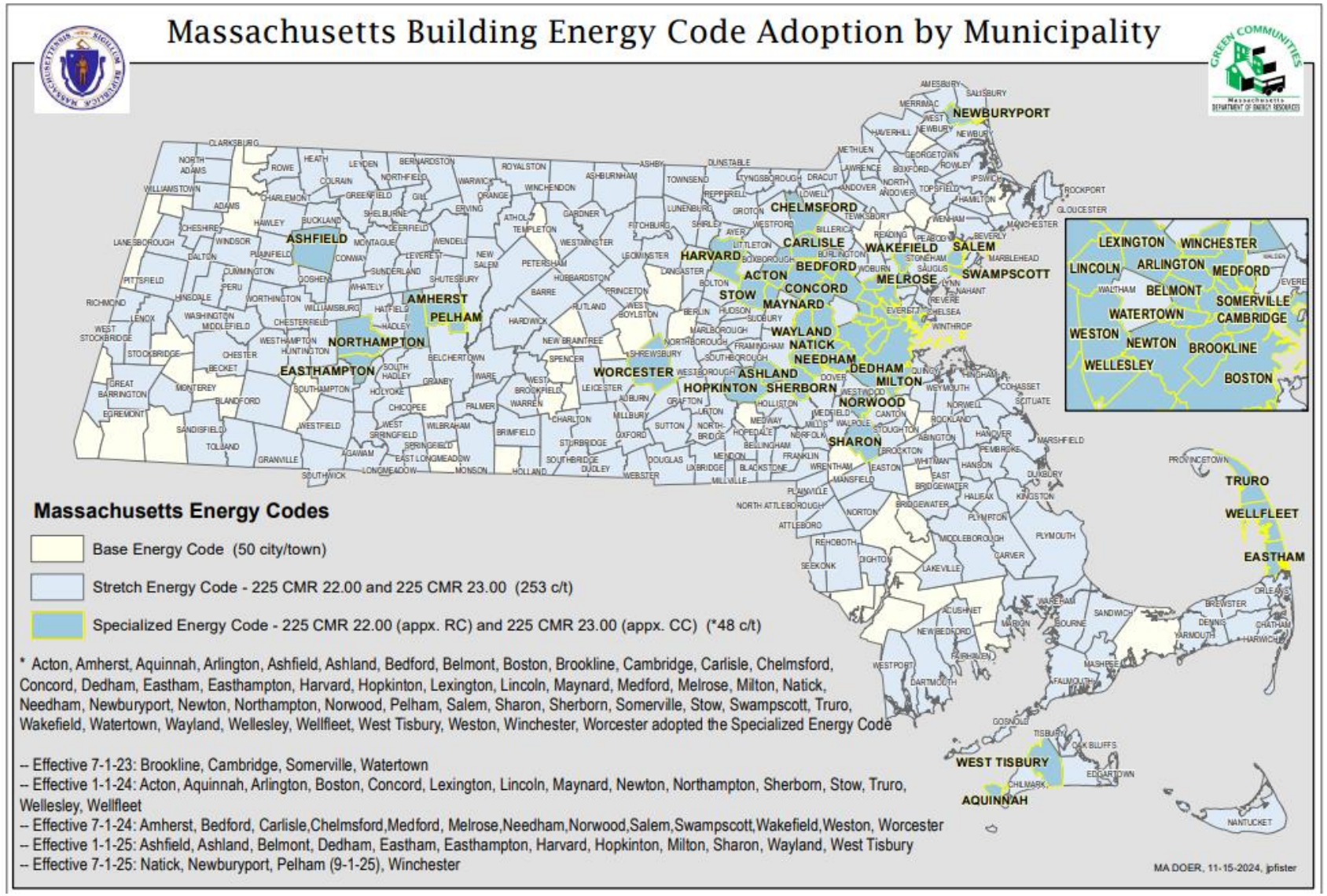
- Passed by the MA Legislature and signed into law in 2009
- Requires the Program Administrators to submit EE plans every 3 years – must be approved by the Dept. of Public Utilities
- *Requires adoption of the International Energy Conservation Code and subsequent updating to the latest version within one year of its publication*
- Created the Energy Efficiency Advisory Council of DOER
- Created the Green Communities Program
  - Provides $20 million per year statewide in technical and financial help to municipalities to promote energy efficiency and the financing, siting and construction of renewable alternative energy facilities.
  - *Municipalities must adopt the Stretch Energy Code and meet a variety of other energy efficiency policies.*

MA Stretch Energy Code

The residential Stretch Energy Code…

- Is developed by the MA Department of Energy Resources (DOER)
- Results in greater energy savings than the Base Energy Code
- Requires new homes and large additions and alterations to receive a HERS Rating or Passive House certification
- Requires compliance with 2021 IECC “mandatory” provisions (Passive House excluded)
- Is adopted at the level of the local jurisdiction

Stretch Code Communities



Source: MA DOER

Poll Question #3

The HERS score for all electric homes changed to 45 on what date?

A. January 1, 2024

B. July 1, 2024

C. June 1, 2023

D. July 31, 2023

Stretch Code Updates

225 CMR 22: MASSACHUSETTS RESIDENTIAL STRETCH ENERGY CODE AND MUNICIPAL OPT-IN SPECIALIZED CODE 2025

Massachusetts Stretch Code and Specialized Code for Low-Rise Residential

(Note: please see 225 CMR 23 for Commercial, Multi-family, and all other construction)

The Massachusetts Stretch energy code (Stretch Code) first became available for municipal adoption in 2009 as Appendix 110.aa and then 115.aa as part of the building code in 780 CMR. In 2021 the Massachusetts legislature passed new legislation moving authority for updates to the Stretch Code to the Department of Energy Resources and 225 CMR.

The Stretch Code and Existing Buildings

Exception: Additions that add existing basement or attic spaces to the conditioned floor area of an existing dwelling unit due to changing the thermal boundary but not changing the building footprint or roofline do not require a HERS rating.

Table R406.5 Maximum Energy Rating Index

Clean Energy Application	New Construction Permitted after July 1, 2024	New Construction with R406.5.2 embodied carbon credit	Accessory Dwelling Units	Major Alterations, Additions, and Changes, of use
Mixed-Fuel Building	42	45	52	65
Solar Electric Generation*	42	45	55	70
All-Electric Building	45	48	55	70
Solar Electric* and All-Electric Building	45	48	58	75

***Solar Electric Generation = Solar photovoltaic array rated at 4kW or higher**

Footnote B: The building shall meet the mandatory requirements of Section R406.2

R406.5.1 Trade-Off for Clean Energy Systems

Accessory Dwelling Units (ADUs) following Section R406 or existing buildings and additions following IECC chapter 5[RE] may use clean energy trade-offs to increase the maximum allowable HERS rating

Solar Electric Generation

Solar photovoltaic array rated at 4kW or higher shall offset 3 HERS points for new ADUs and 5 HERS points for alterations, Change of use to Residential R-use occupancies or for fully attached additions.

All Electric Buildings

Shall offset 3 HERS points for each dwelling unit in new construction, including new ADUs, and 5 HERS points for alterations, change of use to Residential R-use occupancies and fully attached additions.

R406.5.2 Embodied Carbon Credit

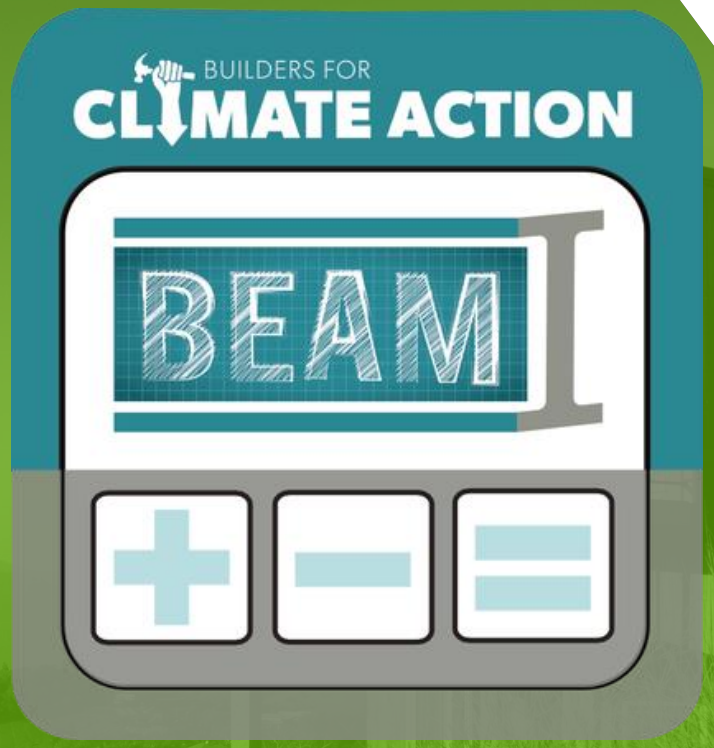
New construction following Section R406 may use either of the following embodied carbon credits to increase the maximum allowable HERS rating for each unit by 3 HERS points as shown in Table R406.5:

Insulation Embodied Carbon Credit

New single dwelling units or R-use buildings containing multiple dwelling units that demonstrate an average calculated insulation Global Warming Potential (GWP) intensity (kg CO2e/m2) less than 0 across the whole building envelope shall offset 3 HERS points for each applicable dwelling unit of new construction. GWP intensity shall be based on the default values in Table R406.5.3, or product specific EPDs or calculations in the approved tools: EC3 and BEAM, may be used in place of default table values.

Low GWP Concrete Mix Credit

New single dwelling units or R-use buildings containing multiple dwelling units that demonstrate an average calculated concrete mix Global Warming Potential (GWP) for at least 90% of all concrete mix used in the building of not more than 100% of the 2022 NRMCA NorthEast Benchmark average values shown in Table R406.5.4 shall offset 3 HERS points for each applicable dwelling unit of new construction.



Source:
www.buildersforclimateaction.org

Default GWP values for insulation materials are from Building Emissions Accounting for Materials (BEAM) Estimator

R406.5.3 Documentation for Insulation Embodied Carbon Credit

Offset 3 HERS points when the average calculated insulation GWP intensity is < 0 across the whole building envelope

The HERS rater must submit a complete calculation to summarize estimated embodied carbon emissions from all insulation materials used in the project

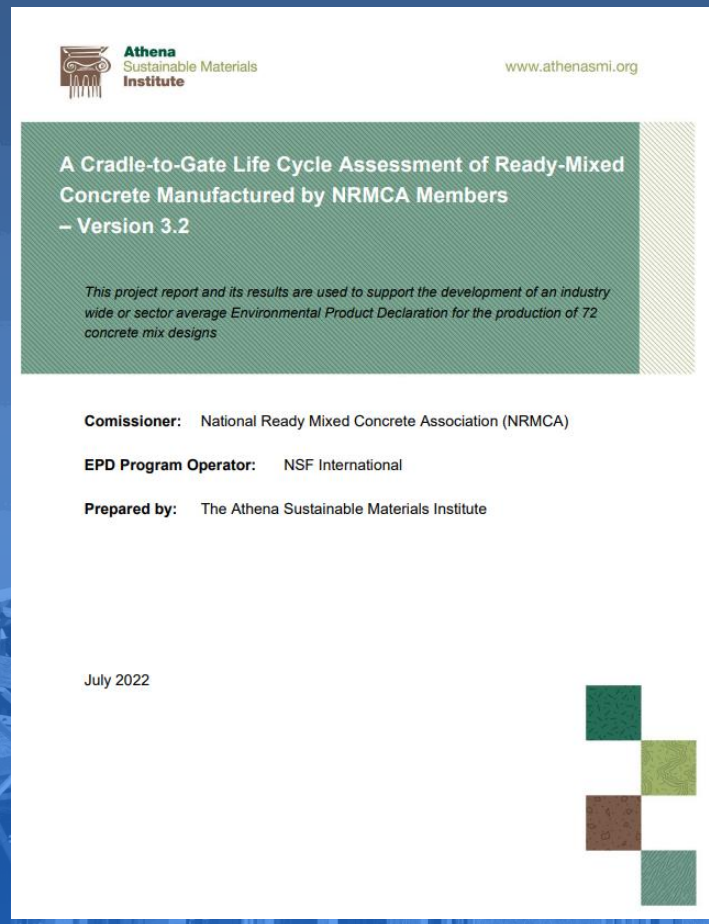
Project teams shall provide the following information for foundation, floor, wall, and roof insulation materials:

- Insulation material type
- Product R-value
- Total surface area
- Default, industry-average GWP value, from Table R406.5.3 or GWP values from Type III Product-specific EPD
- Total project area

R406.5.4 Documentation for Low GWP Concrete Mix Credit

Offset 3 HERS points when average calculated concrete mix GWP for at least 90% of all concrete mix used in the building of ≤ 100% of the 2022 NRMCA NorthEast Benchmark average values

The HERS rater must submit specific EPDs for concrete used in the unit.


Athena Sustainable Materials Institute

www.athenasmi.org

A Cradle-to-Gate Life Cycle Assessment of Ready-Mixed Concrete Manufactured by NRMCA Members – Version 3.2

This project report and its results are used to support the development of an industry wide or sector average Environmental Product Declaration for the production of 72 concrete mix designs

Comissioner: National Ready Mixed Concrete Association (NRMCA)

EPD Program Operator: NSF International

Prepared by: The Athena Sustainable Materials Institute

July 2022

Source: www.nrmca.org

Default GWP values for concrete are the Eastern Region Average from the National Ready Mix Concrete Associations' "A Cradle-to-Gate Life Cycle Assessment of Ready-Mixed Concrete Manufactured by NRMCA Members, Version 3.2," (July 2022), pg. 65.

Poll Question #4

When did the stretch code start for residential new construction and existing residential buildings?

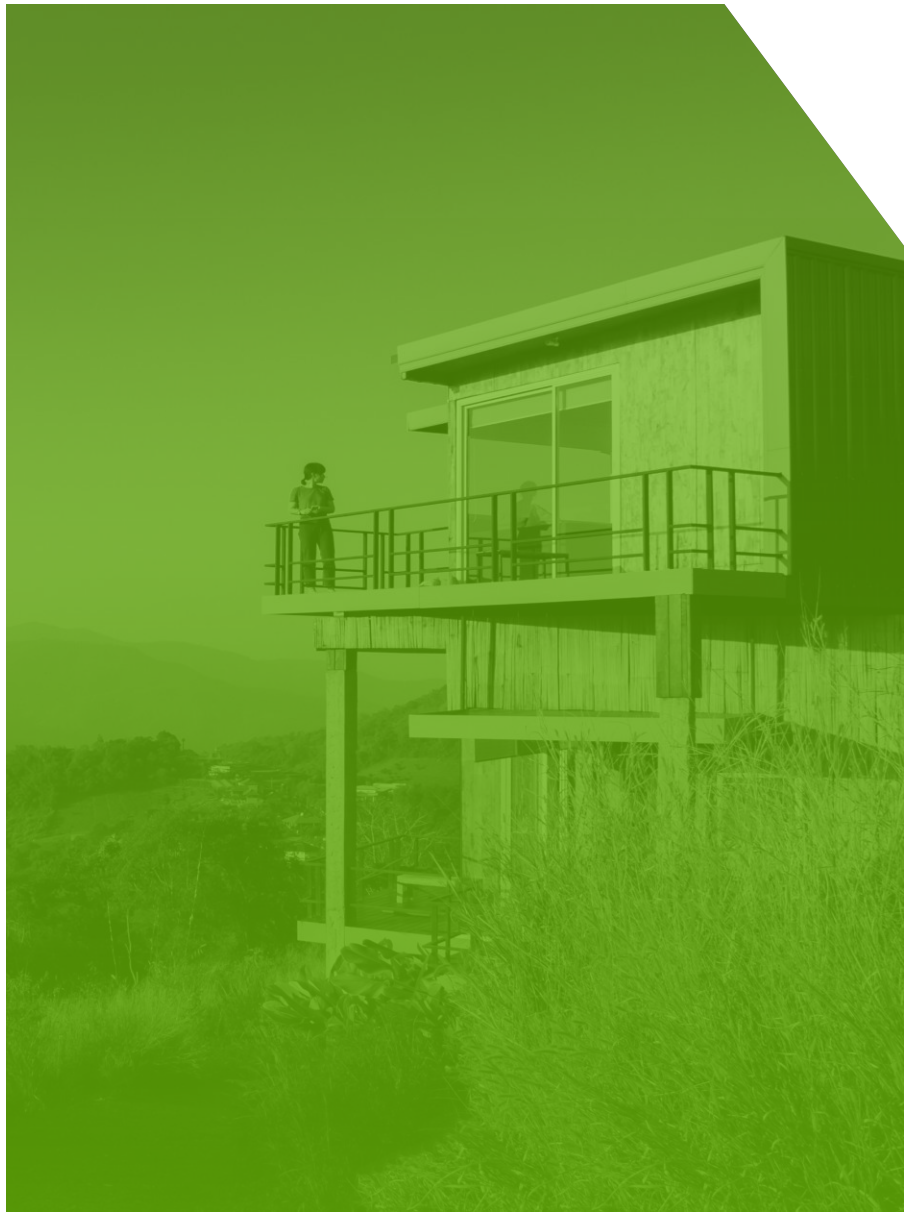
A. June 30, 2023

B. July 1, 2024

C. January 1, 2023

D. July 1, 2023

Stretch Code Compliance Software



R401 Scope Compliance Options for Stretch Code

New Construction

R401.2.2 Passive House Building Certification Option

- The Passive House Building Certification Option requires compliance with Sections R405 and R404.4.

R401.2.3 Energy Rating Index Option

- The Energy Rating Index (ERI) Option requires compliance with Sections R406, R403.6 and R404.4.

R401.2.4 Appendix RC Opt-In Stretch Code

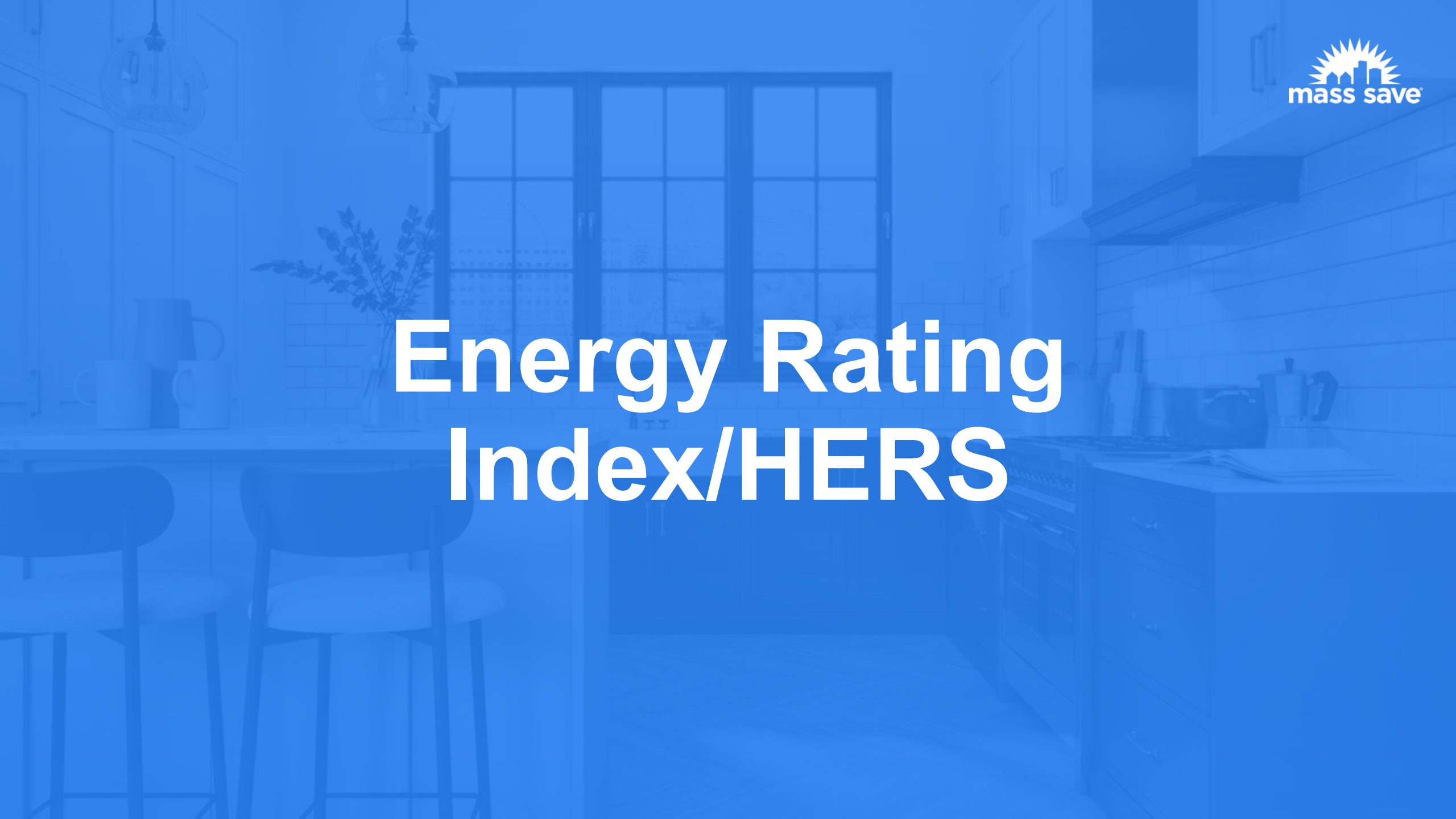
- Residential Buildings and dwelling units covered by this chapter may elect to comply with the requirements of IECC Appendix RC and R404 as amended.

Poll Question #5

Energy Star V3.1 is still a compliance path for the new residential stretch code? True or False.

A. True

B. False



Energy Rating Index/HERS

Table R406.2 Requirements – Energy Rating Index

Formerly Listed as Mandatory Requirements

Now in One Table

Section	Title
	General
R401.3	Certificate
	Building Thermal Envelope
R402.1.1	Vapor retarder
R402.2.3	Eave Baffle
R402.2.4.1	Access hatches and doors
R402.2.10.1	Crawl space wall insulation installation
R402.4.1.1	Installation
R402.4.1.2	Testing
	Mechanical
R403.1	Controls
R403.3	Ducts (except R403.3.2, R403.3.3, and R403.3.6)
R403.4	Mechanical system piping insulation
R403.5.1	Heated water circulation and temperature maintenance systems
R403.5.3	Drain water heat recovery units
R403.6.1	**Heat or energy recovery ventilation (HRV/ERV)**
R403.7	Equipment sizing and efficiency rating
R403.8	System serving multiple dwelling units
R403.9	Snow and ice melt systems
R403.10	Energy consumption of pools and spas
R403.11	Portable spas
R403.12	Residential pools and permanent residential spas
	Electrical Power and Lighting Systems
R404.1	Lighting equipment

Passive House

Passive House Building Certification Option

- Projects may document compliance with either PHIUS certification or PHI certification.
- Must use the most recent version of the software for the Passive House approach

R405.2.1

phius

Source: Phius

R405.2.2

Passive House Institute

Source: PHI

PHIUS/PHI Requirements for Permit Applications

Documentation
R405.2.1 PHIUS

- Passive House Verification report with results from the approved passive house certification software which demonstrates project compliance with Phius CORE 2021 (or newer), or Phius ZERO 2021 (or newer) performance requirements.
- A CPHC verification report reflecting plans submitted.
- Project registration from PHIUS or Design certification letter.

Documentation
R405.2.2 PHI

- A PHPP (Passive House Planning Package) compliance report with results from the approved Passive House certification software which demonstrates project compliance with current PHI performance requirements
- A statement from the PHI-accredited Certifier that the approved Passive House certification software results and compliance report accurately reflect the plans submitted; are “based on plans”
- Evidence of project registration from a PHI-accredited Certifier. OR
- A Design State Conditional Assurance Letter from a PHI-accredited Certifier

R405.3

Documentation of projects that pursued Phius or PHI certifications that did not achieve final certification

- If, at construction completion, final certification cannot be received from either Phius or PHI, R405.3 may be followed to receive a certificate of occupancy
- This pathway is not equivalent to either Phius or PHI Certification and will not designate the project as a certified passive house.

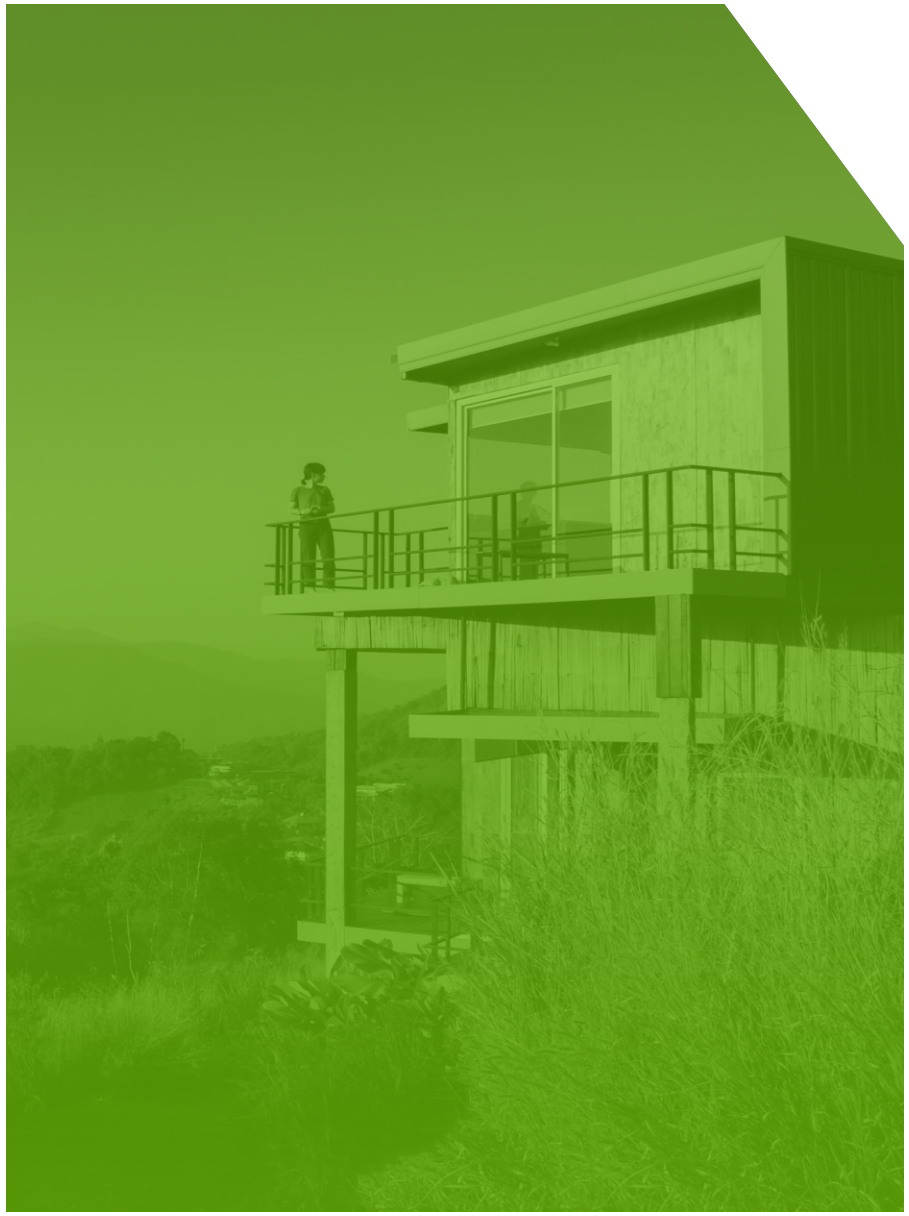
Requirements for Passive House Projects That Did Not Achieve Final Certification

Documentation

R405.3.2 Projects that pursued Phius or PHI certifications that did not achieve final certification

- Statement from the Phius certified consultant or PHI-accredited verifier confirming project has completed all interim, final, and corrective testing and modeling requirements, including a summary of deviations from certification requirements.
- Copy of executed contracts with Phius consultant or PHI rater/verifier covering all required inspections and testing requirements for certification.
- Design phase pre-certification/approval, in the form of a statement issued from Phius or PHI-accredited verifier confirming design certification or precertification was achieved.
- Report from rater/verifier demonstrating as-built conditions, including those that comply with Phius or PHI requirements, and those that do not.
    i. If the initial whole building blower door tests do not meet the Phius or PHI airtightness requirement, a statement must be provided to reflect evidence of a re-test. Statement shall include an explanation for sources of leakage and attempted remediation efforts. Final test results shall not exceed Phius or PHI airtightness thresholds by more than 30%.
    ii. If the mechanical ventilation flow rates and balance do not meet the requirements of Phius or PHI, report must show that installed ventilation system demonstrates compliance with the mechanical code in accordance with Section C403.
- For projects with Phius design certification, provide final Energy Star and Zero Energy Ready Homes certificates.
- A letter from a licensed professional engineer that states that the potential hygrothermal or moisture risk of the as-built assemblies, with the measured blower door test result, is acceptably low.

2021 IECC Mandatory Requirements



Mandatory Requirements Overview

- Certificate (R401.3)
- Air Leakage (R402.4)
- Maximum fenestration U-factor and SHGC (R402.5)
- Controls (R403.1)
- Heat pump supplementary heat (R403.1.2)
- Duct sealing (R403.3.2)
- Duct testing (R403.3.3)
- Building cavities (R403.3.5)
- Mechanical system pipe insulation (R403.4)
- Heated water circulation and temperature maintenance system (R403.5.1)
- Hot water pipe insulation (R403.5.3)
- Mechanical ventilation (R403.6)
- Equipment sizing and efficiency rating (R403.7)
- System serving multiple dwelling units (R403.8)
- Snow melt and ice system controls (R403.9)
- Pools and permanent spas (R403.10)
- Portable spas (R403.11)
- Lighting equipment (R404.1)

2021 IECC Changes from 2018 IECC

Air Barrier and Insulation Criteria

No major changes

Still required for all compliance options

TABLE R402.4.1.1
AIR BARRIER, AIR SEALING AND INSULATION INSTALLATION[a]

COMPONENT	AIR BARRIER CRITERIA	INSULATION INSTALLATION CRITERIA
General requirements	A continuous air barrier shall be installed in the building envelope. Breaks or joints in the air barrier shall be sealed.	Air-permeable insulation shall not be used as a sealing material.
Ceiling/attic	The air barrier in any dropped ceiling or soffit shall be aligned with the insulation and any gaps in the air barrier shall be sealed. Access openings, drop down stairs or knee wall doors to unconditioned attic spaces shall be sealed.	The insulation in any dropped ceiling/soffit shall be aligned with the air barrier.
Walls	The junction of the foundation and sill plate shall be sealed. The junction of the top plate and the top of exterior walls shall be sealed. Knee walls shall be sealed.	Cavities within corners and headers of frame walls shall be insulated by completely filling the cavity with a material having a thermal resistance, *R*-value, of not less than R-3 per inch. Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier.
Windows, skylights and doors	The space between framing and skylights, and the jambs of windows and doors, shall be sealed.	—
Rim joists	Rim joists shall include an exterior air barrier.[b] The junctions of the rim board to the sill plate and the rim board and the subfloor shall be air sealed.	Rim joists shall be insulated so that the insulation maintains permanent contact with the exterior rim board.[b]
Floors, including cantilevered floors and floors above garages	The air barrier shall be installed at any exposed edge of insulation.	Floor framing cavity insulation shall be installed to maintain permanent contact with the underside of subfloor decking. Alternatively, floor framing cavity insulation shall be in contact with the top side of sheathing, or continuous insulation installed on the underside of floor framing and extending from the bottom to the top of all perimeter floor framing members.
Basement crawl space and slab foundations	Exposed earth in unvented crawl spaces shall be covered with a Class I vapor retarder/air barrier in accordance with Section R402.2.10. Penetrations through concrete foundation walls and slabs shall be air sealed. Class 1 vapor retarders shall not be used as an air barrier on below-grade walls and shall be installed in accordance with Section R702.7 of the *International Residential Code*.	Crawl space insulation, where provided instead of floor insulation, shall be installed in accordance with Section R402.2.10. Conditioned basement foundation wall insulation shall be installed in accordance with Section R402.2.8.1. Slab-on-grade floor insulation shall be installed in accordance with Section R402.2.10.
Shafts, penetrations	Duct and flue shafts to exterior or unconditioned space shall be sealed. Utility penetrations of the air barrier shall be caulked, gasketed or otherwise sealed and shall allow for expansion, contraction of materials and mechanical vibration.	Insulation shall be fitted tightly around utilities passing through shafts and penetrations in the building thermal envelope to maintain required *R*-value.
Narrow cavities	Narrow cavities of 1 inch or less that are not able to be insulated shall be air sealed.	Batts to be installed in narrow cavities shall be cut to fit or narrow cavities shall be filled with insulation that on installation readily conforms to the available cavity space.

Source: ICC

R401.3 Certificate

The 2021 IECC requires additional items to be listed on the certificate that is to be posted in the furnace or utility room including:

- Photovoltaic system information (if applicable)
- Energy Rating Index score with and without on-site generation) if applicable)
- The energy code edition and compliance path used

Energy Code Certificate

Energy Code Edition _____ Compliance Path _____

Building Thermal Envelope

Ceiling R-value: _____
Roof R-value: _____
Wall R-value: _____
Slab R-value: _____
Bsmt wall R-value: _____
Crawl wall R-value: _____
Floor R-value: _____
Window U-factor: _____
Window SHGC: _____
Air infiltration rate: _____

Mechanical Systems

Duct R-value: _____
Duct leakage rate: _____
Heating equip eff: _____
Cooling equip eff: _____

Photovoltaic System

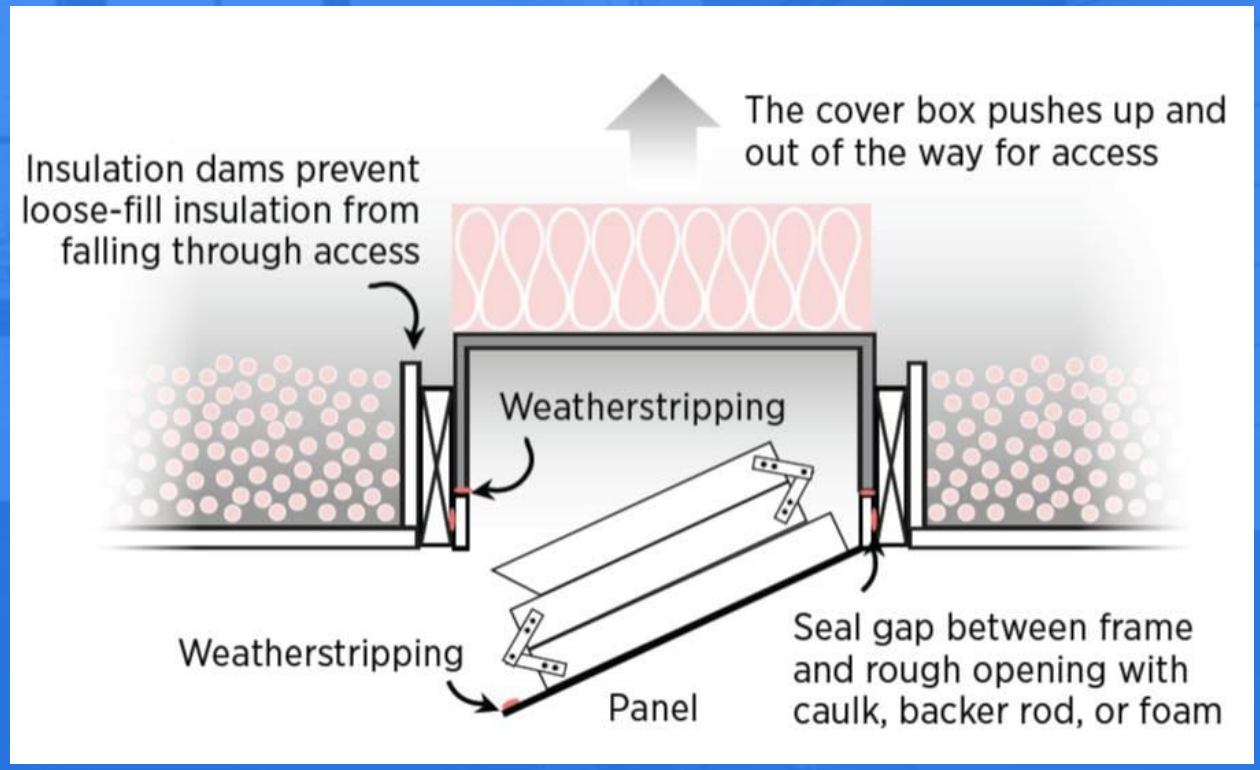
Capacity: _____
Inverter eff: _____
Panel tilt: _____
Panel orientation: _____

Energy Rating Index

With onsite power: _____ W/o onsite power: _____

R402.2.4 – Access Hatches and Doors

Source: PSD



Source: PNNL Building America Solutions Center

Pull-down Attic Stairs can be custom built, or kits can be installed

Air Leakage Testing

- Max ACH50 for Prescriptive Option
  - CZs 3-8 = 3.0
- Energy Rating Index (ERI) Option
  - Max ACH50 for all CZs = 5.0

Source: The Energy Conservatory

Air Leakage Testing

Air leakage per square foot of enclosure area may be used in lieu of ACH50 for:

- Attached single- and multiple-family building dwelling units
- Buildings or dwelling units ≤ 1,500 square feet

Maximum leakage rate = 0.30 cfm per sf

DWELLING UNIT ENCLOSURE AREA. The sum of the area of ceilings, floors, and walls separating a dwelling unit's conditioned space from the exterior or from adjacent conditioned or unconditioned spaces. Wall height shall be measured from the finished floor of the dwelling unit to the underside of the floor above.

Ducts in Floors and Exterior Walls

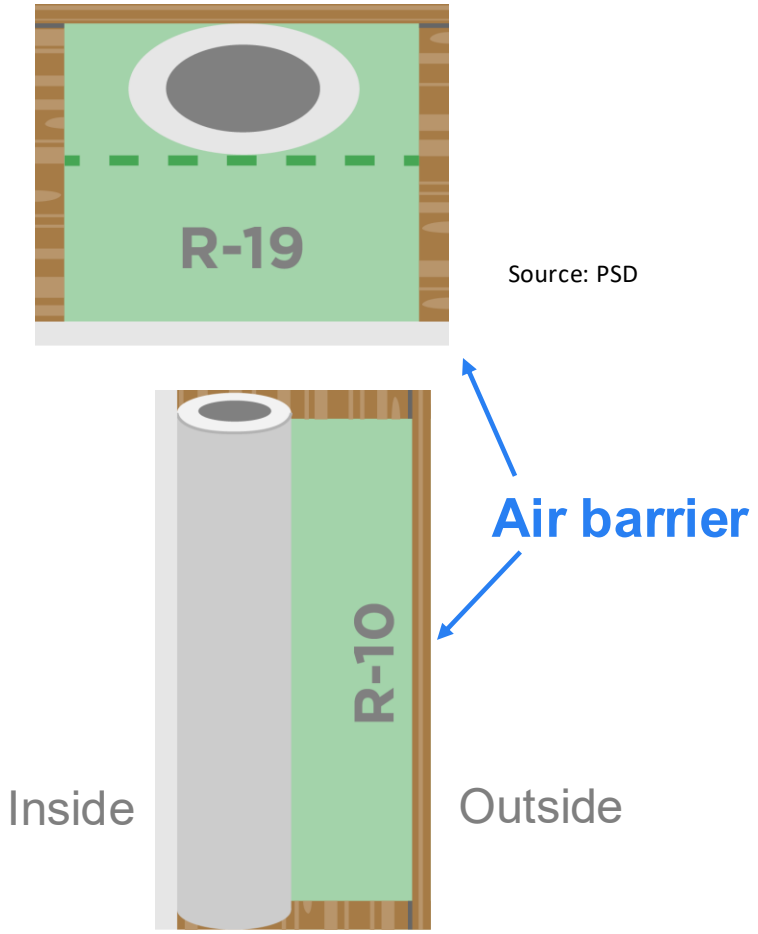
Ducts, floors, and exterior walls that are a part of the thermal envelope **can be considered in conditioned space** when certain criteria are met. *This section does NOT apply to the ERI path.*

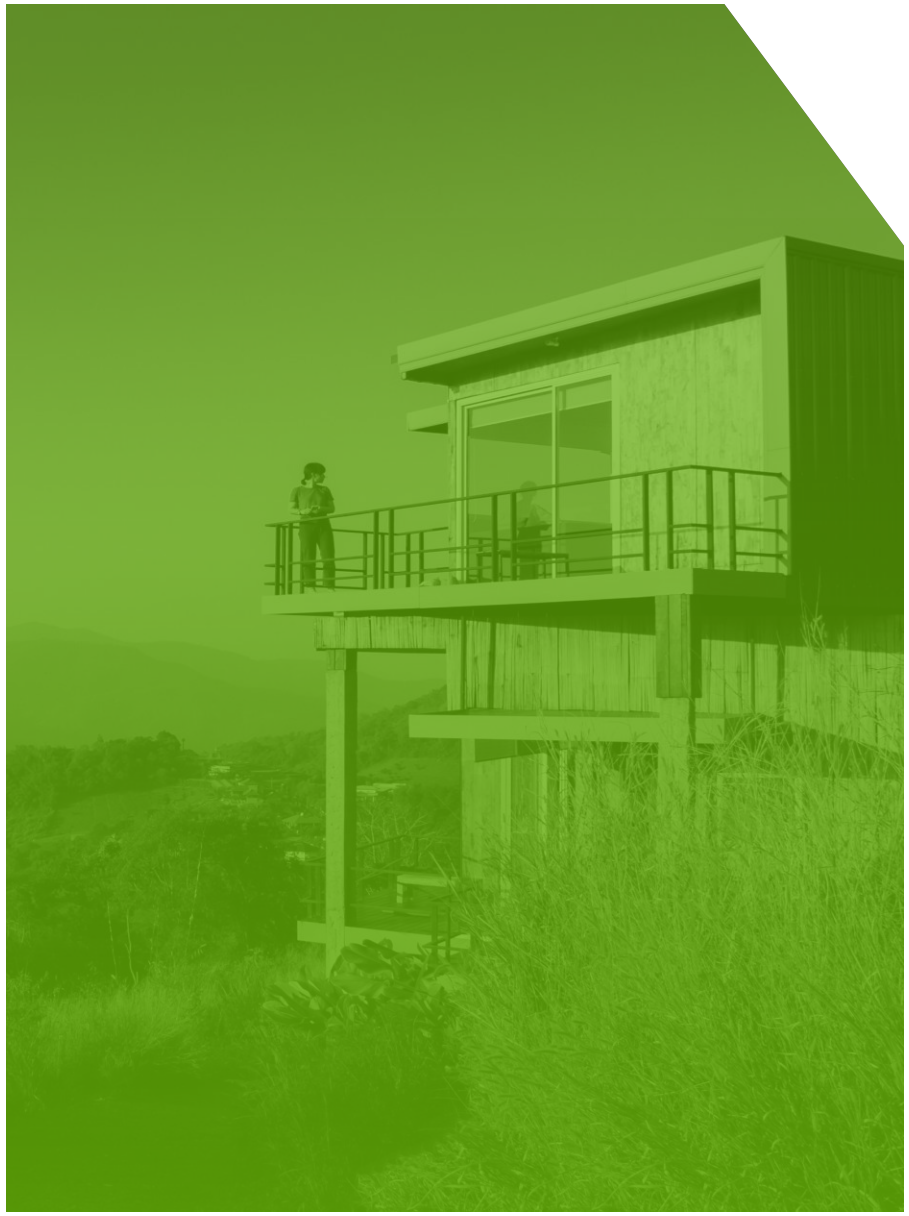
Ducts in floors over unconditioned space

1. A continuous air barrier is installed between the unconditioned space and the duct
2. Floor insulation is installed per R402.2.7 found under Specific Insulation Requirements
3. At least R-19 insulation installed separating the duct from the unconditioned space for the full cavity width

Ducts in exterior walls

1. A continuous air barrier is installed between the unconditioned space and the duct
2. Minimum R-10 insulation separating the duct from the outside for the full cavity width
3. The remainder of the cavity is filled with insulation





Duct Leakage Testing

Duct leakage testing is required ***regardless*** of duct and air handler location

- No exceptions for systems entirely within the thermal envelope

Testing standards added

- ANSI/RESNET/ICC 380 or
- ASTM E1554

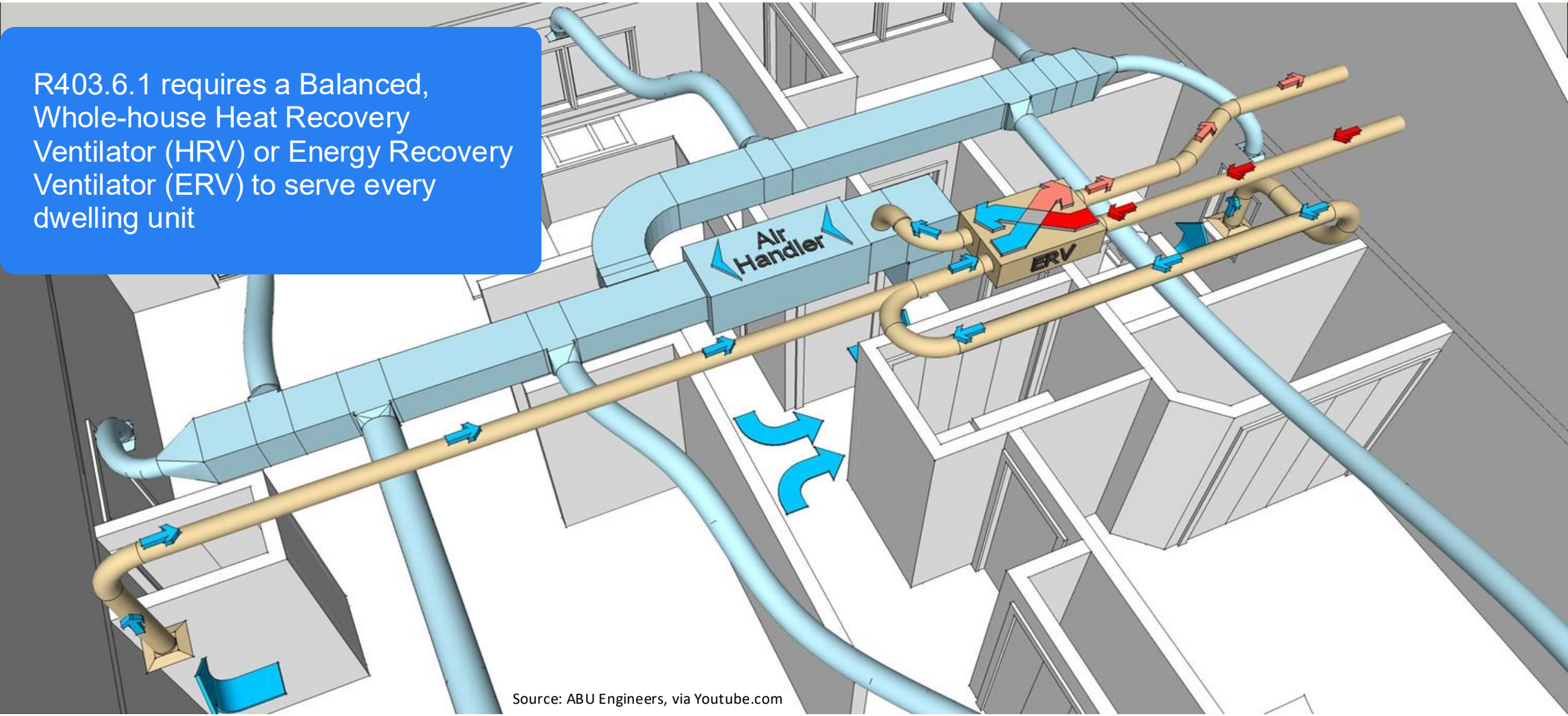
Prescriptive leakage limits

- 4 cfm/100 sf with air handler installed
- 3 cfm/100 sf without air handler installed
- 8 cfm/100 sf when entire system is inside

Limits do not apply to ERI path

Mechanical Ventilation Systems

R403.6.1 requires a Balanced, Whole-house Heat Recovery Ventilator (HRV) or Energy Recovery Ventilator (ERV) to serve every dwelling unit

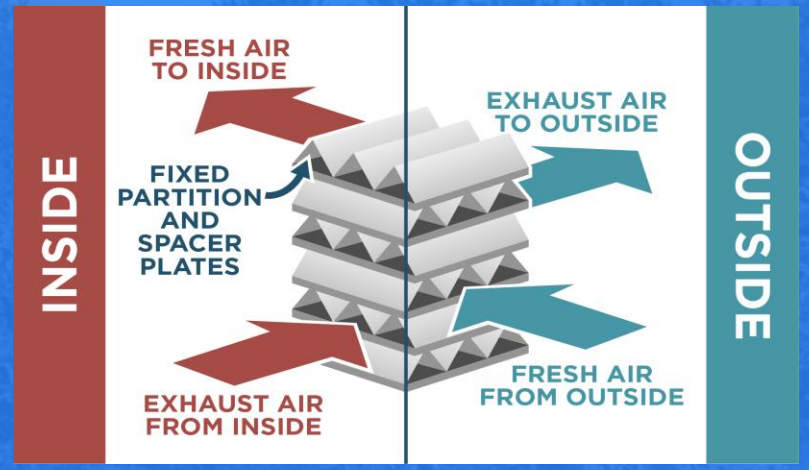


Source: ABU Engineers, via Youtube.com

Mechanical Ventilation Systems (HRV/ERV)

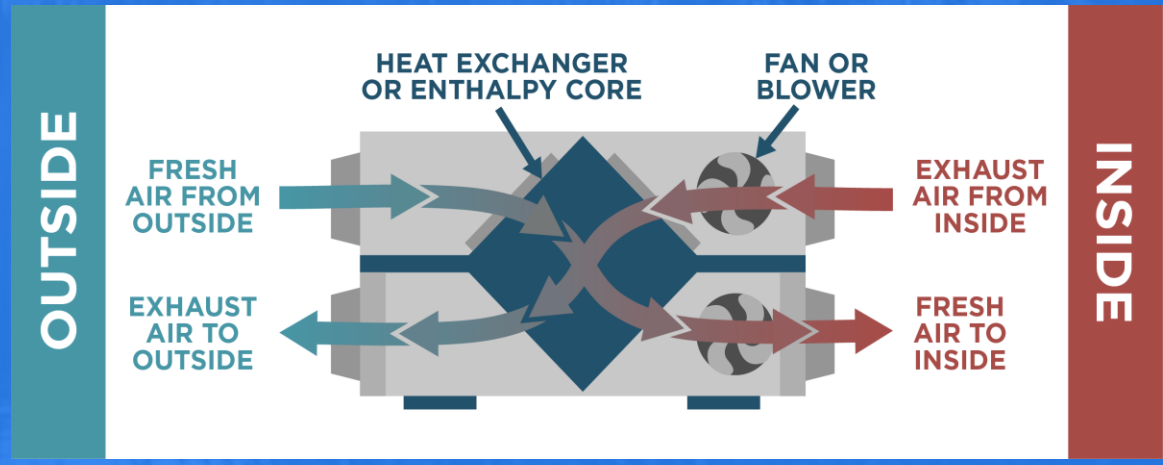
Large Systems (> 300 CFM)

- ≥ 50% Enthalpy Recovery Ratio – Cooling Design Condition
- ≥ 60% Enthalpy Recovery Ration – Heating Design Condition
- Determined in accordance with AHRI 1060 at an airflow not less than the design airflow.
- Compliance to the enthalpy recovery ratio shall be demonstrated by ratings at design conditions and airflows by software or catalogs certified by AHRI.



Source: PSD

HRV or ERV

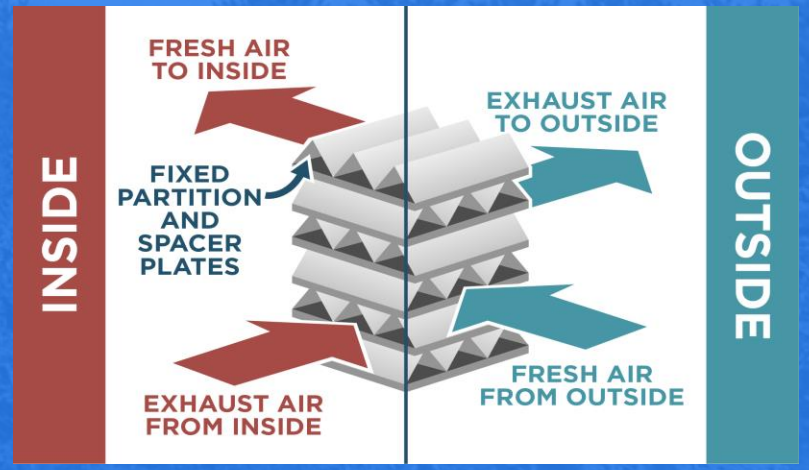


Source: PSD

Mechanical Ventilation Systems (HRV/ERV)

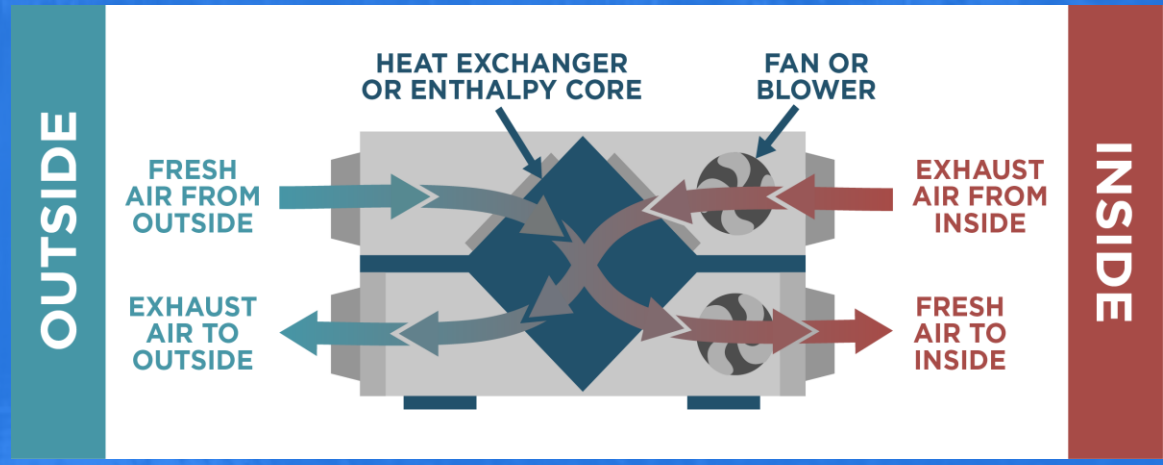
Other Systems (≤ 300 CFM)

- ≥ 65% Sensible Recovery Ratio (SRE) @ 32°F at an airflow not less than the design airflow
- SRE shall be determined in accordance with CAN/CSAC439 and compliance to the requirement shall be demonstrated by a listing in Home Ventilating Institute's Certified Product Directory. Linear interpolation of listed values for SRE shall be permitted.



Source: PSD

HRV or ERV



Source: PSD

Mechanical Ventilation System Testing

Mechanical ventilation systems must be tested and verified to achieve minimum required ventilation rate

- This includes whole-house and local ventilation systems
- Exception: Kitchen range hoods ducted to the outside with 6-inch or larger duct and not more than one 90-degree elbow or equivalent.

Testing in accordance with the manufacturer's instructions, flow hood or box, flow grid or other airflow measuring device.

Source: Retrotec

Source: The Energy Conservatory

Poll Question #6

HRV/ERV Systems are balanced systems. True or False.

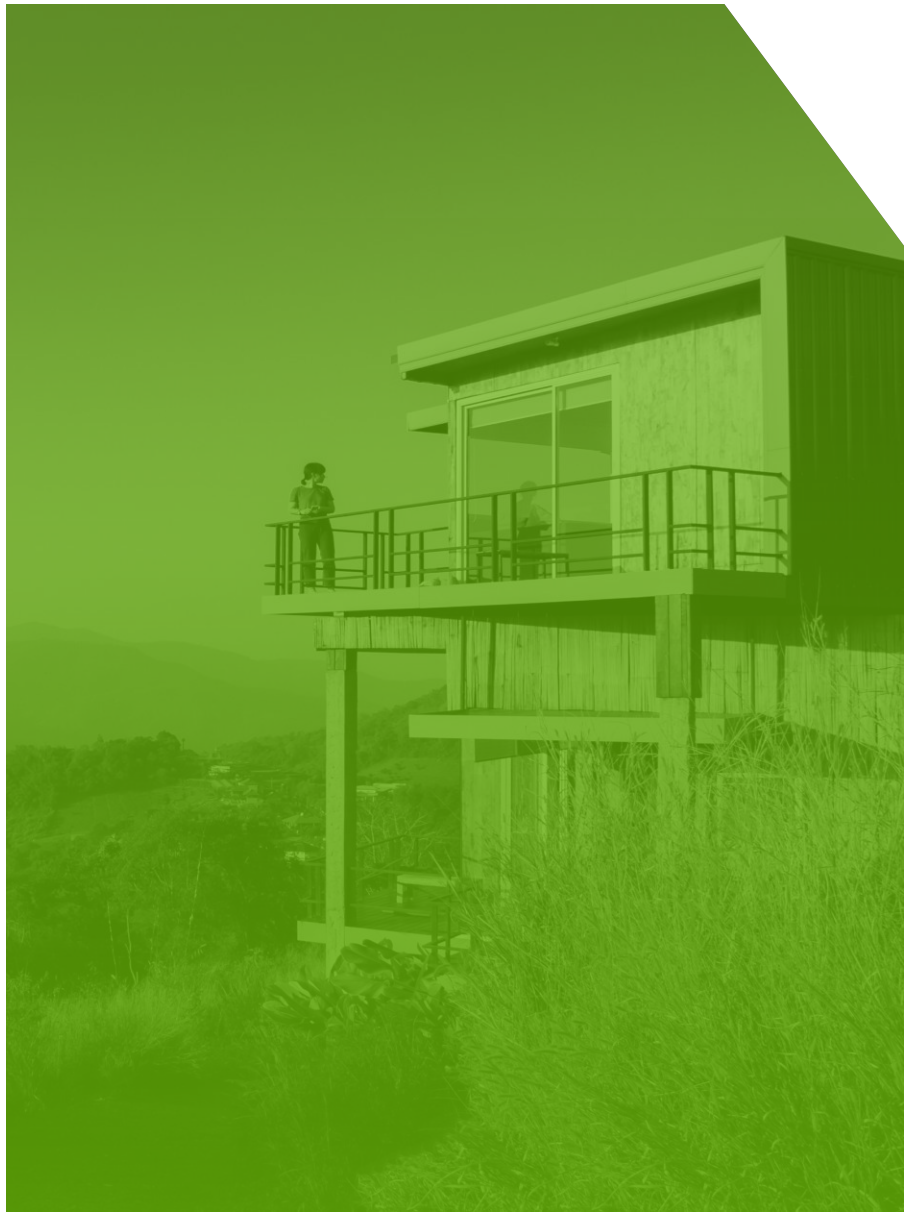
A. True

B. False

2021 IECC Changes

Electrical Power and Lighting Systems R404.1

- 100% High Efficacy lighting is required in all sockets
- Exceptions Appliance lighting



Exterior Lighting Power

Exterior lighting for multifamily buildings must comply with the commercial provisions of the IECC (Lighting Power Allowance).

Exceptions

- Detached two-family dwellings
- Townhouses
- Solar-powered lamps not connected to any electrical service
- Luminaires controlled by a motion sensor
- Lamps and luminaires that comply with Section R404.1 (high-efficacy light sources)

High-efficacy light sources:

- Lamps with at least 65 lumens per watt
- Luminaires with at least 45 lumens per watt

Exterior Lighting Controls

Where total exterior lighting is > 30 W

- **Manual on/off switch that is auto-off capable**
  - **Exception for lighting serving multiple dwelling units**
- **Lighting automatically shuts off when daylight is present and satisfies the lighting needs**
- **Override allowed, but must return to automatic within 24 hours**

Source: Building America Solutions Center

Interior Lighting Controls

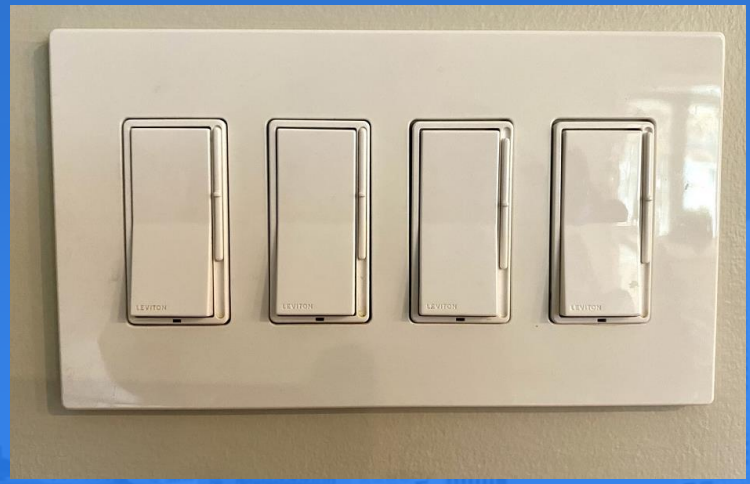
Dimmers, occupant sensors, or controls built into the fixture

Exceptions:

- **Bathrooms**
- **Hallways**
- **Exterior lighting fixtures**
- **Lighting designed for safety or security**

Source: Z22

Source: PSD



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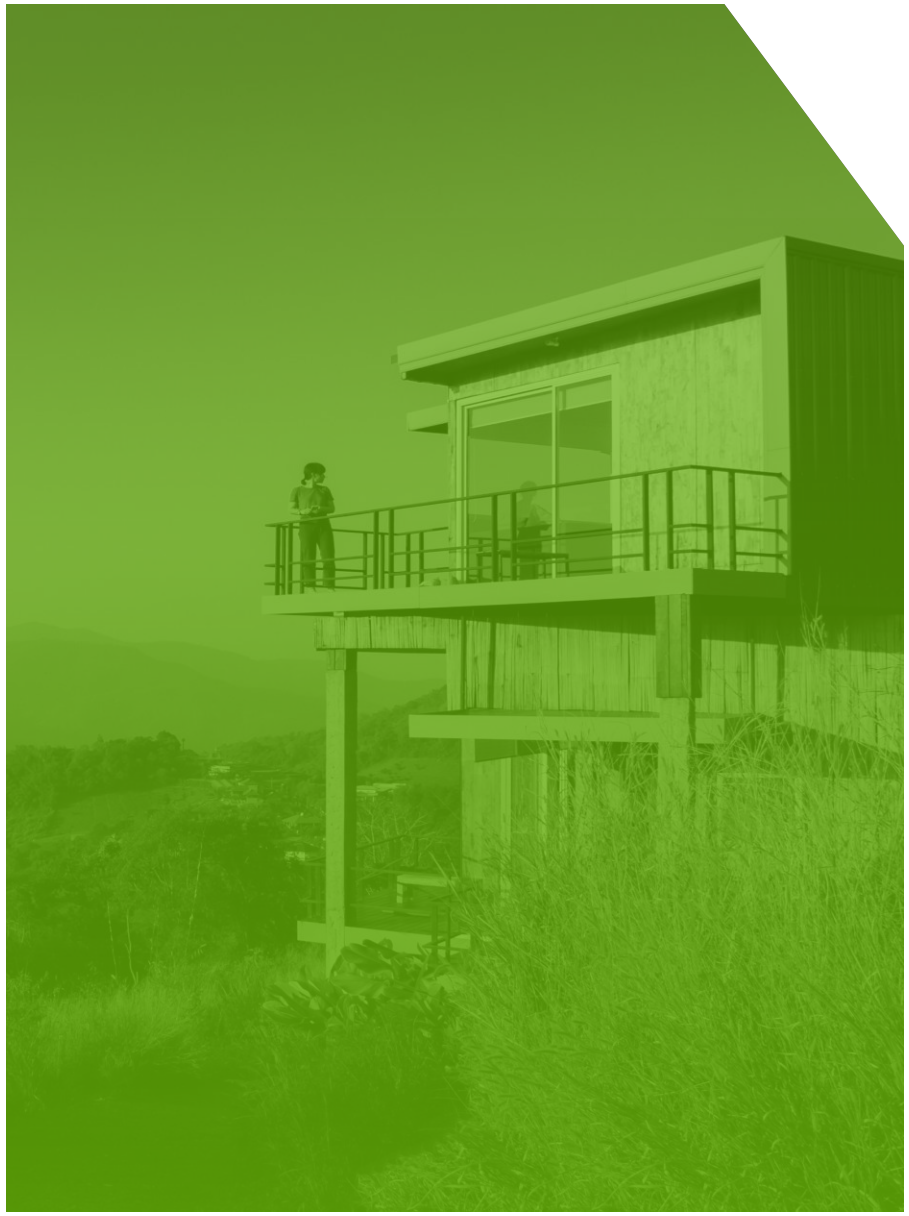


R401.2.5 Additional Energy Efficiency

R401.2.5

1. Buildings complying with the Prescriptive Compliance Option ***must choose two*** packages from R408.2. (Not applicable to stretch code)
2. Buildings electing to be *all-electric* must meet the HVAC and DHW efficiencies of R408.2.2 and R408.2.3.

R408.2

1. Enhanced Envelope Performance Option (R408.2.1)
2. More efficient HVAC equipment performance option (R408.2.2)
3. Reduced energy use in service water-heating option (R408.2.3)
4. More efficient duct thermal distribution system option (R408.2.4)
5. Improved air sealing and efficient ventilation system option (R408.2.5)

Appendix RB Solar-Ready Provisions

RB101 Scope

RB101.1 General

- These provisions shall be applicable for all **R-use buildings** new construction, except additions 1,000 ft^2 and under.

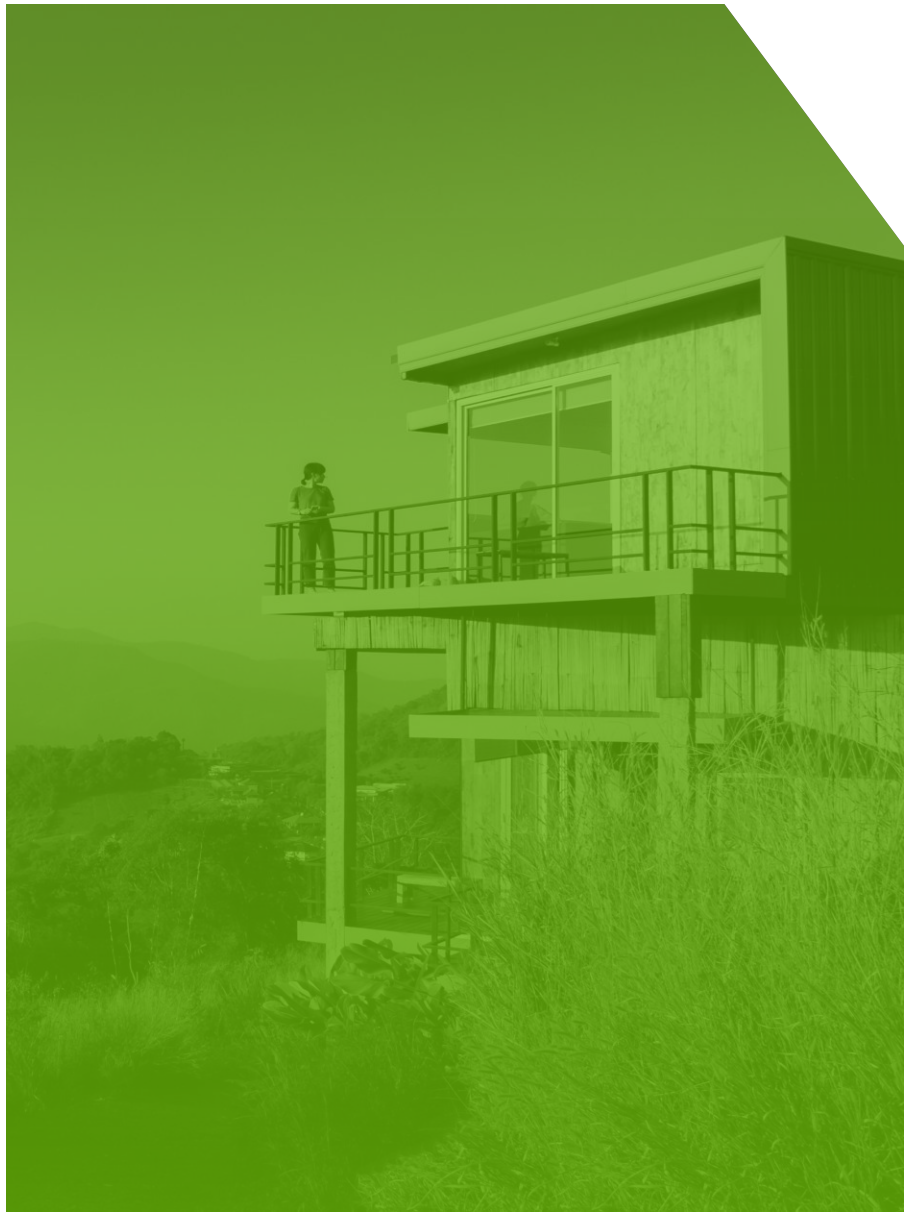
Exceptions

- Buildings and dwelling units complying with Appendix RC: Sections RC102, Zero energy pathway or RC105, more than 70 of roof shaded

Section RB102

General Definition Solar-Ready Zone

A section or sections of the roof or building overhang designated and reserved for the future installation of a solar photovoltaic or solar thermal system



Appendix RB: Solar-Ready Provisions

New in 2021:

Applies to all R-use buildings 3 stories and below shading

- The solar-ready zone shall be set back from any permanently affixed object, such as a chimney on the building that is located south, east, or west of the solar-ready zone
- Setback must be at least 2X the object's height
- Objects may include taller portions of the building, parapets, chimneys, antennas, signage, rooftop equipment, trees and roof plantings

Capped roof penetration sleeve

- A capped roof penetration sleeve shall be provided adjacent to a solar-ready zone located on a roof slope of not greater than 1 in 12.
- Sleeve shall be sized to accommodate the future photovoltaic system conduit, but not less than 1.25” in diameter

EV Ready

R404.4 Wiring for Electric Vehicle Charging Spaces

("EV Ready Spaces")

EV Ready Spaces shall be provided in accordance with Table R404.4

- The dedicated branch circuit shall be identified as "EV READY" in the service panel or subpanel directory, and the termination location shall be marked as "EV READY."
- The circuit shall terminate in a NEMA receptacle, outlet or a Society of Automotive Engineers (SAE) standard J1772 or SAE J3400 electrical connector.

EV Ready Spaces

Table R404.4 EV Ready Space Requirements

Type of Building	Number of spaces	Wiring Requirement
1 & 2 Family Dwellings and Townhomes	At least one EV Ready Space per dwelling unit	50 Amp circuit provided
All other R-use Buildings	At least 20% of all installed spaces	40-amp, 208/240-volt circuit with a minimum capacity of 9.6 kVA

Appendix RC Massachusetts Municipal Opt-In Specialized Stretch Code 2025

Appendix RC *Revise the Appendix RC title and notes as follows:*
APPENDIX RC – MASSACHUSETTS MUNICIPAL OPT-IN SPECIALIZED STRETCH CODE 2025

RESIDENTIAL LOW-RISE BUILDING PROVISIONS

The provisions contained in this appendix together with referenced sections from the Stretch energy code constitute the Specialized opt-in code for residential low-rise buildings, and may be adopted by a city or town together with the Commercial Specialized code Appendix CC as their stretch energy code. When adopted by the local municipality, the provisions in this appendix are mandatory in combination with the IECC2021 with Massachusetts Stretch code amendments.

User Note:

About this appendix: *This appendix provides requirements for residential buildings. Where adopted by ordinance as a requirement, Section RC101 language is intended to replace Section R401.2.*

Municipal Specialized Opt-In Code

The Specialized Stretch Code…

Includes net-zero building performance standards

Designed to remain below the MA GHG emissions threshold

Requires compliance with the Stretch Code

Requires pre-wiring for future electrification of space and water heating for homes with fossil fuels

Is adopted at the local level but is NOT required for participation in Green Communities

Specialized Code Pathways

Meet the Stretch Code
+
Follow One Specialized Code Pathway

Zero Energy Pathway RC102	All-electric Pathway RC 103	Mixed-fuel Pathway RC104 and RC105
• HERS 0 or Phius ZERO	• HERS 45 • No requirements beyond the Stretch Code	• HERS 42 • Pre-wiring for electrification • Onsite renewable energy

Specialized Code Pathways

Allowable pathways depend on:

- **Dwelling unit or building floor area**
- **Presence or absence of fossil fuels or fossil fuel piping**

Specialized Code Requirement Summary

TABLE 2: Residential Specialized code requirements summary by building/dwelling unit size

Building Size	Fuel Type	Minimum Efficiency	Electrification	Min. EV wiring	Renewable Generation
Dwelling units up to 4,000 sf	All Electric	HERS 45 or Phius CORE or PHI	Full	1 parking space	Optional
Dwelling units up to 4,000 sf	Mixed-fuel	HERS 42 or Phius CORE or PHI	Pre-wiring	1 parking space	Solar PV (except shaded sites)
Dwelling units > 4,000 sf	All Electric	HERS 45 or Phius CORE or PHI	Full	1 parking space	Optional
Dwelling units > 4,000 sf	Mixed-fuel	HERS 0 or Phius ZERO	Pre-wiring	1 parking space	Solar PV or other renewables
Multi-family >12,000 sf	All Electric	Phius CORE or PHI	Full	20% of spaces	Optional
Multi-family >12,000 sf	Mixed-fuel	Phius CORE or PHI	Pre-wiring	20% of spaces	Optional

Source: MA DOER

Mass Save Incentive Programs

Residential Rebates and Incentives

Rebates for appliances, heating systems and more.

www.masssave.com/en/residential/rebates-and-incentives

Residential New Construction

Five ***incentive paths*** that cover new construction and renovation projects with multiple fuel types, multiple Program Administrators and both commercial and residential meters

Incentives are ***performance-based*** for incorporating high-performance upgrades that go beyond minimum building code requirements

Program also features a ***Passive House & All-Electric Homes workforce training initiative*** to promote workforce development and market transformation in the energy efficiency and residential building construction industry.

ICF serves as single point of contact Lead Vendor for all statewide Sponsors

WE ARE MASS SAVE®:

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EVERSOURCE

Liberty

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Unitil

Residential New Construction

Low Rise New Construction

- 1-4 unit homes and 5+ unit multi-family ≤ 3 Stories and residential-metered heat
- Enrollment via program-approved HERS rater

All-Electric Homes

- Single Family and 2-4 unit new construction homes
- All-Electric heating, cooling, water heating and cooking
- Enrollment via program-approved HERS rater

Renovations & Additions

- 1-4 unit homes and 5+ unit multi-family ≤ 3 Stories and residential-metered heat
- Major renovations & large additions
- Enrollment via program-approved HERS rater

Residential New Construction

High Rise New Construction

- 4+ stories and 5+ units with residential-metered heat [or] all multi-family buildings with master-metered heat
- Enrollment via program Account Manager

Passive House

- New Construction multi-family buildings of 5+ units pursuing Passive House Certification (PHI or PHIUS)
- Enrollment via program Account Manager

Passive House & All-Electric Homes Training

- Enrollment online via Energy Efficiency Learning Center
- 50% cost reimbursement upon completion of Passive House professional accreditations (PHI or PHIUS)

Energy Code Support

Questions about the energy code?

Energy Code Support Hotline:

855-757-9717

Energy Code Support Email:

energycodesma@psdconsulting.com

Thanks!

Massachusetts Energy Code Technical Support Program

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