



Massachusetts Codes

Updated Stretch Code and Municipal Opt-In Stretch Code for Commercial Buildings

Background and Introduction

Massachusetts has consistently been a national leader in energy efficiency, especially in new construction.

With buildings making up 40 percent of total greenhouse gas emissions in the United States, decarbonization measures in new construction offer critical solutions to mitigate the worst impacts of climate change. Base codes only go so far to address emission reduction goals, so states must take the lead and adopt above code measures in order to effectively respond to a changing climate.

Massachusetts has recently revamped its energy stretch code in order to meet the targets set by the Global Warming Solutions Act. This ambitious Updated Stretch Code adopts stronger measures that greatly exceed those of the 2021 International Energy Conservation Code (IECC). In addition to the Updated Stretch Code, the Climate Act of 2021 in Massachusetts required the Department of Energy Resources (DOER) to create a Municipal Opt-In Stretch Code that provides even more opportunities for energy savings than the Updated Stretch Code.

The Green Communities Program in Massachusetts requires that existing and newly-designated Green Communities adopt the Updated Stretch Code. As of November 2022, 299 cities and towns in Massachusetts have joined the program. This document summarizes the new provisions of both the Updated Stretch Code and Municipal Opt-In Stretch Code for commercial buildings. For information regarding low-rise residential buildings, please see NEEP's resource on the Residential Updated Stretch Code and Municipal Opt-In Stretch Code.

The Updated Stretch Code requirements outlined in this document take effect for buildings permitted on or after July 2023. For existing Green Communities, the Updated Stretch Code will automatically take effect immediately in July 2023 without the need for adoption by municipalities.

The Municipal Opt-In Stretch Code will be available for adoption in late December 2022. The recommended effective period is at least six months after adoption, allowing an easier transition for developers, builders, and designers, and giving time for training municipal code officials. This adoption cycle mirrors that of the stretch code, which would initially take effect in either January or July, depending on which is at least six months from the adoption date.



Base Code

Massachusetts recently promulgated the [10th Edition of the Building Code](#) which will take effect in early 2023 after a public comment period. The 52 municipalities in Massachusetts that haven't joined the Green Communities Program must follow the Massachusetts amended 2021 International Energy Conservation Code (IECC)¹.

Updated Stretch Code

All 299 municipalities in the Green Communities Program are automatically enrolled in the Updated Stretch Code and must follow the requirements in the base code, the 2021 IECC, along with the amendments of the Massachusetts Updated Stretch Code. The Updated Stretch Code provisions are noted in this section

Pathways to Compliance

- 1. C401.2.1 Targeted Performance (Thermal Energy Demand Intensity (TEDI)) Pathway:** TEDI is defined as a measure of the thermal energy required by a building for space conditioning and for conditioning of ventilation air. This is an optional new compliance pathway for any building type, but specifically applies to dormitories, fire and police stations, libraries, offices, schools, post offices and town halls (greater than 20,000 square feet that have ventilation rates less than or equal to 0.5 cubic feet per minute per square feet (cfm/sf)). This pathway is intended to minimize heating demand with improved envelopes and heat recovery in ventilation systems. It calculates the TEDI using factors such as insulation and air tightness to determine how much energy is needed to heat and ventilate a space. This is beneficial because it helps guide decisions on equipment sizing and other energy saving measures.
- 2. C401.2.1 Relative Performance (American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 90.1-2019 Appendix G) Pathway:** This is an optional new compliance pathway for commercial high ventilation buildings (defined as projects with more than 0.5cfm/sf of ventilation) and for any building that does not fall under the requirements of the Targeted Performance Path, that stipulates that buildings can't earn credits for compliance unless the design complies with the Massachusetts Amended Appendix G of the ASHRAE 90.1-2019 standard. The stricter limit imposed here allows for further energy savings.
- 3. C401.2.1 Prescriptive Pathway:** This is an optional new compliance pathway for small commercial buildings (less than 20,000 square feet) that provides a mandatory list of measures that buildings must meet or exceed in order to comply with the code.
- 4. C401.2.2 Passive House Compliance Pathway:** This is an existing alternative compliance pathway that can be used for all types of commercial buildings. This pathway requires a Passive House Institute United States (Phius) CORE 2021 or Phius ZERO 2021 certification or a Passive House International (PHI) certification as described in Section C407.3.

¹ Commercial IECC 2021 MA amendments- UNOFFICIAL: <https://www.mass.gov/doc/chapter-13-energy-efficiency-amendments-unofficial-posted-102022/download>



5. C401.2.2 HERS Compliance Pathway: This is an existing alternative compliance pathway that can be used for Group-R buildings with multiple individual dwelling units. A Home Energy Rating System (HERS) score is assigned to the individual dwelling units based on the unit’s energy features. The required HERS Index is noted in Table C407.4.

Additional Energy Efficiency Updates

C401.4 Efficient Electrification: For commercial high ventilation buildings, 25% of the space heating load has to be electric, and for high glazed wall system buildings (where 50% or more of the above grade wall is glazed) 100% of the space heating load has to be electric except for buildings using the Relative Performance Pathway because average ventilation at full occupancy is greater than 0.5 cfm/sf.

C402.1.5 Mandatory Envelope “Area-weighted U value (btu/hr-sf-F) of an Envelope Section: This section simplifies the U-value provisions in section C402.1.5 with some exceptions.

C402.5 Air Leakage: Adopts the language used in the updated IECC 2024, reducing air leakage from 0.40 cubic feet per minute (CFM) at 75 pascals (CFM75) per square foot of thermal envelope area in the current code to 0.35 CFM75 per square foot of thermal envelope area in the Updated Stretch Code. This change will create a tighter thermal envelope which will result in less energy and heat escaping through the building.

C402.7 Thermal Bridges: Adds provisions to reduce thermal bridging, which is when heat can move through a building’s envelope by way of construction material such as steel. This would increase the effectiveness of the building’s thermal envelope by reducing heat loss.

C403.5 Economizers: Strengthens requirements by requiring a dedicated outdoor air system (DOAS) which would improve indoor air quality and thermal comfort of occupants.

C403.7 Ventilation Energy Recovery: Strengthens ventilation requirements by increasing energy recovery and adding new provisions to address high ventilation buildings and toxic exhaust.

C405.13 Wiring for Electric Vehicle (EV) Charging: Requires 20 percent of parking spaces to be EV Ready, which means the spaces have to be wired to accommodate future electric vehicle use, for Group R and B, and 10 percent of spaces for all other occupancy types. This would help ease the transition to EV infrastructure and use.

C406 Additional Efficiency Requirements: Point based system to select options for improved energy efficiency, which gives building professionals more choice in their proposed design.

C502 Additions: Additions less than 20,000 square feet and up to 100% of existing buildings can follow base code, whereas larger additions must follow stretch code.

C503 Alterations: Alterations must follow prescriptive stretch pathway with 10 percent reduced envelope requirements. Also removes an exception, now requiring any altered walls be brought up to prescriptive stretch code (besides historic buildings).



Municipal Opt-In Stretch Code

These requirements are for municipalities that want to go above and beyond the stretch code requirements. In addition to following the IECC 2021 and Updated Stretch Code, the municipalities must also follow the provisions outlined in this section.

Municipalities must comply with one of the following sections depending on building energy fuel type.

CC104 (All-Electric): For buildings to be considered all electric, they must use air source or ground source heat pumps for space heating, heat pumps or solar thermal systems for water heating, and all electric appliances, including those used for cooking and drying. In addition, there are minimum efficiency standards that must be achieved.

CC105 and CC106 (Mixed Fuel): This path is for buildings using fossil fuels for space heating, water heating, cooking, or clothes drying. Unlike the Updated Stretch Code, this option requires electric readiness for future electrification of homes, meaning that homes should be wired to accommodate future electric use and plugs must be installed near the fossil fuel equipment for future installation of electric equipment. In addition, the Municipal Opt-In Stretch Code requires on site solar PV and minimum efficiency requirements for fossil fuel equipment.

CC103 (Zero Energy Buildings): This is an optional pathway for buildings that are designed to result in net zero energy consumption for a year, using the PHIUS ZERO or HERS 0 certification.

Conclusion

The Massachusetts Updated Stretch Code and Municipal Opt-In Stretch Code offer solutions that would save money on energy bills, improve indoor air quality, and ease the transition to a clean energy future. The state has used energy codes as one of many tools to reduce carbon emissions and meet its goals set forth in the Global Warming Solutions Act. The state also added provisions dedicated to addressing equity and environmental justice such as strengthened ventilation requirements, which creates a healthier living space for occupants of a home or building. Stretch codes are unique because they go above and beyond what is expected, which demonstrates strong leadership and a commitment to addressing the challenges posed by climate change. Although there is always more that can be done, Massachusetts has taken a great first step in advancing its clean energy and climate goals.



Comparison Chart

UPDATED STRETCH CODE		MUNICIPAL OPT-IN STRETCH CODE
1. Dormitories, Fire and Police Stations, Libraries, Offices, Schools, Post Offices and Town Halls > 20,000 sf (with < 0.5cfm/sf of ventilation)		
C401.2.1 Targeted Performance (TEDI) Pathway ¹	Modeled TEDI	Same As Updated Stretch Code
C401.2.2 Passive House Compliance Pathway ¹	Phius Core 2021, Phius Zero 2021, or PHI	
2. Commercial High Ventilation Buildings and All Other Building Types > 20,000 sf (with > 0.5cfm/sf of ventilation)		
C401.2.1 Relative Performance (ASHRAE 90.1-2019 Appendix G) ¹	Complies with MA Amended ASHRAE 90.1-2019 Appendix G	Same As Updated Stretch Code
C401.2.1 Targeted Performance (TEDI) Pathway ¹	Modeled TEDI	
C401.2.2 Passive House Compliance Pathway ¹	Phius Core 2021, Phius Zero 2021, or PHI	
3. Small Commercial Buildings < 20,000 sf		
C401.2.1 Prescriptive Pathway ¹	Prescriptive Requirements	Same As Updated Stretch Code
C401.2.1 Targeted Performance (TEDI) Pathway ¹	Modeled TEDI	
C401.2.2 Passive House Compliance Pathway ¹	Phius Core 2021, Phius Zero 2021, or PHI	
4. Group-R Buildings with Multiple Individual Dwelling Units		
C401.2.1 Targeted Performance (TEDI) Pathway ¹	Modeled TEDI	Compliance Paths as Noted in Table CC101.2
C401.2.2 HERS Compliance Pathway ¹	HERS Index as Noted in Table C407.4	
C401.2.2 Passive House Compliance Pathway ¹	Phius Core 2021, Phius Zero 2021, or PHI	
Additional Commercial Energy Efficiency Requirements		
C401.4 Efficient Electrification ¹	Relative Performance Pathway: 25% Electric Space Heating (C401.4.1), High Glazed Wall Systems (50% or more glazed): 100% Electric Space Heating (except for Relative Performance) (C401.4.2)	CC104.1: 100% Electric Space and Water Heating (C401.4.3)
C402.1.5 Mandatory envelope Area-weighted U value (btu/hr-sf-F) of an envelope section ¹	Simplifies C402.1.5	Same As Updated Stretch Code
C402.5 Air Leakage ¹	Reduce Air Leakage	
C402.7 Thermal Bridges ¹	Reduced Thermal Bridging	
C403.5 Economizers ¹	Adds Dedicated Outdoor Air Systems (DOAS)	
C403.7 Ventilation Energy Recovery ¹	Increases ventilation recovery	
C405.13 Wiring for Electric Vehicle (EV) Charging ¹	20% EV Ready Spaces for Group R+B, 10% for others	
C406 Additional Efficiency Requirement ¹	Point based system to select options for improved energy efficiency	
C502 Additions ¹	Additions and up to 100% of existing buildings over 20,000 sq ft must follow stretch	
C503 Alterations ¹	Alterations prescriptive stretch – 10% Envelope Requirements	
C503 Change of Occupancy ¹	Change of Use prescriptive stretch – 10% Envelope Requirements	
R501.6 Historic Buildings ¹	Follow Base Code	
CC104 All Electric Building Performance Standard ²	N/A	Full Electrification with Minimum Efficiency Standards
CC105 and CC106 Mixed Fuel Building Performance Standard ²	N/A	Fossil fuel buildings must meet minimum efficiency requirements, have on-site PV, and be wired to accommodate future electrification
CC103 Zero Energy Building Performance Standard ²	N/A	Net Zero via Phius ZERO or HERS 0

1. Impacts buildings permitted on or after July 1, 2024 for Updated Stretch Code

2. Impacts buildings permitted on or after January 1, 2023 for Updated Stretch Code

* Municipal Opt-In Stretch Code requirements only take effect after adoption, with a recommended 6 month waiting period