

**780 CMR 8th Edition Chapter 13 Proposed MA Front-End Amendments to
the
*International Energy Conservation Code 2009 (IECC 2006)***

Insert new sections:

101.5.3 Compliance Alternative: Buildings with total floor area not greater than 10,000 square feet may be designed and constructed using the envelope requirements of IECC 2009 Chapter 4.

101.5.4 Heating, Pumping, Process Piping and Refrigeration Systems: Heating, pumping, process piping and refrigeration systems shall be installed by contractors and personnel appropriately licensed in the Commonwealth of Massachusetts (Installing Contractor). Engineered designs and specifications prepared by Registered Professional Engineers shall identify systems requiring compliance with appropriate sections of M.G.L. c. 146 and 528 CMR. Shop drawings and design layout prepared by licensed installing contractors shall note the name(s), license number(s) and license expiration date(s) of the contractor(s) installing the heating, pumping, process piping and refrigeration systems. (See Installing Contractor Definition 780 CMR 202.0).

101.5.5 Exempt Buildings: Portions of aircraft hangars where aircraft are housed or stored and/or aircraft servicing, repairs or alterations may occur are exempt from the provisions of 780 CMR 13.

Add to **SECTION 103.2 INFORMATION ON CONSTRUCTION DOCUMENTS:**

The construction documents shall contain sufficient information to completely describe the heating, ventilation, and air conditioning (HVAC); lighting; and electric power distribution systems, including operational features and controls. The information required for each system shall include a summary of:

1. A description of the design intent providing a detailed explanation of the ideas, concepts and criteria that are defined by the owner to be important.
2. A description of the basis of design of the systems including all information necessary to prepare a design to accomplish the design intent.
3. A description of the sequence of operation of the systems and their interaction with other systems, including fire prevention and fire protection systems.
4. A description of the systems including the capacities of the equipment or systems.
5. A description of the testing requirements and the criteria for passing to be used for final systems acceptance.
6. A requirement for submittal of manuals and maintenance manuals as a condition of final acceptance, and a description of their format and content. The operation manual shall provide all relevant information needed for day-to-day operation and management of each system. The maintenance manual shall describe equipment inventory and support the maintenance program.
7. A requirement for submittal of record drawings and control documents as a condition of final acceptance, per 780 CMR 116.0.

Add to end of 103.3.1

Approval by the building official of the design concepts, testing procedures, and acceptance criteria of 103.2, 1 through 7, is not required, but the building official shall reject the

construction documents if these sections are incomplete, or if they specify any design elements that violate other requirements.

Add new section

103.6 Design: All HVAC, lighting, and electric power distribution systems including sequence of operation, controls and supporting documentation shall be designed and specified by a qualified Registered Professional Engineer except as provided in M.G.L. c. 143, § 54A and any profession or trade as provided in M.G.L. c. 112, § 60L and M.G.L. c. 112, § 81R. The Registered Professional Engineer(s) or other legally recognized professional (M.G.L. c. 112, § 81R) shall be responsible for the review and certification that all submittals and shop drawings conform to the approved HVAC, lighting, and electric power distribution construction documents as submitted for the building permit and approved by the building official, per 780 CMR 116.0.

Add new section

103.7 Acceptance: A certificate of occupancy shall not issue until the building official or his designees have witnessed a satisfactory test of all HVAC, lighting control, and electric power distribution systems installed in accordance with the construction documents. All systems shall be tested in accordance with the applicable standards of 780 CMR and documents. In addition, the following documents shall be simultaneously submitted to the building official prior to the issuance of a permanent certificate of occupancy.

1. Certification from the Registered Professional stating that the HVAC, lighting, and electric power distribution systems have been installed in substantial accord with the approved construction documents.
2. Confirmation by the building owner or authorized representative that they have received all HVAC, lighting, and electric power distribution system record drawings from the installing contractors and that the Registered Professional Engineer or other legally recognized professional (M.G.L. c. 112, § 81R) has reviewed their reasonable accuracy.
3. Confirmation by the building owner or authorized representative that they have received all construction documents required in 780 CMR 104 including reports, controls documentation, operation manual(s) and maintenance manual(s).

Exception: In lieu of witnessing a satisfactory functional test, the building official or their designees may accept a final performance acceptance test report from a Registered Professional Engineer or other legally recognized professional (M.G.L. c. 112, § 81R). Said report shall certify that the systems have been tested and satisfactorily meet their performance requirements.

Add new section

103.8 Unsafe Lighting and Ventilation: The building official may require or accept the documentation required in 780 CMR 104.8.4.4 in enforcing the provisions of 780 CMR 3400.6.

Add new section

103.9 Conditional Acceptance: The requirements of 780 CMR 104 shall not preclude the issuance of a temporary certificate of occupancy by the Building Official in accordance with 780 CMR 120.3 as long as it can be demonstrated that compliance can be accomplished with the building occupied.

Add these four (4) Default Door U-Factors to **TABLE 303.1.3(2)**:

Glass	0.92
Air Lock Entry	0.50
Revolving	0.50
Overhead	1.45

Add these two (2) definitions to **Chapter 2**:

CONTINUOUS AIR BARRIER: The combination of interconnected materials and assemblies joined and sealed together with flexible joints that provide the air-tightness of the building envelope above and below grade that separate conditioned from unconditioned space, or from space with conditions^[d1] that differ by more than 50%.

OUTDOOR AIR: Air taken from the outdoors, and therefore not previously circulated through the system.

Add this exception to **SECTION 302.1 DESIGN CONDITIONS**:

Exception: Buildings or portions of buildings which require different temperatures and humidity, such as, but not limited to, hospitals, laboratories, museums, art galleries, supermarkets, thermally sensitive equipment rooms, archival storage facilities, and facilities for the elderly^[d2], may require the use of alternative indoor design conditions. Any such use of alternative indoor design conditions shall be documented by a licensed professional.

Modify 502.2.4

Replace “to a depth of 10 feet (3048mm) below the outside finished ground level or to the level of the floor, whichever is less” with “from the top of the wall to the depth of the bottom of the floor slab.”

Make the following changes to Table 502.2 **(1) BUILDING ENVELOPE REQUIREMENTS – OPAQUE ASSEMBLIES**:

Slab-on-Grade Floors; Unheated Slabs: R-5 for 24”

Add to **502.2.6 Slabs on Grade.**

In addition, the entire area of the slab on grade shall be insulated with a minimum of R 5 rigid insulation in the following buildings: schools K-12, including daycare; buildings of use groups R-1, R-2, I-1 and I-2, and; college and university buildings of B and A use groups.

Add a second exception to **502.4.1 Window and door assemblies**:

2. For garage doors, air leakage determined by test at standard test conditions in accordance with ANSI/DASMA 105 shall be an acceptable alternate for compliance with air leakage requirements.

Add to **5.4.2 Curtain wall, storefront glazing and commercial entrance doors**: “and 0.4 cfm/ft² for all other products under a pressure differential of 0.3 inches of water (1.57 psf) (75Pa).

Delete entire content of **502.4.3 Sealing of the building envelope** and replace with:

502.4.3 Air Barriers: The building envelope shall be designed and constructed with a *continuous air barrier* to control air leakage into, or out of the conditioned space. An air barrier shall also be provided for interior partitions between conditioned space and space designed to maintain temperature or humidity levels which differ from those in the conditioned space by

more than 50% of the difference between the conditioned space and design ambient conditions. The *continuous air barrier* shall have the following characteristics:

1. Materials used in the *continuous air barrier* shall have an air permeance not to exceed 0.004 cfm/ft² (0.02 L/s*m²) under a pressure differential of 0.3 in. water column (1.57 psf) (75Pa) when tested in accordance with ASTM E 2178. Air barrier materials shall be taped or sealed in accordance with the manufacturer's instructions.

3. It shall be capable of withstanding positive and negative combined design wind, fan and stack pressures on the envelope without damage or displacement, and shall transfer the load to the structure. It shall not displace adjacent materials under full load.

4. Air barrier materials shall be maintainable, or, if inaccessible, shall meet durability requirements for the service life of the envelope assembly.

5_[d3]. The air barrier material of an envelope assembly shall be joined and sealed in a flexible manner to the air barrier material of adjacent assemblies, allowing for the relative movement of assemblies due to thermal and moisture variations and creep. Connection shall be made between:

- a. Foundation and walls.
- b. Walls and windows or doors.
- c. Different wall systems.
- d. Wall and roof.
- e. Wall and roof over unconditioned space.
- f. Walls, floor and roof across construction, control and expansion joints.
- g. Walls, floors and roof to utility, pipe and duct penetrations.

Add new section:

502.4.2-3.1 Air Barrier Penetrations: All penetrations of the air barrier and paths of air infiltration/exfiltration shall be made air tight.

Add new section:

502.4.9 Doors and access openings to shafts, chutes, stairwells, and elevator lobbies: These doors and access openings shall either meet the requirements of 780 CMR 502.4.3 or shall be equipped with weatherseals.

Exception: Weatherseals on elevator lobby doors are not required when a smoke control system is installed in accordance with 780 CMR 921.7

Insert new section **505.8 Transformers:**

505.8 Transformers: Single phase and three phase dry-type and liquid-filled distribution transformers first installed after December 31, 1999 shall be selected based on rating as described in 780 CMR 505.8.1 and 505.8.2.

Exceptions:

1. liquid filled transformers below ten kVA or dry type transformers below 15 kVA
2. drive transformers, both AC and DC
3. all rectifier transformers and transformers designed for high harmonics
4. autotransformers
5. non-distribution transformers, such as UPS (Uninterruptible Power Supply) transformers
6. special impedance, regulation, and harmonic transformers
7. sealed and non-ventilated transformers
8. retrofit transformers, machine tool transformers, or welding transformers

- 9. transformers with tap ranges greater than 15% or frequency other than 60 Hz
- 10. grounding or testing transformers.

505.8.1 Liquid Immersed Transformers: Liquid immersed transformers shall comply with the minimum efficiencies in Table 505.8.1 as tested and rated in accordance with Section 313 of the Electric Utility Industry Restructuring Act of November 25, 1997 ("NEMA TP1.")

**Table 1307.4.1
NEMA Class 1 Efficiency Levels for Liquid-Filled Distribution Transformers**

Reference Condition		Temperature		% of Nameplate Load	
Load Loss		85°C		50%	
No Load Loss		20°C		50%	
kVA	Single Phase Efficiency	kVA	Three Phase Efficiency		
10	98.3	15	98.0		
15	98.5	30	98.3		
25	98.7	45	98.5		
37.5	98.8	75	98.7		
50	98.9	112.5	98.8		
75	99.0	150	98.9		
100	99.0	225	99.0		
167	99.1	300	99.0		
250	99.2	500	99.1		
333	99.2	750	99.2		
500	99.3	1000	99.2		
667	99.4	1500	99.3		
883	99.4	2000	99.4		
		2500	99.4		

505.8.2 Dry-Type Transformers: Dry-type transformers shall comply with the minimum efficiencies in Table 505.8.2 as tested and rated in accordance with NEMA TP 1:

**Table 1307.4.2
NEMA Class 1 Efficiency Levels for Dry-Type Distribution Transformers**

Reference Condition		Temperature	% of Nameplate Load		
Low Voltage		75°C	35%		
Medium Voltage		75°C	50%		
Single Phase Efficiency			Three Phase Efficiency		
kVa	Low Voltage	Medium Voltage	kVa	Low Voltage	Medium Voltage
15	97.7	97.6	15	97.0	96.8
25	98.0	97.7	30	97.5	97.3
37.5	98.2	98.1	45	97.7	97.6
50	98.3	98.2	75	98.0	97.9
75	98.5	98.4	112.5	98.2	98.1
100	98.6	98.5	150	98.3	98.2
167	98.7	98.7	225	98.5	98.4
250	98.8	98.8	300	98.6	98.5
333	98.9	98.9	500	98.7	98.7
500	--	99.0	750	98.8	98.8
667	--	99.0	1000	98.9	98.9
833	--	99.1	1500	--	99.0
			2000	--	99.0
			2500	--	99.1