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mass save

2023 Commercial Stretch Code 3 Hour Overview

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What is Mass Save®?

- Mass Save® is an initiative sponsored by Massachusetts' gas and electric Program Administrators and energy efficiency service providers, including
  - The Berkshire Gas Company
  - Cape Light Compact
  - Eversource Energy
  - Liberty Utilities
  - National Grid
  - Unitil
- The Sponsors of Mass Save work closely with the Massachusetts Department of Energy Resources to provide a wide range of services, incentives, trainings, and information promoting energy efficiency that help residents and businesses manage energy use and related costs.

We Are Mass Save®

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Massachusetts Department of Energy Resources (DOER)

Some of the content of this course is sourced from 2023 Technical Guidance provided by Massachusetts Department of Energy Resources.

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Presented by:

PSD

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Moving Energy Efficiency Forward

We combine building science with technology to help utility providers, program implementers, and building performance professionals achieve energy savings.

PSD

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Today's Presenter

Art Pakatar
Senior Manager, Energy Codes Services

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Continuing Education

This webinar is approved for:

- 3-hour CSL CEU
- 3 AIA LU | HSW
- 3 CO CEU
- 3 BPI CEU

Everyone will receive a certificate of attendance via email

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Agenda

- Massachusetts Energy Code
- 2023 Commercial Stretch Energy Code Requirements
- Commercial Energy Efficiency
- Compliance Pathways
- Existing Buildings
- Appendix CB Solar Ready
- EV Ready
- Municipal Opt-In Specialized Stretch Code
- Summary

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Learning Outcomes

Be familiar with the new Commercial Stretch Code.

Gain knowledge of the different compliance pathways and new performance requirements under the Commercial Stretch Code.

Comprehend the impact of thermal bridging on the overall Building Thermal Envelope.

Understand how the Commercial Stretch Code applies to existing buildings and addresses additions, alterations, and changes in use.

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Poll Question #1

Which of the following best describes your field of work?

A. Builder/Contractor/Remodeler
B. Design Professional
C. Code Official
D. HERS Rater/Passive House Consultant/ Energy Modeler
E. Other

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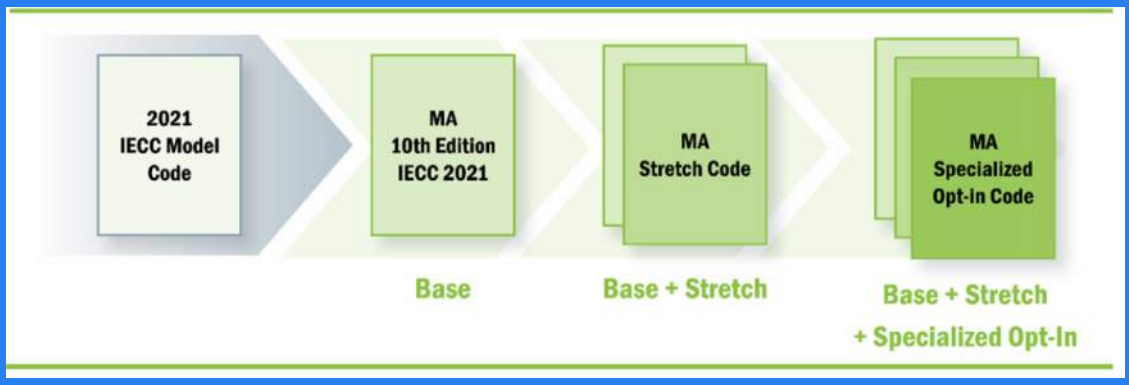
The 2023 Massachusetts Energy Code



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Code Adoption Timeline

Jan 1, 2023
- **Residential update (>4 stories)** HERS 52/55/58

July 1, 2023
- **Commercial and Multi-family update**

July 1, 2024
- **Residential & Multi-family update** HERS 42/45 or TEDI or Passive house options

Stretch code updates in 2023

HERS rating levels lowered – July 2024

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MA Base Energy Code

The Base Energy Code is…

- The default statewide energy code
- Based on the 2021 IECC* (Currently based on 2018 IECC)
- Provides a base level of energy savings
- Found in ***Chapter 13: Energy Efficiency Amendments*** of the MA State Building Code (CMR 780)

* Anticipated Early 2024

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Commercial Code Application

All buildings other than:

- ✓ Detached one- and two-family dwellings,
- ✓ Townhouses
- ✓ Group R-2, R-3, R-4 buildings three stories or less in above grade height.

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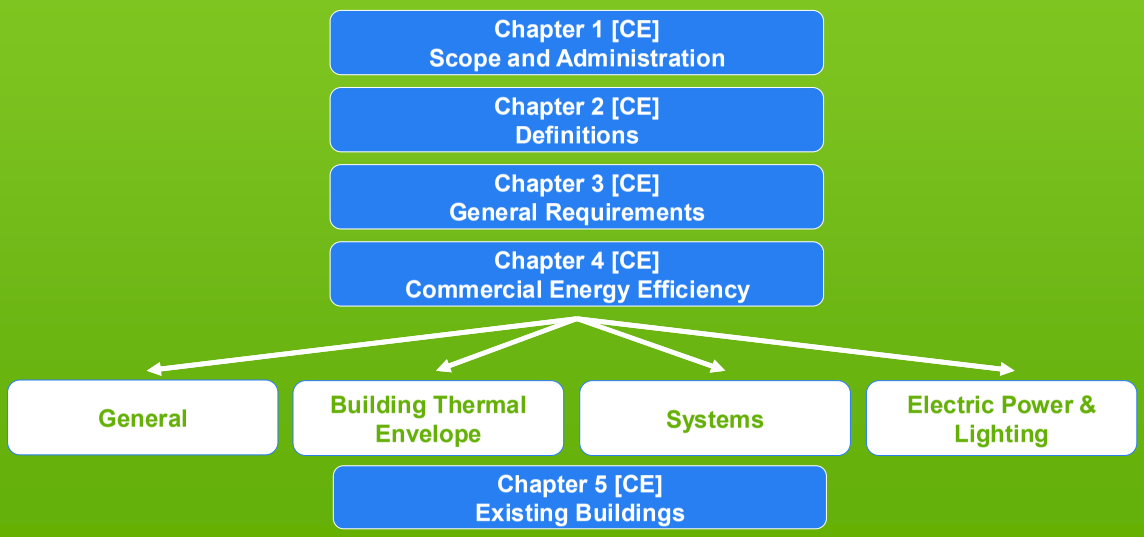
Commercial Provisions



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Poll Question #2

The current MA Base Energy Code is based on:

A. 2009 IECC
B. 2015 IECC
C. 2018 IECC
D. 2021 IECC

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2023 Commercial Stretch Code Overview

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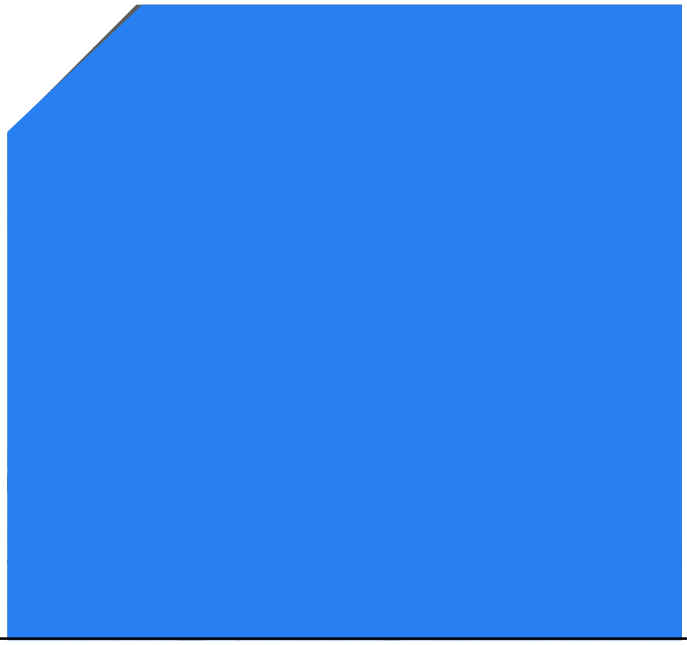
MA Stretch Energy Code

The Commercial Stretch Energy Code…

- Is developed by the MA Department of Energy Resources (DOER)
- Results in greater energy savings than the Base Energy Code
- Requires compliance with 2021 IECC as amended for MA
- Is adopted at the level of the local jurisdiction



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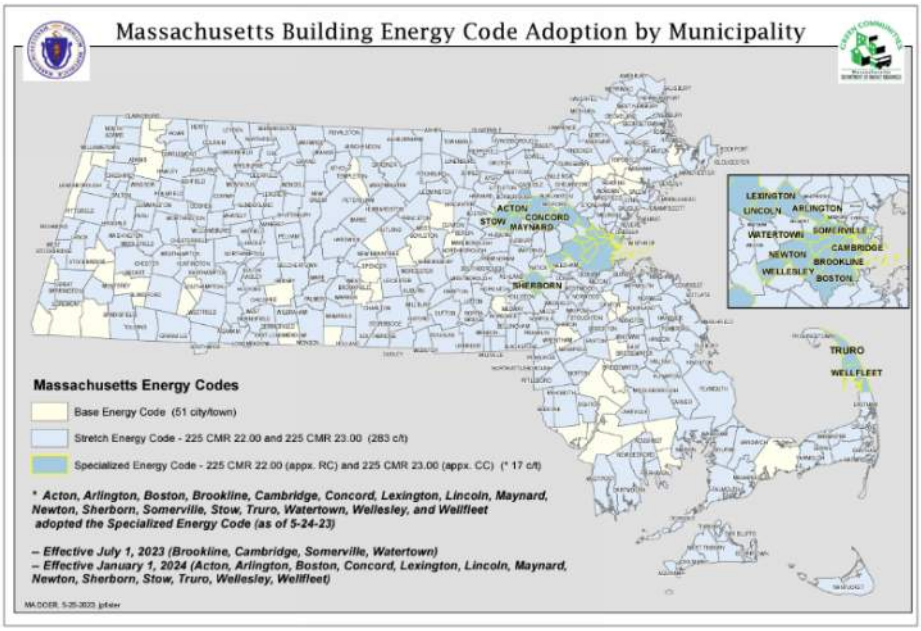
Stretch Code Communities



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Specialized Opt-In Code

- ✓ IECC 2021 w/ MA Amendments
- ✓ Stretch Code Amendments
- ✓ Specialized Code Appendices

- ✓ 17 Communities have voted to adopt.
- ✓ Effective in 4 communities July 1, 2023
- ✓ Next Round January 1, 2024

Photo Reference: "Mapping Our Way Through the Massachusetts Energy Codes in 2023, June 1, 2023, Lauren Gunther, https://www.dimellashaffer.com/blog/mapping-our-way-through-the-massachusetts-energy-codes-in-2023/

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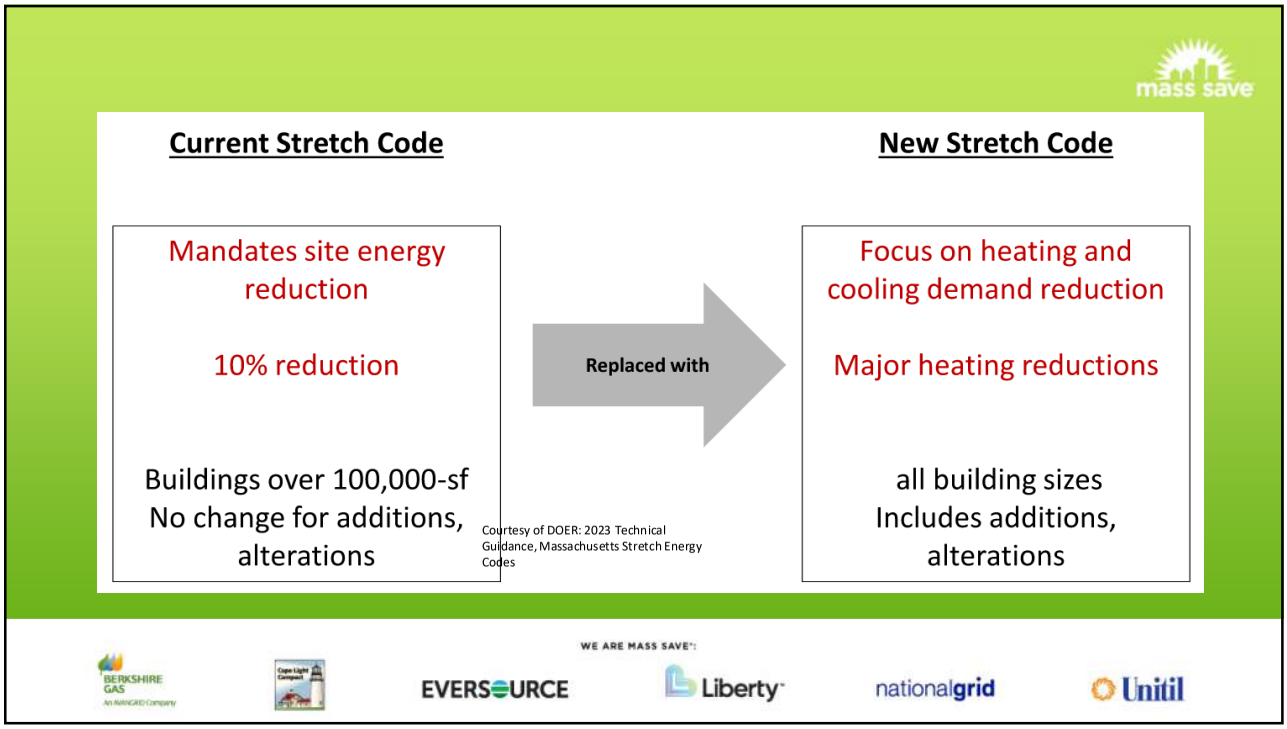

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Poll Question # 3

The Opt-in Specialized Code is an overlay code of both the Stretch Code and the 2021 IECC

A. TRUE

B. FALSE

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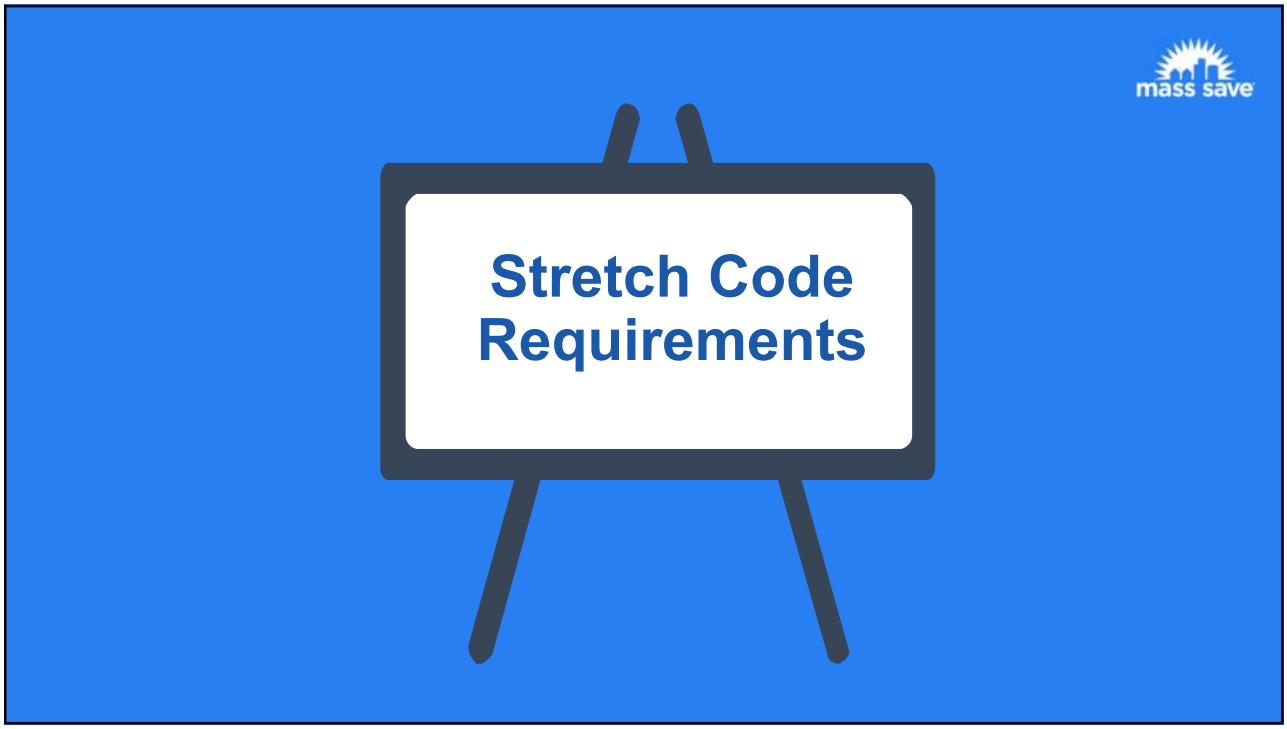

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Summary of Minor Code Changes

These are straightforward changes and not a comprehensive list.

Code Section	Summary of Measure
C103.2	Adds documentation requirements for Solar Ready, EV Ready Spaces, ventilation rate for Relative Performance (see Additional Information for more guidance), and Mixed-Fuel systems' plans for electrification for the Specialized Code. Clarification of COMcheck submittal documentation.
C202	Adds definitions for All-Electric Building, Automatic Load Management System, Class 3 Exhaust, Class 4 Exhaust, Clean Biomass Heating System, Combustion Equipment, Glazed Wall System, Dedicated Outdoor Air System, Electric Vehicle, Electric Vehicle Ready Parking Space, Enthalpy Recovery Ratio, Exempt Exhaust, Fuel Gas, Fuel Oil, Mixed-Fuel Building, Other Exhaust, Sensible Energy Recovery Ratio, Spandrel Section, Thermal Bridge
C402.2.4.1	Insulation Installation, Delete C402.2.4.1 Exception
C402.2.8	New section listing specifications for fireplaces.
C402.4	Lowers fixed and operable U-factors and makes performance documentation explicit for all fenestration.
C402.6	Approved Calculation Software Tools, Allows MA Stretch COMcheck
C405.2	Lowers existing threshold requiring controls in daylight zones to 100W.
Appendix CB	Solar-Ready Zone – Commercial, included without modification

Simple code measures that don't require further explanation. Refer to code for specific requirements.

Courtesy of DOER: 2023 Technical Guidance, Massachusetts Stretch Energy Codes

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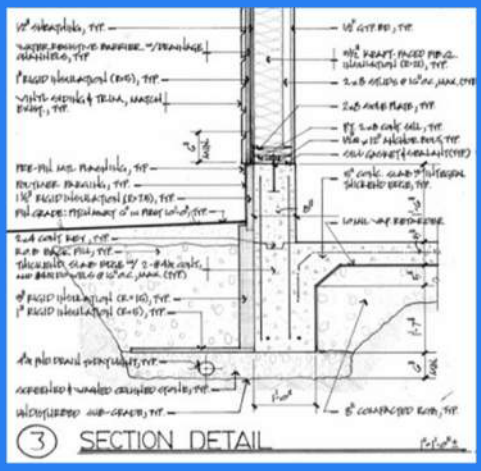
Construction Documents

New Requirements to be included on Construction Documents (CDs)

- Solar Ready Roof Zone or Potential Solar Zone Area
- EV Ready Spaces
- Relative Performance Pathway ventilation documentation, schedules, and calculations
- For Opt-in Communities – electric HVAC retrofit design



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COMcheck Required

ALL Permits Shall Include Completed COM*check including:*

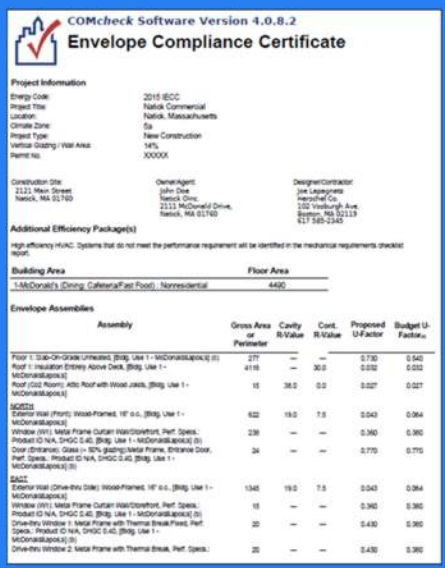
- Envelope Compliance Certificate
- Lighting Compliance Certificate
- Mechanical Compliance Certificates
- Plan Review/Inspection Checklist

Exception:

Projects documenting compliance following Section C407.2 (ASHRAE 90.1 Appendix G) shall follow applicable reporting requirements.

COMcheck-Web

https://energycode.pnl.gov/COMcheckWeb/


COMcheck Software Version 4.0.8.2

Envelope Compliance Certificate

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Definitions

- Chapter 2 as always includes definitions of terms/words related to the scope applicable to this code.
- Helps maintain the context in which the terms are being used.
- Some new definitions in the version include:
  - Dedicated Outdoor Air System (DOAS)
  - Thermal Bridge
  - Spandrel Section
  - Tenant Fit Out Zone
  - Enthalpy Recovery Ratio
  - Sensible Energy Recovery Ratio
  - Automatic Load Management System (ALMS)
  - Thermal Distribution Efficiency

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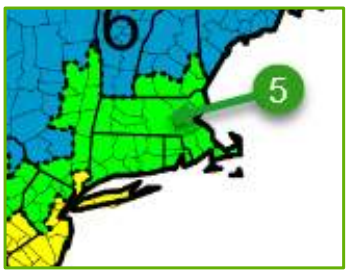
Climate Zone

All of MA is in CZ 5A



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Poll Question # 4

Which of the following is a new requirement to be depicted on the Construction Documents submitted for permitting?

A. Solar Ready Zone
B. Thermal Boundary
C. Air Barrier
D. Ventilation documentation, schedules, and calculations

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Compliance Pathways

Prescriptive Compliance

Nonresidential buildings ≤20,000 sf

Targeted Performance Compliance

Dormitories, fire stations, libraries, offices, schools, police stations, post offices and town halls over 20,000 sf and having average ventilation at full occupancy of 0.5 cfm/sf or less

Relative Performance Compliance

Buildings not required to use Targeted Performance are permitted to use this path

Certified Performance - Passive House

All buildings or spaces are permitted to use Passive House compliance

Certified Performance - HERS Compliance

All Group R buildings and Group R spaces in buildings with multiple dwelling units are permitted to use HERS compliance

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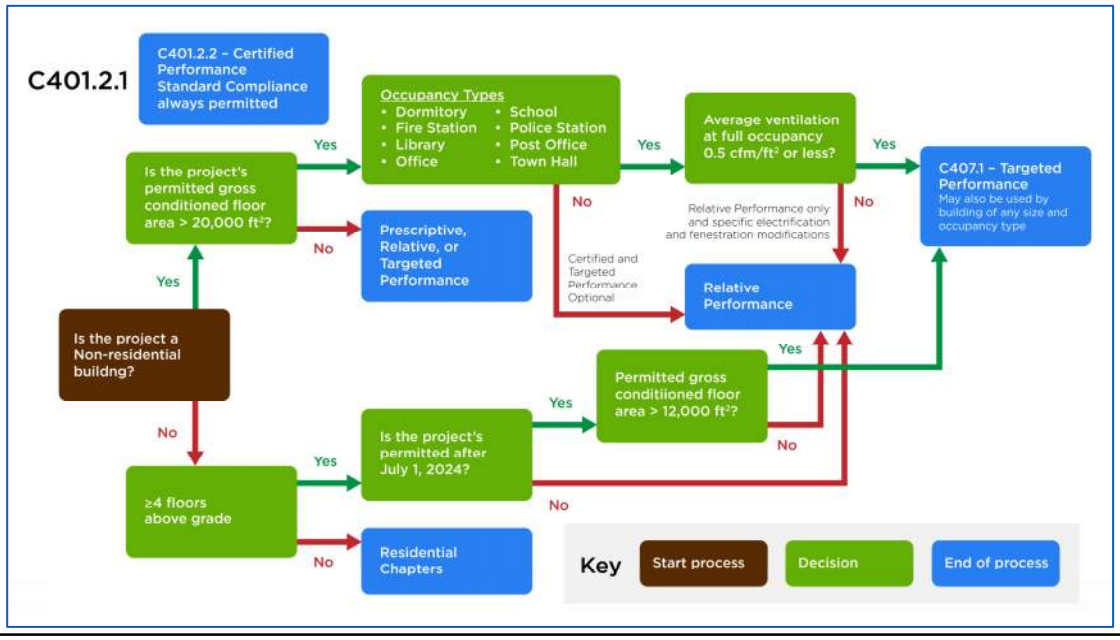
Compliance Path Flow Chart



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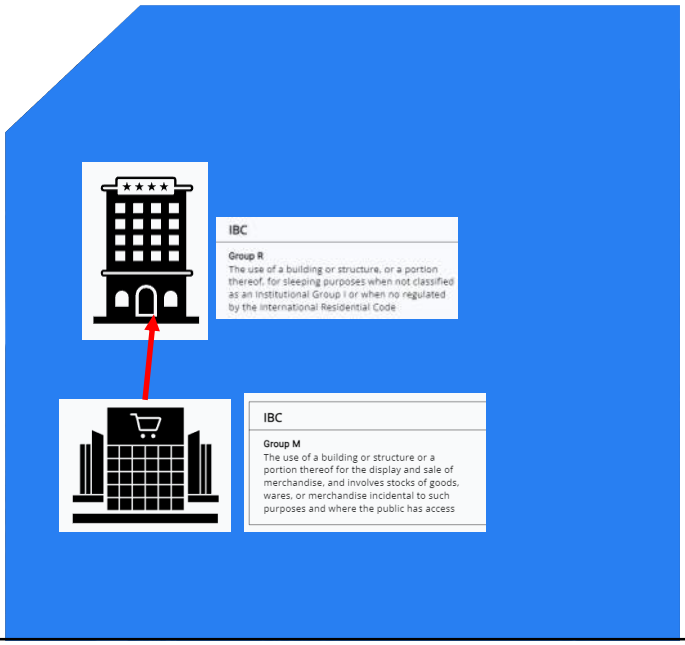
Mixed Use Buildings

- Where there are 2 or more uses within a building each use shall separately and independently show compliance
- Where different compliance paths are required – each use shall follow the appropriate patch



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Thermal Envelope Certificate

The 2021 IECC requires a permanent thermal envelope certificate to be posted in the furnace or utility room including

Information required includes:

- R-Values for the envelope components
- U-factors and SHGCs of fenestration
- Results from any building envelope air leakage testing performed on the building

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IECC Amended Sections for Compliance Pathways

This table (Pg 17) from DOER Technical Guidance illustrates the IECC amended sections that apply for each compliance pathway

Code Requirements		C407.1 Targeted Performance	C407.2 Relative Performance	C407.3 Passive House	C407.4 HERS
C401.3 Thermal envelope certification Requirements for post thermal envelope certificate with the key performance characteristics of the opaque envelope and fenestration and air leakage testing results.		Yes	Yes	Yes	Yes
C401.4.1 Partial Space Heating Electrification		No	Yes	No	No
C401.4.2 Full Space Heating Electrification		Note 1	Note 1	No	No
C402 Building Envelope Requirements	**C402.1.5** Component Performance Alternative Maximum area-weighted U-factor of the opaque above-grade walls and the maximum U-factor of the glazed wall systems specified in either Section C402.1.5.1 or C402.1.5.2 depending on the percentage of the exterior wall taken by glazed wall systems; the maximum SHGC of the glazed wall systems	Yes	Yes	No	No
	C402.2.8 Requirement for combustion fireplaces	Yes	Yes	No	No
	C402.3 Rooftop solar readiness	Yes	Yes	Yes	Yes
	C402.4.6 Fenestration Documentation Allowed methods for determining fenestration performance.	Yes	Yes	No	No
	C402.5 Air Leakage – Thermal Envelope Air barrier design and testing requirements; maximum allowed air leakage rates.	Yes	Yes	No	No
	C402.7 Derating and Thermal Bridges Methodology that must be used to account for thermal bridging losses in exterior walls	Yes	Yes	No	No
C403 Building Mechanical Systems		Yes	No except must meet C403.5 (Economizer) and C403.7 (Exhaust Air Energy Recovery)	No	No
C404 Service Water Heating The minimum equipment efficiency and controls; piping insulation.		Yes	No	No	No
C405 Electric Power and Lighting Systems Interior and exterior lighting power and controls; electric metering; transformers; motors; vertical and horizontal transportation systems and equipment; voltage drop; automatic receptacle controls; energy monitoring; provisions for the electric vehicles ready parking spaces.		Yes	Yes	Yes	Yes
C406 Additional Efficiency Requirements Projects must implement efficiency measures to achieves at least 15 credits.		(Note 2)	(Note 2)	No	No
C408 Maintenance Information and System Commissioning Requirements related to systems commissioning, functional testing and maintenance information.		Yes	Yes	Yes	Yes

Note 1: Full heating electrification is required for high *glazed wall system* buildings (C402.1.5.2) except buildings using Relative Performance Path because average ventilation at full occupancy is greater than 0.5 cfm/sf in which case partial heating electrification is required.

Note 2: Some specified systems and equipment that contribute toward compliance with Section C406 may be included in the whole building energy models and thus contribute toward compliance with the performance thresholds of a given compliance path. Others cannot be modeled as specified following the simulation rules of the given compliance option. **Error! Reference source not found.** shows energy efficiency credits that may contribute toward modeled performance for each performance-based compliance path.

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Building Electrification

- This is a new section!
- Projects following Relative Performance paths require partial electrification (25%)
- High Glazed Wall Projects require full electrification – except they can do partial electrification when following Relative Performance path due to high ventilation rate
- All-Electric pathway of the Specialized Code requires full space and water heating electrification (C401.4.3)

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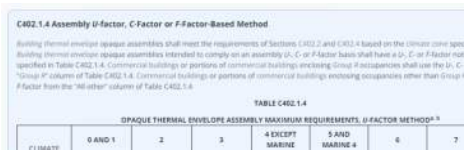
Building Envelope Thermal Requirements

- Insulation R-Value is no longer permitted.
- Vertical assemblies must meet an area-weighted U-factor
- COMcheck –Web is approved for Prescriptive Compliance
- Thermal Bridging mitigation is required – more on that later
- Table C402.1.4 – Assembly U-Factors

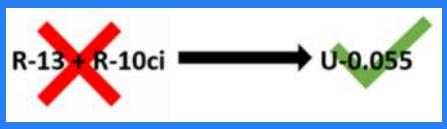


C402.1.4 Assembly *U*-factor, *C*-Factor or *F*-Factor-Based Method

TABLE C402.1.4

OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, *U*-FACTOR METHOD[a, b]

CLIMATE	0 AND 1	2	3	4 EXCEPT MARINE	5 AND MARINE 4	6	7



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Component Performance Alternative

- This section allows for more flexible glazing limits.
- Differentiates between low glazed and high glazed wall systems
- Tradeoffs between roof/floors and walls/windows are not allowed.
- “Intra-vertical” tradeoffs are allowed
- Thermal Bridging still must be addressed – more on that later
- Provides U-factor area-weighting for Prescriptive Compliance
- Prepares inputs for Appendix G calculations

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Low Glazed Wall System Buildings

- Glazed Wall System area is **not greater** than 50% of the above-grade wall area
- Low Glazed Wall System **max. allowed** area-weighted U-factor is U=0.1285
- Maximum allowed vision glass assembly is U=0.25

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High Glazed Wall System Buildings

- Glazed Wall System area **is greater** than 50% of the above-grade wall area
- High Glazed Wall System max. allowed area-weighted U-factor is U=0.1600
- Maximum allowed vision glass assembly is U=0.25

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Air Leakage- Thermal Envelope (C402.5)

- ✓ Air Leakage Testing is Mandatory
- ✓ Tested by approved third party
- ✓ All Prescriptive and Performance Compliance pathways require compliance
- ✓ Two testing options:
  - Whole-building
  - Dwelling units
- ✓ Options for buildings over 100,000SF
- ✓ Max. Allowance: 0.35cfm/SF @ 75Pa
- ✓ Group R and I buildings can use a different standard (allowance 0.27 cfm/SF)

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C402.7 Derating and Thermal Bridging

New section – include exterior insulation layers.

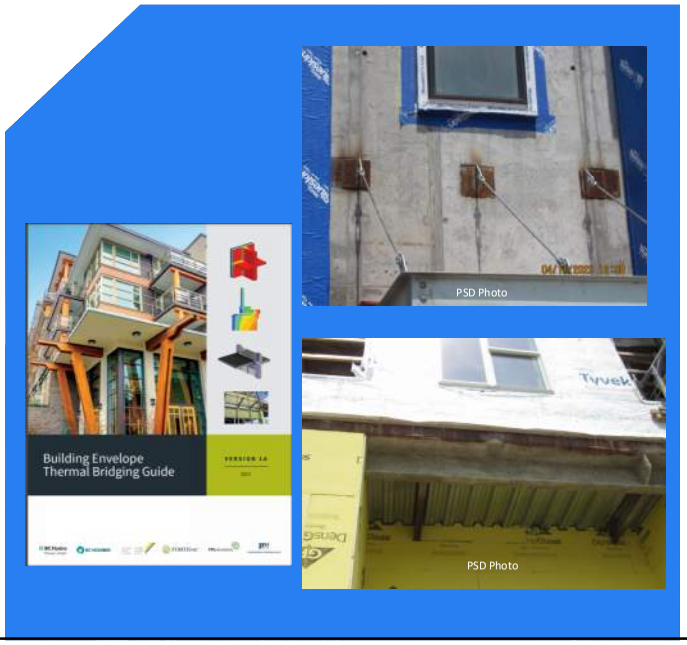
Also addressed opaque portions of glazed wall systems

Required for all Prescriptive and Performance paths.

Must include method and selections on CDs

Reference: "Building Envelope Thermal Bridging Guide by BC Hydro/BS Housing Research Center)

Look for upcoming course on Thermal Bridging and Derating



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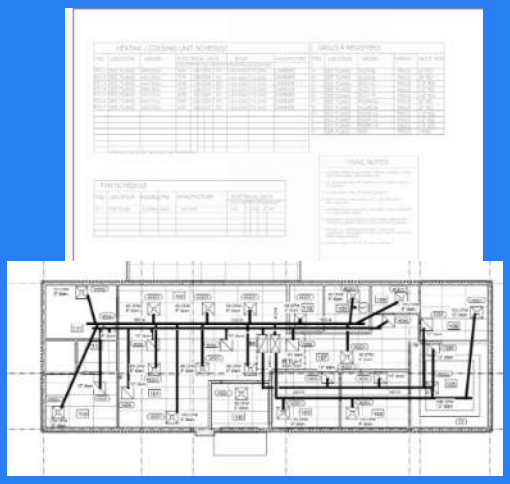
Building Mechanical Systems

C403.2.1 Zone Isolation Is Required

- ✓ Zones >25,000sf in floor area
  or
- ✓ Spanning more than 1story . . .
  Shall be divided into isolated areas

- ✓ Each area must be equipped with isolation devices and controls to control the supply of conditioned and exhaust air into the zone.



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Building Mechanical Systems

C403.2.3 Fault Detection Diagnostics (FDD)

Required on new buildings of 100,000 sf or larger

FDD system to include:

- ❑ Include permanently installed sensors to monitor performance
- ❑ Sample performance at 15 min. intervals
- ❑ Automatically identify and report faults
- ❑ Automatically provide prioritized recommendations for repairs
- ❑ Be capable of transmitting recommendations to authorized personnel

Exceptions: R1 & R2 occupancies

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Building Mechanical Systems

C403.4.1.1 Heat Pump Supplementary Heat

HP w/ supplementary electric resistance heat shall have controls that limit supplemental heat operation to one of the following conditions:

- ✓ Vapor compression cycle cannot meet the demand for the set point temperature
- ✓ HP is in defrost mode
- ✓ Vapor Compression cycle malfunctions
- ✓ Thermostat malfunctions

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Building Mechanical Systems

Energy Recovery Systems

Required for:

- Non-transient Dwelling Units
  - Enthalpy Recovery Ratio not less than 50% cooling; 75% heating
- Spaces other than Non-transient Dwelling Units
  - Required when supply airflow rate of a fan system (dwelling unit) exceeds Tables C403.7.4.2(1) and C403.7.4.2(2)
  - Sensible Energy Recovery Ratio at least 50% heating – Class 3 or Class 4 Exhaust
  - Enthalpy Recovery Ratio not less than 70% heating & cooling for all other

TABLE C403.7.4.2(1)

ENERGY RECOVERY REQUIREMENT (Ventilation systems operating less than 8,000 hours per year)

CLIMATE ZONE	PERCENT (%) OUTDOOR AIR AT FULL DESIGN AIRFLOW RATE							
	≥=10% and <20%	≥=20% and <30%	≥=30% and <40%	≥=40% and <50%	≥=50% and <60%	≥=60% and <70%	≥=70% and < 80%	≥=80%
	Design Supply Fan Airflow Rate (cfm)							
5A	10,000	8,000	2,750	0	0	0	0	0

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Building Mechanical Systems

C404.2 Service Water-Heating Equipment Performance Efficiency

Water-heating equipment and hot water storage tanks shall meet Table C404.2

Manufacturer's published data sheets to be provided.

Also applies to water-heating equipment used for space heating

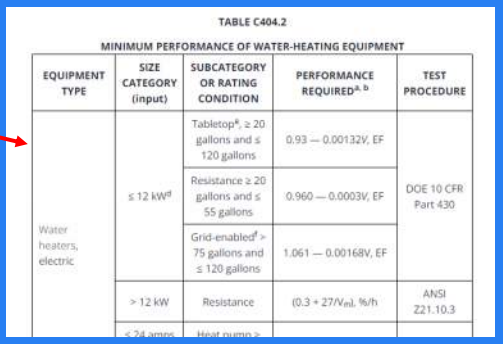

TABLE C404.2

MINIMUM PERFORMANCE OF WATER-HEATING EQUIPMENT

EQUIPMENT TYPE	SIZE CATEGORY (input)	SUBCATEGORY OR RATING CONDITION	PERFORMANCE REQUIRED[a, b]	TEST PROCEDURE
Water heaters, electric	≤ 12 kW[d]	Tabletop[e], ≥ 20 gallons and ≤ 120 gallons	0.93 — 0.00132V, EF	DOE 10 CFR Part 430
		Resistance ≥ 20 gallons and ≤ 55 gallons	0.960 — 0.0003V, EF	
		Grid-enabled[f] > 75 gallons and ≤ 120 gallons	1.061 — 0.00168V, EF	
	> 12 kW	Resistance	$(0.3 + 27/V_{rd})$, %/h	ANSI Z21.10.3
	≤ 24 amps	Heat pump ≥		

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Lighting for Dwelling Units

- 90% (min) High Efficacy lighting is required in all permanently installed lighting
- Exception: Appliance lighting

High-efficacy light sources:

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

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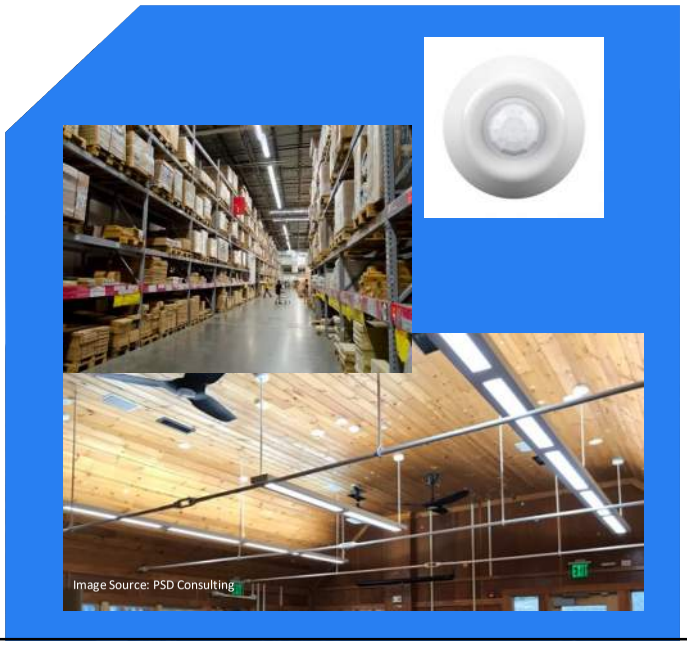
Occupancy Sensor Controls

Required areas added:

- Corridors
- Warehouse Storage Areas
- Must incorporate a manual off switch



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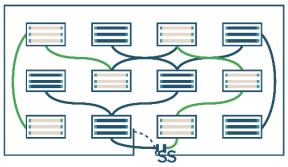
Light-reduction Controls- C405.2.3

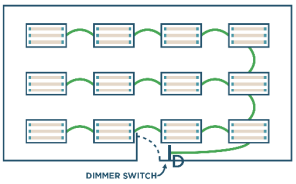
Light Reduction Controls must allow the occupant to reduce connected lighting load

- By not less than 50%
- In a reasonably uniform illumination pattern

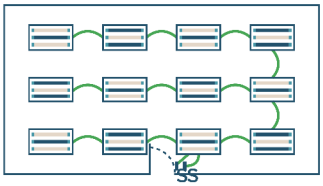
Alternating Luminaires



Dimming



Alternating Lamps



Exception: Light Reduction Control **Not** required in daylight zones with daylight responsive controls complying with C405.2.3

Image: DOE

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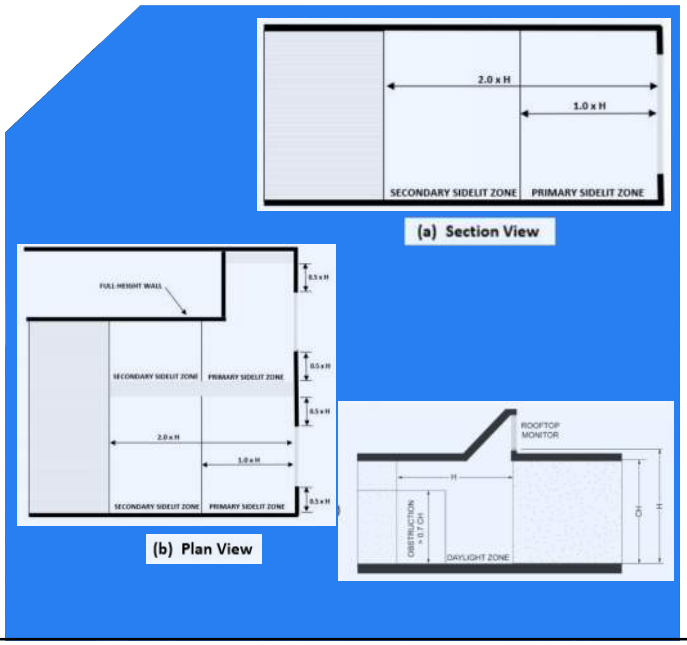
C405.2.4.2
Sidelit Daylight Zone

The Sidelit Daylight Zone requirements have changed.

Added:

- Requirements for roof top monitors
- Secondary sidelit daylight zone
- Visible transmittals not less than 0.20
- Added requirements of projection factor



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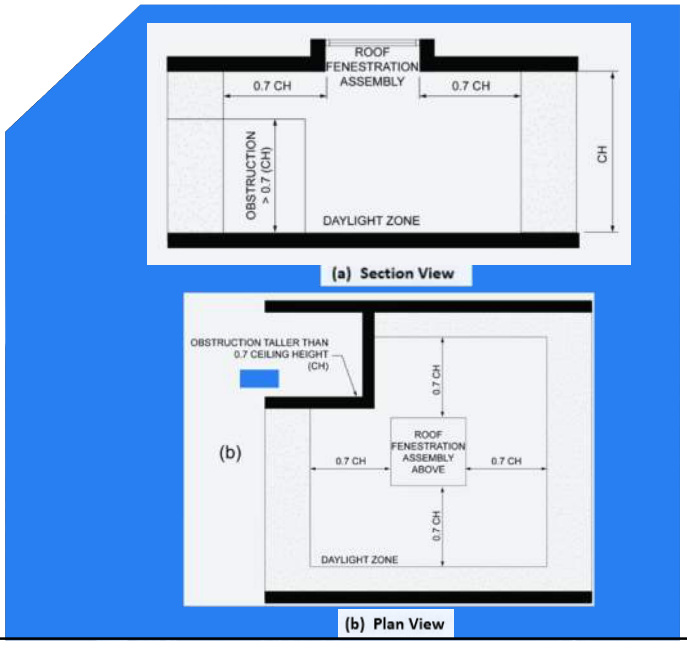
C405.2.4.3
Toplit Daylight Zone

The toplit daylight zone is the floor area underneath a roof fenestration assembly that complies with all the following:

- To nearest obstruction that is taller than 0.7 times the ceiling height or up to 0.7 times the ceiling ht., whichever is less.
- Direct sunlight is not blocked from hitting the roof fenestration assembly at the peak solar angle on the summer solstice by buildings or geological formations
- The product of the visible transmittance of the roof fenestration assembly and the area of the rough opening of the roof fenestration assembly divided by the area of the toplit zone is not less than 0.008



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C405.2.8 Parking Garage Lighting Control

Parking garage lighting shall be controlled by an occupant sensor or a time-switch control

- Lighting power to each luminaire shall be automatically reduced by not less that 30% when not activity for 20 minutes
- Lighting zones to be no more than 3600 SF
- Separately control and reduce power by 50% areas with lighting is provided for eye adaptation
- Power to luminaires within 20 feet of the perimeter walls shall have daylight responsive controls to reduce power by at least 50%

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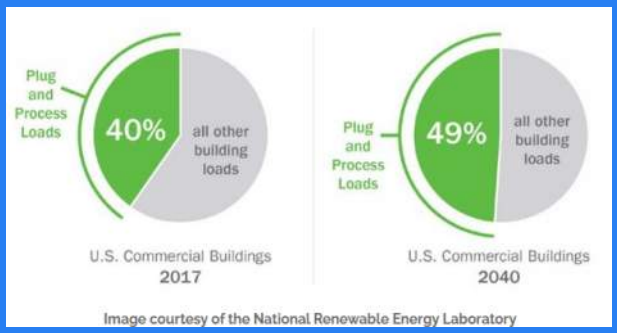
C405.11 Automatic Receptacle Control

50% of all 125V 15-and 20 amp receptacles installed in:

- Offices
- Conference Rooms
- Rooms used for printing
- Breakrooms
- Classrooms
- Workstations

25% of branch circuit feeder to modular workstations not shown on CDs



55

C405.12
Energy Monitoring

Required in new buildings w/ CFA of ≥25,000 sf

Systems must:

- Measure
- Monitor
- Record
- Report consumption data

Image source: www.Airedale.com

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C406 Additional Efficiency Requirements

1. C406.1 -New Buildings are required to achieve a min. of 15 credits
2. C406.2 - Tenant Spaces are required to achieve a min. of 10 credits

Credits based on Table C406.1

TABLE C406.1(1)

ADDITIONAL ENERGY EFFICIENCY CREDITS FOR GROUP B OCCUPANCIES

SECTION	CLIMATE ZONE															
	0A & 1A	0B & 1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
C406.2.2: 5% cooling efficiency improvement	6	6	5	5	4	4	3	3	3	2	2	2	1	2	2	2	1
C406.2.3: Renewable space heating	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	15	1	1	2	2	NA	1

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Poll Question # 5

Air Leakage Testing is Required in all buildings except those over 50,000 sq.ft.

A. TRUE
B. FALSE

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SCENARIO	PATHWAY NAME	WHAT CODE and SOFTWARE
Less than 20,000-sf	Prescriptive	Based on IECC2021, No modeling, can use COMcheck Web MA Stretch version
Over 20,000-sf and residential, office, dorm, fire station, library, school, police station, post office, or town hall	"Targeted" performance	TEDI path – can use Equest (or other) model – show heating/cooling demand below limits
More than 20,000-sf and not use above, or any use for high ventilation building	"Relative" performance	ASHRAE 90.1 Appendix G - can use Equest (or other) model – show EUI improvement over baseline
Passivehouse	Passivehouse	Passivehouse Certified - can use WUFI or PHPP models, and certify with PHIUS or PHI
HERS (Group R Buildings)	HERS	HERS Certified, work with HERS rater – can use Ekotrope or REMrate

Courtesy of DOER: 2023 Technical Guidance, Massachusetts Stretch Energy Codes

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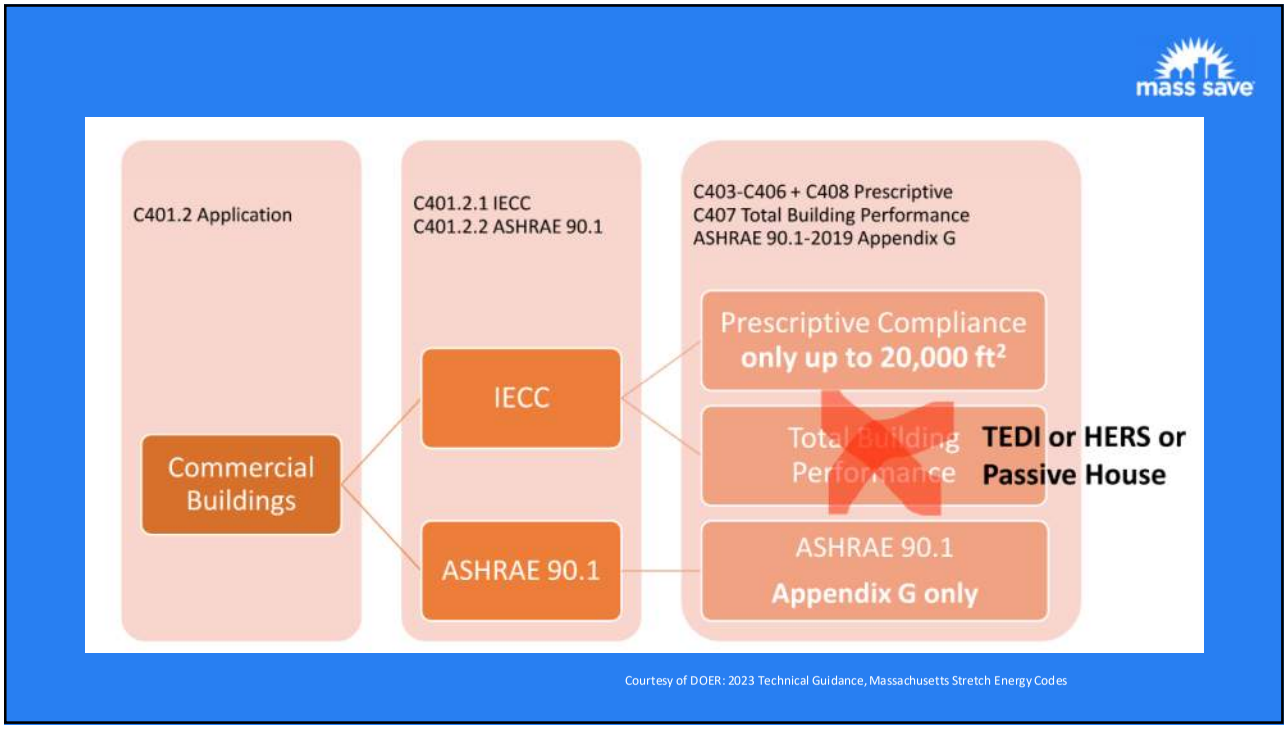

Courtesy of DOER: 2023 Technical Guidance, Massachusetts Stretch Energy Codes

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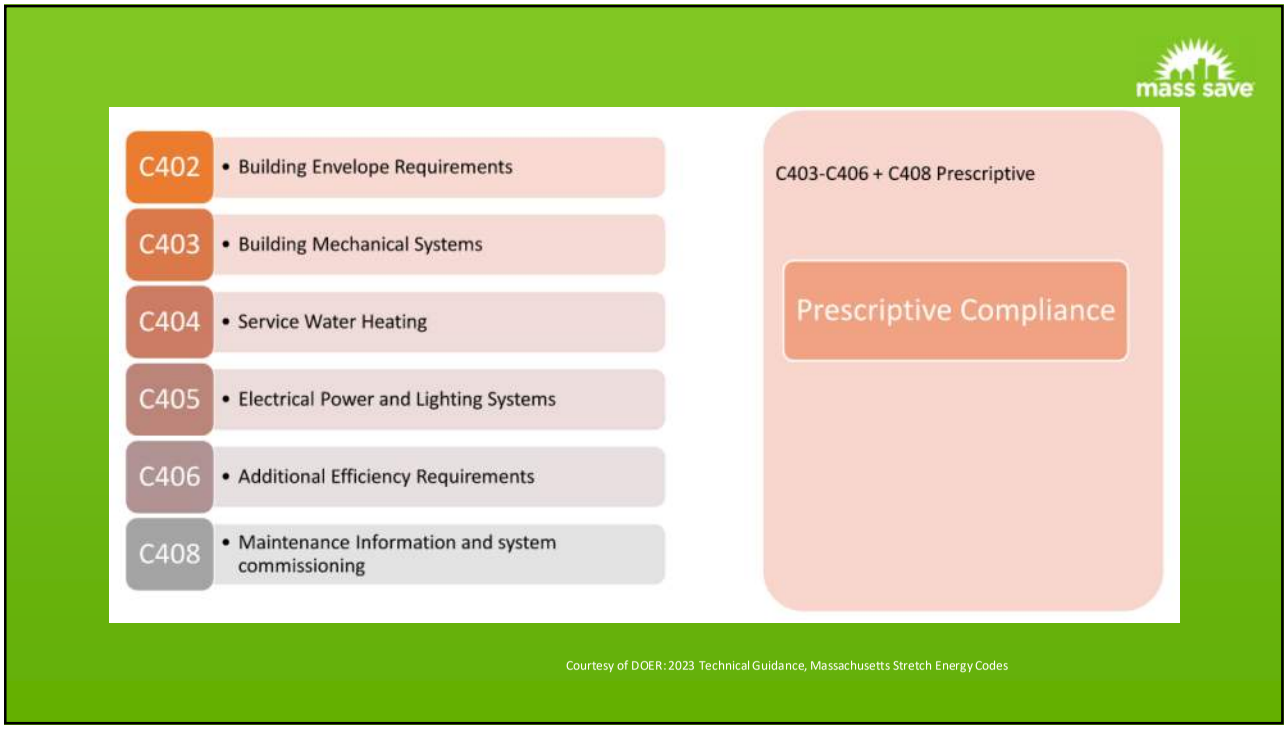

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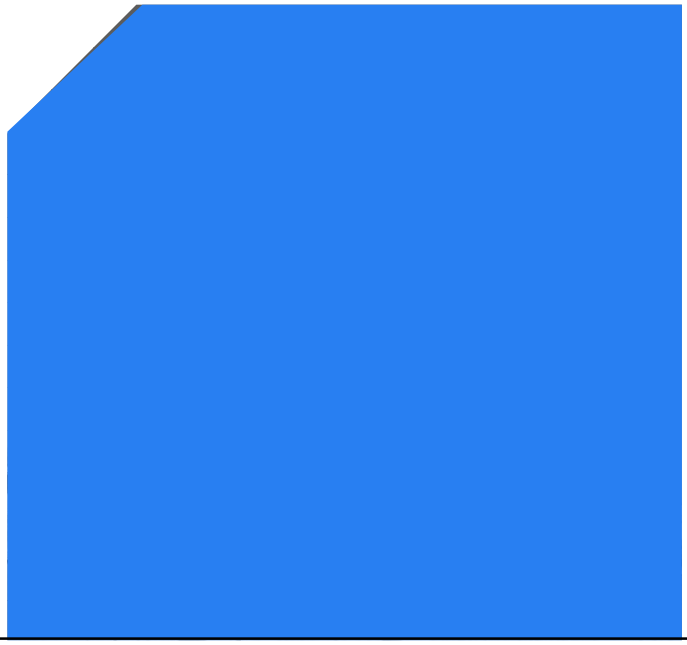
Total Building Performance Certification Method

Has been replaced

- Four Stretch Code Performance-based compliance options
  - Targeted Performance Simulation
  - ASHRAE 90.1 2019 Appendix G
  - Passive House
  - HERS



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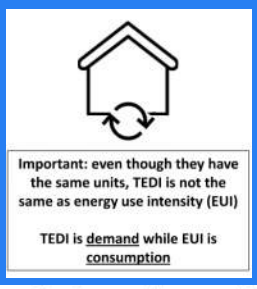
Targeted Performance Pathway (TEDI)

- Stretch Code now directly regulated heating and cooling demand for:
- Office
- Municipal buildings
- Schools
- Residential Buildings



Important: even though they have the same units, TEDI is not the same as energy use intensity (EUI)

TEDI is demand while EUI is consumption

Heating TEDI	*Total annual energy **delivered to** the building for space conditioning and conditioning of ventilation air, normalized by area (kBtu/sf-yr)*
Cooling TEDI	*Total annual energy **removed from** the building for space conditioning and conditioning of ventilation air, normalized by area (kBtu/sf-yr)*

Courtesy of DOER: 2023 Technical Guidance, Massachusetts Stretch Energy Codes

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TEDI continued …

- "Targeted" performance pathway (e.g. "TEDI"), must be used if one of the building use types is over 20,000 sf (12,000 sf for Multi-family)

Building type	Heating TEDI limit (kBtu/sf-yr)	Cooling TEDI limit (kBtu/sf-yr)
K-12 school	2.2 - 2.4	12 -20
Office, fire & police station, library, post office, town hall	1.5 - 2.5	21 - 23
Multi-family (including dorms)	2.8 – 3.2	15 - 22

The same models currently used for stretch code compliance also produce TEDI information

IES EnergyPlus eQUEST

Courtesy of DOER: 2023 Technical Guidance, Massachusetts Stretch Energy Codes

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Relative Performance Pathway (ASHRAE 90.1 Appendix G)

- ❑ Relative Performance Pathway (aka ASHRAE Appendix G):
  - ✓ Ventilated to >0.5 cfm/sf OR
  - ✓ A building occupancy or type other than listed for Targeted Compliance
- ❑ Can show site energy use reduction per Table 4.2.1.1 of ASHRAE 2019
- ❑ Must size heat pumps for 25% of peak space heating when RPP is used due to high ventilation rate.

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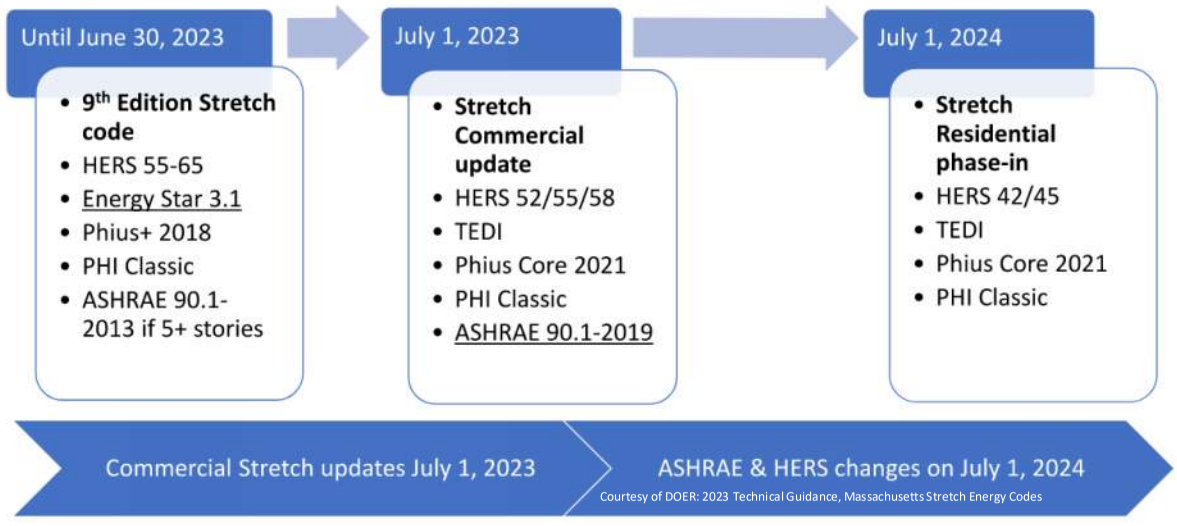
Timeline: Stretch Code Update for Multi-family



Courtesy of DOER: 2023 Technical Guidance, Massachusetts Stretch Energy Codes

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Poll Question # 6

The project consists of a Dormitory, 35,000 sq. ft. of conditioned floor area. What is the appropriate compliance path?

A. Prescriptive

B. Targeting Performance

C. Relative Performance

D. ASHRAE 90.1, 2016 Appendix G

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Existing Buildings – Chapter [CE] 5

Controls:

- Additions (C502)
- Alteration (C503)
- Repair (C504)
- Change of Occupancy/Use (C505)

Intent is to allow existing buildings to continue as is – as long as lawfully constructed

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Existing Buildings – Chapter [CE] 5

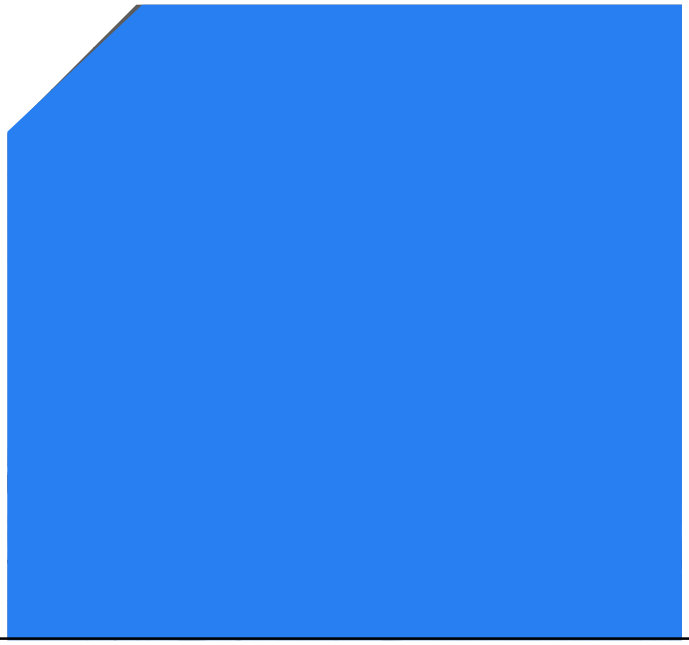
Additions:

- ✓ Less than 20,000 SF
- ✓ Up to 100% of existing building

- ✓ Comply with as if new construction

- ❑ Greater than 20,000 SF
- ❑ Or greater than 100% of existing building

- ❑ Must follow appropriate compliance path



71

Existing Buildings – Chapter [CE] 5

Alterations:

- ✓ Shall not be made less conforming than before new work
- ✓ New work shall comply to new construction requirements

72

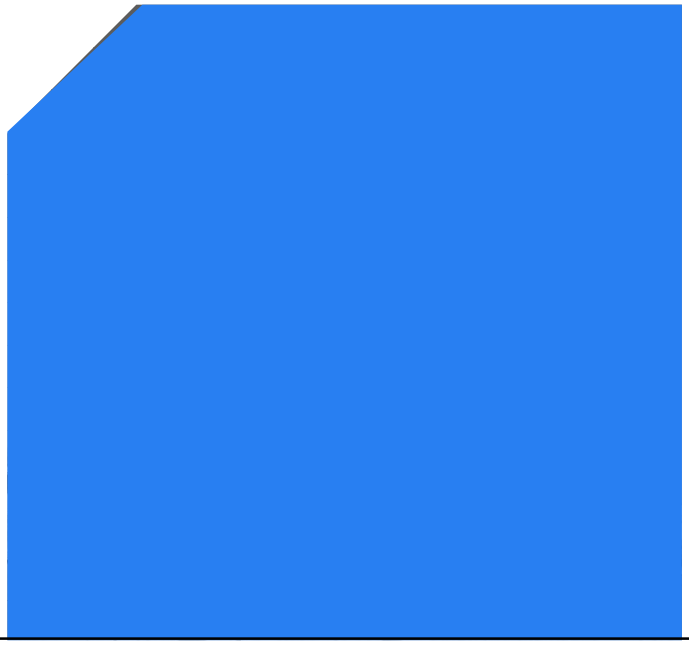
Existing Buildings – Chapter [CE] 5

Repairs:

- ✓ Repairs are not subject to the code.
- ✓ Like materials to existing can be used.

Change or Use or Occupancy

- ✓ Increased in energy demand
  - ✓ Treated as new construction



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Appendix CB: Solar-Ready Zone Commercial

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Appendix CB

Appendix CB – Solar-Ready Zone – Commercial

- ❑ Adopted Unamended from 2021 IECC Appendix CB
- ❑ Ability to plan ahead
- ❑ Solar-ready zones and roof load documentation helps solar contractors with future installs
- ❑ Easy identification of unobstructed areas
- ❑ Easy identification of pathway to run conduits and wiring

75

CB101 Scope

CB101.1 General

- These provisions shall be applicable to new construction, not additions.

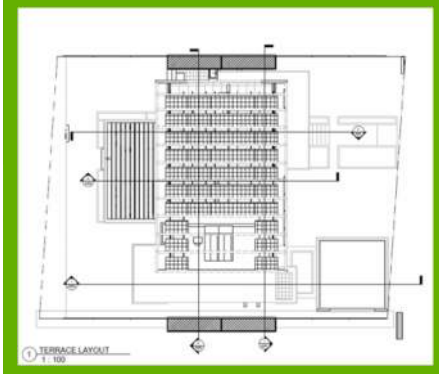
76

Section CB102

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

77



Appendix CB: Solar-Ready Provisions

New in 2021:

Applies to all Commercial and Multifamily Buildings (>3 stories)

- Solar-Ready Zone – roofs of buildings 5 stories and less in height above the grade plane and oriented between 110 degrees and 270 degrees of true north or have low slope roofs
- Solar-Ready Zone Area – Total area shall not be less that 40% of the gross roof area. Can be a single area or several smaller areas. Each area must be at least 5' in width.
- Obstructions – The Solar ready zone shall be free from obstructions including pipes, vents, ducts, equipment, skylights and roof-mounted equipment. Objects may include taller portions of the building, parapets, chimneys, antennas, signage, trees and roof plantings

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Appendix CB: Solar-Ready Provisions

- Roof Loads and Documentation – Structural design loads shall be indicated on the CDs. A dead load of 5 PSF shall be included in the gravity load calculations.
- Interconnection Pathway – CDs shall delineate pathways for routing of conduit or piping the solare-ready zone to the electric service panel
- Electric Energy Storage System-Ready Area – the floor area share not be less than 2' x 4'. The locations and layout shall be depicted on the CDs
- Electric Service Reserved Space – the main electric service panel shall have a reserved space to allow installation of a dual-pole breaker
- Construction Documentation Certificate – a permanent certificate showing the solar-ready zone, the structural loading, the interconnection pathway is to be posted by the electrical distribution panel

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Poll Question # 7

Renovations of an existing building requires identification of a solar ready zone

A. TRUE.
B. FALSE

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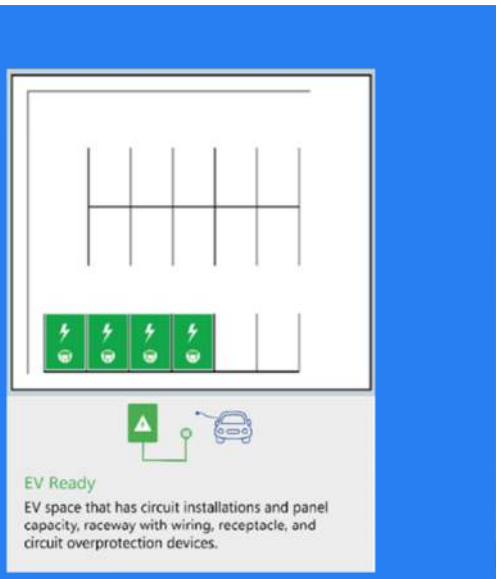
EV Ready Parking Spaces

("EV Ready Spaces")

EV Ready Spaces shall be provided in accordance with Table C405.13

- AC Level II spaces
- 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 electrical connector.



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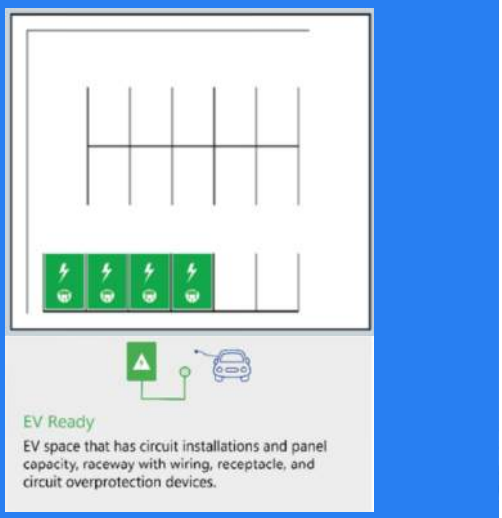
EV Ready Parking Spaces

- Automatic Load Management System (ALMS) can be used to service multiple spaces using a higher amperage circuit
- CDs to show details and calculations
- EV Spaces are required for a compliance paths.



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EV Ready Spaces

Table C405.13 EV Ready Space Requirements

Occupancy Classification Group	Minimum percentage of EV-Ready Spaces	EV Charging Performance Requirements
Group R and Group B	At least 20% of spaces	40-amp dedicated branch circuit or larger branch circuit with ALMS in accordance with Table C405.13.1
All other Occupancies	At least 10% of spaces	40-amp dedicated branch circuit or larger branch circuit with ALMS in accordance with Table C405.13.1

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Poll Question # 8

Automatic Load Management System (ALMS) can be used to service multiple spaces using a higher amperage circuit.

A. TRUE

B. FALSE

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Appendix CC Massachusetts Municipal Opt-In Specialized Stretch Code 2023

225 CMR 23: MASSACHUSETTS COMMERCIAL STRETCH ENERGY CODE AND MUNICIPAL OPT-IN SPECIALIZED CODE 2023

APPENDIX CC - MASSACHUSETTS MUNICIPAL OPT-IN SPECIALIZED ENERGY CODE 2023

COMMERCIAL BUILDING PROVISIONS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance. The provisions contained in this appendix together with referenced sections from the Stretch energy code constitute the Specialized opt-in code for commercial buildings, and may be adopted by a city or town together with the Residential Specialized code Appendix RC 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.

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Compliance

New Buildings Shall Demonstrate Compliance:

- **Zero Energy Pathway**
- **All-Electric Pathway**
- **Mixed Fuel Pathway**

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Summary/Closing

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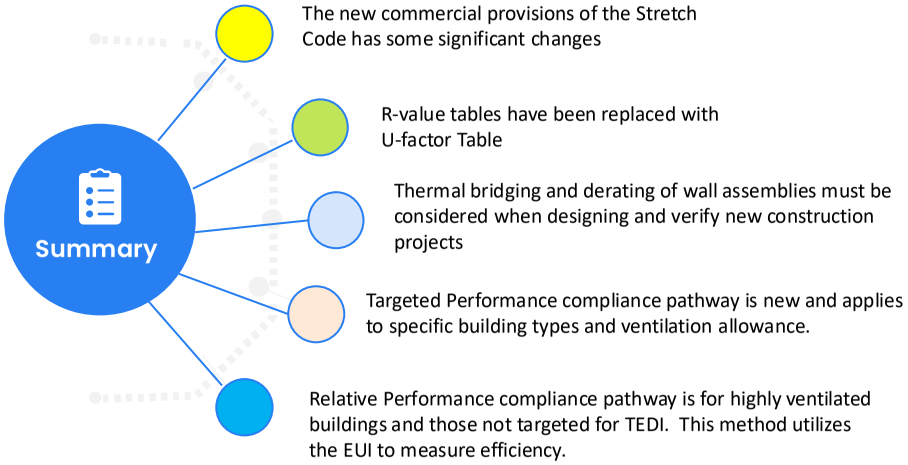
Commercial Overview Summary



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Mass Save Incentive Programs

Residential Rebates and Incentives

Rebates for appliances, heating systems and more.

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

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Commercial New Construction or Major Renovation Program

Choose Your Path to Generate Energy Savings and Reduce Carbon

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There is a Pathway for Every Project

Mass Save Sponsors offer the highest incentives for projects with the lowest EUIs and greatest levels of decarbonization

Path 1, Net Zero and Low EUI Buildings (10,000 sf or greater)	Path 2, Whole Building Energy Use Intensity (EUI) Reduction Approach (50,000 sf or greater)	Path 2, High Performance Buildings
Receive expert net zero building technical assistance and the highest new construction/major renovation project incentives available. Set an ultra-low EUI and save. We provide support through a post occupancy period to help you make sure the building performs at the level you expect	In this path for larger, complex building projects, your incentives will be greater with the lowest design EUIs. We offer technical support and energy modeling services to help you succeed	For whole building projects of any size where customers do not wish to set and pursue an EUI target, projects that are not whole buildings (e.g., tenant fit outs, open air parking garages), projects that are process-load heavy buildings (e.g., cannabis, industrial), and projects where customers are only interested in one-off measures.

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Summary of Path Incentives

PATH 1: NET ZERO/LOW EUI BUILDINGS	
Customer Incentives	
Construction Incentive	up to $2.00/sf
Post Occupancy Incentive	$1.50/sf
Space Heating Heat Pump Adder*	
• Air Source Heat Pumps:	$800/ton
• Variable Refrigerant Flow (VRF):	$1,200/ton
• Ground Source Heat Pumps:	$4,500/ton
ZNE Or PH Certification Incentive	$3,000
Technical Assistance For Net Zero Expert Consultant Services	50% of fee up to $10,000
Verification Incentive	50% of fee up to $10,000

PATH 2: WHOLE BUILDING EUI REDUCTION APPROACH	
Customer Incentives	
Incentive rate range (based on EUI % reduction)	$0.35/sf - $1.25/sf
Space Heating Heat Pump Adder*	
• Air Source Heat Pumps:	$800/ton
• Variable Refrigerant Flow (VRF):	$1,200/ton
• Ground Source Heat Pumps:	$4,500/ton
Technical Assistance	up to 75% cost share (capped at $20,000 per Sponsor)
Verification Incentive	50% of fee up to $10,000

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Summary of Path Incentives

PATH 3: HIGH PERFORMANCE BUILDINGS	
Customer Incentives	
Custom: Envelope, lighting controls, unitary HVAC (RTU, AC), high efficiency chillers, energy recovery, demand control ventilation, variable flow kitchen hoods, DHW heaters, low flow water fixtures and other custom measures	$0.35/kWh $2.00/therm
Prescriptive: variable frequency drives	Current program rate
Space Heating Heat Pump*	
• Air Source Heat Pumps:	$800/ton
• Variable Refrigerant Flow (VRF):	$1,200/ton
• Ground Source Heat Pumps:	$4,500/ton

*Refers to nominal heating capacity (btu/h) at AHRI conditions divided by 12,000. The heat pump adder is available for equipment that transfers heat from a source outside of the building (i.e., outside air or a ground loop) for space heating purposes. For ground source heat pump projects, the capacity of the ground loop is used instead of the capacity of the heat pump. Equipment must be used as a primary heating source to qualify.

Go to masssave.com/en/business/programs-and-services/new-construction-and-major-renovations to learn more about the pathways.

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High-Rise Path Overview

Eligibility

- 4+ stories and 5+ units with residential-metered heat
- All multi-family with commercially-metered heat
- New construction and ≥ 50% rehab projects
- Must register prior to construction start

Enrollment process

- Work with a dedicated ICF Account Manager
- Verification completed utilizing architect and/or engineer approved submittals

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Available Incentives

- Provides incentives for both residential in-unit and common area energy savings.
- Building Envelope
- Domestic Hot Water Production
- HVAC Systems
- Motors & Drives
- Lighting & Controls
- Plumbing Fixtures
- And more

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Energy Code Support

Questions about the energy code?

Energy Code Support Hotline:

855-757-9717

Energy Code Support Email:

energycodesma@psdconsulting.com

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Thanks!

Massachusetts Energy Code Technical Support Program

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