

## 780 CMR 34.00

### EXISTING STRUCTURES

*780 CMR 34.00 is entirely unique to Massachusetts*

#### 780 CMR 3400.0 SCOPE

**3400.1 General.** The provisions of 780 CMR 34.00 are intended to maintain or increase public safety, health, and general welfare in existing buildings by permitting repair, alteration, addition, and/or change of use without requiring full compliance with the code for new construction except where otherwise specified in 780 CMR 34.00.

**3400.2 Compliance.** Repairs, alterations, additions, and changes of use shall conform to the requirements of 780 CMR 34.00. Where compliance with the provisions of this code for new construction is required by 780 CMR 34.00, and where such compliance is impractical because of construction difficulties or regulatory conflicts, *compliance alternatives* as described in 780 CMR 3406.0 may be accepted by the *building official*.

**Note.** Specialized codes, rules, regulations, and laws pertaining to repair, alteration, addition, or change of use of existing buildings promulgated by various authorized agencies may impact upon the provisions of 780 CMR 34.00. Specialized state codes, rules, regulations, and laws include, but are not limited to those listed in 780 CMR 35.00.

**3400.3 Applicability.** The provisions of 780 CMR 34 apply to repair, alteration addition or change in use to existing buildings which qualify to use 780 CMR 34.00 (see 780 CMR 3400.3.1), based on the proposed continuation of, or change in use group, as follows:

1. Continuation of the same *use group*, or a change in *use group* which results in a change in *hazard index* of one or less as determined by 780 CMR 3403.0 shall comply with 780 CMR 3404.0.
2. Change in use group to a use group with *hazard index* of two or more greater than the *hazard index* of the existing use shall comply with the requirements of 780 CMR 3405.0 and the code for new construction.
3. Portions of the building is changed to a new *use group*, shall be separated from the remainder of the building with *fire separation assemblies* complying with 780 CMR 302.3, or with approved *compliance alternatives*. The portion of the building changed shall be made to conform with the applicable provisions of 780 CMR 34.00.
4. Additions to *existing buildings* shall comply with all code requirements for new construction, except as otherwise provided in 780 CMR 34.00. The combined height and area of the *existing*

*building* and the addition shall not exceed that allowed by 780 CMR 503.0 and Table 503 as modified by 780 CMR 504.0 and 506.0. Where a *fire wall* complying with 780 CMR 705.0 is provided, the addition shall be considered as a separate building.

5. *Ordinary repairs* conforming to 780 CMR 110.3 item 4. and 780 CMR 2.00 may be performed without a building permit.

6. A change from any other use group to an assembly use group (A) shall comply with the requirements of the code for new construction, except that structural requirements need only conform to 780 CMR 3408.0 and energy conservation requirements need only comply with 780 CMR 3407.0.

#### 6.1. Existing A-2nc Use Means of Egress.

For existing buildings or portions thereof that are classified as A-2nc use and which have an occupant load of 50 or greater; which have a single main exit door, such egress system shall conform to the requirements of 780 CMR 10.0. Non-compliance with these requirements shall be cause for the issuance of an Exit Order in accordance with 780 CMR 3400.5.1.

As an alternative, or where construction, regulations or other conditions exist which would preclude the installation of said main entrance/exit door and associated exit access, the owner shall cause the existing means of egress system to be evaluated by a Massachusetts registered architect or Massachusetts registered professional engineer. Such evaluation shall determine whether the existing means of egress is sufficient to accommodate the occupant load or whether the existing means of egress requires improvement to accommodate safely the occupant load. If the existing means of egress is insufficient to accommodate the occupant load, such inadequate means of egress will, as a minimum, be deemed in violation of 780 CMR 3400.4.1. Calculation methodologies based on alternative approaches to life safety may be utilized in order to effect said egress evaluation.

7. **Institutional Use Groups.** A change from any other use group to an institutional use group (I) shall comply with the requirements of the code for new construction, except that structural requirements need only conform to 780 CMR 3408.0 and energy conservation requirements need only comply with 780 CMR 3407.0.

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8. **Residential Use Groups.** A change from any other use group to a residential use group (R) shall comply with the requirements of the code for new construction, except that structural requirements need only conform to 780 CMR 3408.0 and energy conservation requirements need only comply with 780 CMR 3407.0.

9. **Historic Buildings.** Buildings which qualify as *totally or partially preserved historic buildings* in accordance with 780 CMR 3409.0 shall meet the provisions of 780 CMR 3409.0.

10. **Structural Requirements.** Structural requirements for additions, and for *existing buildings* subject to repair, alteration, and/or change of use, shall be in accordance with 780 CMR 3408.0.

11. **Energy Conservation Requirements.** Energy conservation requirements for additions, and for *existing buildings* subject to repair, alteration, and/or change of use, shall be in accordance with 780 CMR 3407.0.

**Exceptions.** *House Museums and Preserved Historic Buildings.*

12. **Flood Resistant Construction.** Renovations/Additions to existing buildings in areas prone to flooding are subject to the requirements of 780 CMR 120.G

**3400.3.1 Buildings Which Qualify.** The provisions of 780 CMR 34.00 shall apply to *existing buildings* which have been legally occupied and/or used for a period of at least five years. Any building for which there exists an outstanding notice of violation or other order of the building official shall not qualify to use 780 CMR 34.00 unless such proposed work includes the abatement of all outstanding violations and compliance with all outstanding orders of the building official. Buildings which do not qualify as *existing buildings* for the purposes of 780 CMR 34.00 shall comply fully with the applicable provisions of 780 CMR for new construction.

**Exceptions:**

1. For other than structural work, *existing buildings* or portions thereof which are changed in use from any other use group to day care centers (I-2 or E) shall not qualify as *existing buildings* for the purposes of 780 CMR 34.00, but shall comply with the requirements of 780 CMR 4.00, as applicable.
2. For other than structural work, *existing buildings* or portions thereof, which are changed in use from any use to a Group Residence, Limited Group Residence or Group Dwelling Unit shall not qualify as *existing buildings* for the purposes of 780 CMR 34.00, but shall comply with the provisions of 780 CMR 4.00, as applicable.

**3400.4 Special Provisions for Means of Egress.**

**3400.4.1 Existing Non Conforming Means of Egress.** The following conditions, when observed by the *building official*, shall be cited, in writing as a violation. Said citation shall order the abatement of the non conformance and shall include such a time element as the building official deems necessary for the protection of the occupants thereof, or as otherwise provided for by statute.

1. Less than the number of *means of egress* serving every space and/or story, required by 780 CMR 10.00 or 780 CMR 5311.0 for one and two family dwellings.

2. Any required *means of egress* component which is not of sufficient width to comply with 780 CMR 10.00, or is not so arranged as to provide safe and adequate *means of egress*, including exit signage and emergency lighting.

**3400.4.1.1 Assembly Nightclubs (A-2nc) Main Entrance/Exit Door Size.** Where the occupant load of an existing A-2nc use is 50 or greater, the main entrance/exit door shall be a minimum 72 inches (nominal) width. This main entrance/exit door shall consist of a pair of side-hinged swinging type doors without a center mullion and shall be equipped with panic hardware – also see 780 CMR 1011.3.

**3400.4.2 Fire Escapes.** Fire escapes shall be permitted only as provided for in 780 CMR 3400.4.2

**3400.4.2.1 New Buildings.** Fire escapes shall not constitute any part of the required means of egress in new buildings.

**3400.4.2.2 Existing Fire Escapes.** Existing fire escapes shall be continued to be accepted as a component in the means of egress in existing buildings only.

**3400.4.2.3 New Fire Escapes.** New fire escapes for existing buildings shall be permitted only where exterior stairs cannot be utilized due to lot lines limiting stair size or due to the sidewalks, alleys or roads at grade level. New fire escapes shall not incorporate ladders or access by windows.

**3400.4.2.4 Limitations.** Fire escapes shall comply with this section and shall not constitute more than 50% of the required number of exits nor more than 50% of the required exit capacity.

**3400.4.2.5 Location.** Where located on the front of the building and where projecting beyond the building line, the lowest landing shall not be less than seven feet (2134 mm) or more than 12 feet (3658 mm) above grade, and shall be equipped with a counterbalanced stairway to the street. In alleyways and thoroughfares less than 30 feet (9144 mm)

wide, the clearance under the lowest landing shall not be less than 12 feet (3658 mm).

**3400.4.2.6 Construction.** The fire escape shall be designed to support a live load of 100 pounds per square foot (4788 Pa) and shall be constructed of steel or other approved noncombustible materials. Fire escapes constructed of wood not less than nominal two inches (51 mm) thick are permitted on buildings of Type 5 construction. Walkways and railings located over or supported by combustible roofs in buildings of Type 3 and 4 construction are permitted to be of wood not less than nominal two inches (51 mm) thick.

**3400.4.2.7 Dimensions.** Stairs shall be at least 22 inches (559 mm) wide with risers not more than, and treads not less than, eight inches (203 mm) and landings at the foot of stairs not less than 40 inches (1016 mm) wide by 36 inches (914 mm) long, located not more than eight inches (203 mm) below the door.

**3400.4.2.8 Opening Protectives.** Doors and windows along the fire escape shall be protected with ¾-hour opening protectives.

**3400.4.2.9 Testing and Certification.** All exterior bridges, steel or wooden stairways, fire escapes and egress balconies and their structural anchorage shall be examined and/or tested, and certified for structural adequacy and safety every five years, by a Massachusetts registered professional engineer, or others qualified and acceptable to the building official; said engineer or others shall then submit an affidavit to the building official.

#### **3400.5 Hazardous Means of Egress.**

**3400.5.1 Exit Order/Hazardous Means of Egress.** In any *existing building* or structure not provided with exit facilities as herein prescribed for new buildings and in which the exits are deemed hazardous or dangerous to life and limb, the *building official* shall declare such building dangerous and unsafe in accordance with the provisions of 780 CMR 121.0.

**3400.5.2 Appeal from Exit Order.** Any person served with any order pursuant to 780 CMR 3400.5 shall have the remedy prescribed in 780 CMR 121.0.

**3400.6 Unsafe Lighting and/or Unsafe Ventilation.** In any *existing building*, or portion thereof, in which (a) the light or ventilation do not meet the applicable provisions of 780 CMR 12.00 and (b) which, in the opinion of the *building official*, are dangerous, or hazardous, to the health and safety of the occupants, the *building official* shall order the abatement of such conditions to render the building or structure occupiable or habitable as applicable for the posted use and occupant load.

In enforcing the provisions of 780 CMR 3400.6 the *building official* may require or accept engineering or other evaluations of the lighting and/or ventilation systems in order to evaluate possible dangerous or hazardous conditions and acceptable solutions.

Where full compliance with 780 CMR for new construction is not practical for structural and/or other technical reasons, the *building official* may accept compliance alternatives, or engineering or other evaluations which adequately address the building or structure livability for the posted use and occupant load.

**3400.7 Change in Commodity or Storage Arrangement.** *Existing buildings*, or portions thereof, in which there is a change in occupancy classification, commodity classification, or storage arrangement, as defined by NFPA 13, requires an evaluation of the existing sprinkler system for compliance with NFPA 13 and NFPA 25.

In enforcing the provisions of 780 CMR 3400.7 the *building official* may require or accept engineering or other evaluations of the fire protection systems in order to identify possible non-compliant conditions and acceptable solutions. If the evaluation determines that alterations are necessary, the *building official* shall order the abatement of such conditions.

#### **780 CMR 3401.0 DEFINITIONS**

**3401.1 General.** Definitions shall, for the purposes of 780 CMR 3401.0, have the meaning shown in 780 CMR 3401.1.

**Building System.** Any mechanical, structural, egress, electrical, plumbing, building enclosure and/or fire protection system, or fire resistive construction system, or portion thereof.

**Building System Component.** A part or portion of a *building system*.

**Compliance Alternative.** An alternative life-safety construction feature which meets or exceeds the requirements or intent of a specific provision of 780 CMR. The *Building Official* is authorized to approve or disapprove *compliance alternatives*. *Compliance alternatives* are only permitted for *existing buildings*.

**Existing Building or Structure.** Any building or structure qualifying under 780 CMR 3400.3.1.

**Hazard Index.** A numerical value, between 1 and 8, which is assigned to a specific *Use Group* in order to determine which of the provisions of 780 CMR 34.00 apply to the proposed work on the *existing building*. The *Hazard Index* is a relative scale used only to determine applicable provisions of 780 CMR 34.00. *Hazard indices* are listed in Table 3403 and 780 CMR 120.S.

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**Historic Buildings.** (a) Any building or structure individually listed on the National Register of Historic Places or (b) any building or structure evaluated by MHC to be a contributing building within a National Register or State Register District. (c) any building or structure which has been certified by the Massachusetts Historical Commission to meet eligibility requirements for individual listing on the National Register of Historic Places. Historic building shall be further defined as totally or partially preserved buildings. All entries into the house museum list shall be certified by the Massachusetts Historical Commission. The Board of Building Regulations and Standards shall ratify all buildings or structures certified by the Massachusetts Historical Commission to qualify for *house museum* listing (see 780 CMR 120.Y).

**Partially Preserved Buildings.** (a) Any building or structure individually listed on the National Register of Historic Places or (b) any building or structure certified as a historic building by the Massachusetts Historical (Commission/t and not designated a *house museum* in 780 CMR 120.Y.

**Restoration.** *Restoration* is the process of accurately reconstructing or repairing the forms and details of a building or structure or portion thereof as it appeared at a particular period or periods of time by means of removal of later work/or the replacement of missing original work

**House Museums.** A *house museum* is an *historic building* or structure. The principal use of such a building or structure must be as an exhibit of the building or the structure itself which is open to the public not less than 12 days per year, although additional uses, original and/ or ancillary to the principal use shall be permitted within the same building up to maximum of 40% of the gross floor area. *House museums* shall be those listed in 780 CMR 120.Y. All entries into the *house museum* list shall be certified by the Massachusetts Historical Commission. The Board of Building Regulations and Standards shall ratify all buildings or structures certified by the Massachusetts Historical Commission to qualify for *totally preserved* listing (See *Appendix 120.Y*).

**Substantial Renovation, or Substantial Alteration.** The terms *substantial renovation* and *substantial alteration* are defined herein for the specific purpose of determining whether fire protective systems are required in existing buildings, when such buildings undergo renovations or alterations, change in use or occupancy or additions. As used in 780 CMR 34.00, *substantial renovation* or *substantial alteration* shall have the following meanings; *Substantial renovation* and *substantial alteration* is work which is major in scope and expenditure when compared to the work and expenditure required for the installation of a fire protection system, when such system is required by

780 CMR 9.00 for a particular *use group*. Work shall not be considered a substantial alteration if the cost of installing the fire protection system exceeds 15% of the total renovation cost. The *building official* shall make such determination and may request the owner or applicant to provide such supporting information as is necessary to make such determination

**780 CMR 3402.0 IMPLEMENTATION**

**3402.1 Building Permit Application Requirements for Existing Buildings.** A building permit shall be required for any work regulated by 780 CMR 34.00.

**Exception.** *Ordinary repairs* may be performed without a building permit.

**3402.1.1 Investigation and Evaluation.** For any proposed work regulated by 780 CMR 34.00, which is subject to 780 CMR 116.0, as a condition of the issuance of a building permit the building owner shall cause the *existing building* (or portion thereof) to be investigated and evaluated in accordance with the provisions of 780 CMR 34.00 (see 780 CMR 120.S).

The investigation and evaluation shall be in sufficient detail to ascertain the effects of the proposed work (if any) on the structural, egress, fire protection, energy conservation systems and light and ventilation systems of the space under consideration and, where necessary, the entire building or structure.

**3402.1.2 Submittal.** The results of the investigation and evaluation, along with any proposed *compliance alternatives*, shall be submitted to the *building official* in written report form.

**3402.1.3 Non Conformities and Compliance Alternatives.** The application for a building permit shall identify all items of non or partial compliance with the requirements of 780 CMR 34.00, and *compliance alternatives*, if any are proposed, for approval by the building official. The *building official* shall respond to the acceptability of any proposed *compliance alternatives* within 30 days of the filing of the building permit application. Where proposed *compliance alternatives* are, in the opinion of the *building official*, unacceptable, or where issues of non-compliance remain, the permit applicant shall have the remedies prescribed by 780 CMR 122.0.

**3402.1.4 Documentation of Compliance Alternatives.** Whenever action is taken on any building permit application to repair, make alterations or additions, or change the use or occupancy of an existing building, and when said application proposes the use of *compliance alternatives*, the building official shall ensure that one copy of the proposed *compliance alternatives*, including applicable plans, test data, or other data

for evaluation, be submitted to the BBRs, together with a copy of the building permit application and the *building official's* decision regarding the proposed *compliance alternatives*.

### 780 CMR 3403.0 HAZARD INDEX

**3403.1 Hazard Index.** In the implementation of the provisions of 780 CMR 34, the *hazard index* associated with a particular use group shall be as identified in table 3403 and 780 CMR 120.S. In order to determine the applicable provisions of 780 CMR 34.00 the *hazard index* of the existing *use group* shall be subtracted from the *hazard index* of the proposed use. The algebraic difference shall be used to determine the applicable provisions of 780 CMR 34.00.

**TABLE 3403 HAZARD INDEX**

USE GROUP <sup>(1)</sup>	DESCRIPTION	HAZARD INDEX NO. <sup>(2)</sup>
A-1	Theater with stage	6
A-2nc	Night Club	7
A-3	Theater without stage	5
A-2r	Restaurant	5
A-3	Lecture halls, recreations centers, museums, libraries, churches, similar assembly buildings	4
A-4	Indoor arenas, skating rinks, swimming pools, tennis courts	4
A-5	Bleachers, amusement park structures, grandstands, stadiums	4
B	Business	2
E	Educational (K through 12)	4
F	Factory and industrial	3
H	High hazard	8
I-1	Residential Board & Care; Social rehabilitation facilities; alcohol and drug centers; convalescent homes	4
I-2	Institutional incapacitated	4
I-3	Institutional restrained	5
I-4	Day care Centers for two years nine months or younger	4
M	Mercantile	3
R-1	Hotels, motels	4
R-2	Multi-family (4 or more dwellings)	4
R-2	Multi-family (3 dwellings)	2
R-3	Multiple single-family, One and two family	2
R-4	Residential care/Assisted Living facilities of 6-16 occupants excluding staff	2
S-1	Storage, moderate hazard	3
S-2	Storage, low hazard	1

Notes to Table 3403.

(1) See 780 CMR 3.00 and 4.00 and 780 CMR 120.S.

(2) Hazard Index Modifier for selected construction types as follows.

(a) When a building is classified in construction Type IA, IB, or IIA, subtract one from the *Hazard index* shown in Table 3403 for the applicable proposed new use group only.

(b) When a building is classified in construction VB, add one to the *Hazard index* shown in Table 3403 for the applicable proposed new use group only. Exception. *Partially Preserved Historic Buildings* (780 CMR 3409.0).

### 780 CMR 3404.0 REQUIREMENTS FOR CONTINUATION OF THE SAME USE GROUP OR CHANGE TO A USE GROUP RESULTING IN A CHANGE IN HAZARD INDEX OF ONE OR LESS

**3404.1 General.** The requirements of 780 CMR 3404.0 and applicable provisions of 780 CMR 3408.0 shall apply to all repairs and alterations to *existing buildings* having a continuation of the same use group or to *existing buildings* changed in use group of one or less *hazard index* (Table 3403).

**3404.2 Requirements Exceeding Those Required for New Construction.** *Existing buildings* which, in part or as a whole, exceed the requirements of 780 CMR may be altered, in the course of compliance with 780 CMR 34.00, so as to reduce or remove, in part or completely, features not required by 780 CMR for new construction.

**Exception.** Pursuant to M.G.L. c. 148, § 27A, fire protection devices, shall not be disconnected (temporarily or permanently), obstructed, removed or shut off or destroyed without first procuring a written permit from the head of the local fire department.

**3404.3 New Building Systems.** Any new *building system* or portion thereof shall conform to 780 CMR for new construction to the fullest extent practical. However, individual *components* of an existing *building system* may be repaired or replaced without requiring that system to comply fully with the code for new construction unless specifically required by 780 CMR 3408.0.

**3404.4 Alterations and Repairs.** Alterations or repairs to *existing buildings* which maintain or improve the performance of the building may be made with the same or like materials, unless required otherwise by 780 CMR 3408.0. Alterations or repairs which have the effect of replacing a *building system* as a whole shall comply with 780 CMR 3404.3

**3404.5 Number of Means of Egress.** Every floor or story of any existing building shall provide at least the number of *means of egress* as required by 780 CMR 3400.4 and which are acceptable to the *building official*.

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**3404.6 Capacity of Exits.** All required *means of egress* shall comply with 780 CMR 10.00. Existing *means of egress* may be used to contribute to the total egress capacity requirement based on the unit egress widths of 780 CMR 10.00.

**3404.7 Exit Signs and Lights.** Exit signs and lighting shall be provided in accordance with 780 CMR 10.00.

**3404.8 Means of Egress Lighting.** *Means of egress* lighting shall be provided in accordance with 780 CMR 10.00.

**3404.9 Height and Area Limitations.** The height and area requirements of 780 CMR 5.00 shall apply to *existing buildings* when such *existing buildings* are modified by addition and/or change in use. Modifications to the height and area requirements as provided in 780 CMR 504.0 and 506.0 are permitted.

**3404.10 Existing Fire Walls/Partitions.** No further compliance is required with 780 CMR 7.00. The height above the roof of existing fire, partitions and exterior walls need not comply with 780 CMR 3404.0

**3404.11 Fire Protection Systems.** Fire Protection Systems. Design, installation and maintenance of fire protection systems shall be provided in accordance with 780 CMR 3404.3 and 780 CMR 3404.12 as applicable.

**3404.12 Fire Protection Systems Are Required for the Following Cases.**

1. Additions where required by 780 CMR 9.00 for the specific *use group*.
2. For *existing buildings modified* by addition and/or change in use where required by 780 CMR 504.0 or 506.0 to satisfy height and area requirements.
3. *Existing buildings*, or portions thereof which are *substantially altered* or *substantially renovated*, and where otherwise required by 780 CMR 9.00 for the specific use group.
4. Existing buildings or portions thereof when changed in use to an A-2nc occupancy shall be protected with an automatic fire suppression system. Where the A-2nc occupancy is created in a mixed use building, the A-2nc occupancy, including all ingress and egress portions shall require automatic fire suppression when the A-2nc occupant load is 50 or greater; additionally in such mixed use, the A-2nc occupancy shall be separated from adjacent uses by one hour horizontal and vertical fire separation assemblies in accordance with the applicable provisions of 780 CMR 7.00.

**Note.** Notwithstanding the provisions of 780 CMR 3404.12, automatic Fire Suppression systems are required in municipalities which

have adopted the provisions of M.G.L. c. 148, § 26G, H or I; also see M.G.L. c. 143, § 97A, and M.G.L. c. 148, § 26G½ relative to statutory prospective and retroactive sprinkler requirements for nightclubs and similar Uses.

**3404.13 Enclosure of Stairways.** Open stairways are prohibited except in one- and two-family dwellings or unless otherwise permitted by 780 CMR 10.00. There shall be no minimum fire-resistance rating required for an existing enclosure of a stairway. Partitions or other new construction which is added in order to fully and solidly enclose a stairway shall provide a minimum fire-resistance rating of one hour. All doors in the enclosure shall be self-closing and tight-fitting with approved hardware. All doors in those portions of the stairway which are fire-resistance rated shall comply to the applicable provisions of 780 CMR 9.00.

**3404.14 Assembly Use Groups.** Notwithstanding the provisions of 780 CMR 3404, Assembly Use Groups shall comply with the provisions of 780 CMR 3400.3, item 6.

**3404.15 Institutional Use Groups.** Notwithstanding the provisions of 780 CMR 3404.0, Institutional Use Groups shall comply with the provisions of 780 CMR 3400.3, item 7.

**3404.16 Residential Use Groups.** Notwithstanding the provisions of 780 CMR 3404, Residential Use Groups shall comply with the provisions of 780 CMR 3400.3, item 8.

**3404.17 Fire Hazard to Adjacent Buildings.** Any proposed change in the use or occupancy of an existing building which has the effect of increasing the fire hazard to adjacent buildings shall comply with the requirements of Table 705.2 for exterior wall fire resistance rating requirements, or with approved *compliance alternatives*.

**3404.18 Accessibility for Persons with Disabilities.** Accessibility requirements shall be in accordance with 521 CMR.

**3404.19 Energy Conservation.** Energy conservation requirements shall be in accordance with 780 CMR 3407.0.

**3404.20 Carbon Monoxide Alarms.** Carbon monoxide alarms are required and shall be selected and installed in accordance with the applicable requirements of 527 CMR and/or 248 CMR and 780 CMR 9.00.

For any building undergoing substantial renovation, CO detection shall be brought up to the Code for new construction.

### 780 CMR 3405.0 REQUIREMENT FOR CHANGE IN USE GROUP TO TWO OR MORE HAZARD INDICES GREATER

**3405.1 General.** When the existing use group is changed to a new use group of two or more hazard indices higher (as provided in Table 3403), the existing building shall conform to the requirements of the code for new construction, except as provided in 780 CMR 3408.0 or as otherwise allowed in 780 CMR 3407.0.

**3405.2 Accessibility for Persons with Disabilities.** Accessibility requirements shall be in accordance with 521 CMR.

**3405.3 Carbon Monoxide Alarms.** Carbon monoxide alarms are required and shall be selected and installed in accordance with the applicable requirements of 527 CMR and/or 248 CMR and 780 CMR 9.00. For any building undergoing substantial renovation, CO detection shall be brought up to the Code for new construction.

### 780 CMR 3406.0 COMPLIANCE ALTERNATIVES

**3406.1 General.** Except for structural work, where compliance with the provisions of the code for new construction, required by 780 CMR 34.00, is impractical because of construction difficulties or regulatory conflicts, *compliance alternatives* may be accepted by the building official.

Examples of *compliance alternatives* which have been used are provided in 780 CMR 120.S. The building official may accept these *compliance alternatives* or others proposed.

**3406.2 Documentation.** In accordance with 780 CMR 3402.1.5, the building official shall ensure that the BBRs is provided with information regarding *compliance alternatives* accepted or rejected by the *building official*.

### 780 CMR 3407.0 ENERGY PROVISIONS FOR EXISTING BUILDINGS

**3407.1 General.** 780 CMR 3407.0 establishes the energy provisions for *existing buildings* governed by 780 CMR 3404.0 or 780 CMR 3405.0.

**3407.2 Applicability.** Alterations to any building component affecting the energy conservation performance of an existing building shall comply with the applicable requirements of.

- (a) 780 CMR, Table 3407 and all applicable subsections of 780 CMR 13.00, or.
- (b) 780 CMR 13.00 for thermal envelope requirements and all other applicable requirements of 780 CMR 13.00.

**3407.3 Exempt Buildings.** Refer to 780 CMR 13.00 for thermally exempt buildings and for lighting exemptions.

### 3407.4 Certain Specific Requirements And/or Compliance Exceptions.

**3407.4.1 Fenestration.** Replacement windows for existing low-rise residential buildings are required to have a maximum thermal transmittance of 0.44 and such windows must be NFRC listed/labeled.

#### Exceptions:

1. Criteria for NFRC listing/labeling and maximum U-0.44 are not required if the existing window (s) are true divided light (i.e. – single thickness multi-pane sashes with structural muntin bars) and being replaced with “like kind” units. This Exception additionally requires that a storm window be installed over the replacement window. The storm window may be installed internally, externally, or integrated with the primary window.
2. Criteria for NFRC listing/labeling and maximum U-0.44 are not required for basement windows with a unit height up to 24 inches, whether or not the basement is a conditioned space.

#### 3407.4.1.1 Reduction in Wall Fenestration.

When alterations to a wall assembly include only altering the fenestration component, the areas of fenestration may be decreased or replaced with an opaque wall element made to comply with the thermal transmittance value of the existing wall.

**3407.4.2 Ordinary Repairs.** *Ordinary repairs* need not comply with the energy provisions.

Note that in the repair of broken windows, broken doors or broken skylights, like-kind replacement shall be allowed, but the complete replacement of windows, doors or skylights in an *existing building* shall require compliance with the applicable requirements of 780 CMR 3407.2. Any window replacement that includes new jambs or new jamb liners does not qualify as an “ordinary repair,” and such replacement is subject to the energy performance criteria of 780 CMR, 3407.2.

**3407.4.3 Roofs.** Compliance of the roof/ceiling assembly is not required unless the existing roofing material is stripped off the roof deck. However, if a structural analysis by a registered professional engineer shows that the roof will not support the additional live loads imposed by compliance of the roof/ceiling assembly, or, if such analysis shows that addition of the required amount of insulation will cause ponding of water, then compliance of the roof/ceiling assembly is not required.

**3407.5 Alternative Designs.** Alternative design methods may be used where it can be demonstrated through analysis by a licensed professional that the alternative will achieve a level of energy



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conservation equivalent to that required by 780 CMR 3407. A report on the energy conservation analysis shall be submitted to the building official with the application for the building permit.

**TABLE 3407 COMPONENT VALUES FOR ALTERED ELEMENTS**

BUILDING COMPONENT	DESCRIPTION	THERMAL PROPERTIES	NOTES
Walls	All wall construction containing heated or mechanically cooled space	U-0.08	6, 8
Foundation Walls Including Band	Containing heated or mechanically cooled space Containing unheated space	U-0.08 U-0.17	4
Roof/Ceiling Assembly	Wood plank and beam construction containing heated or mechanically cooled space	U-0.08	1
Roof/Ceiling Assembly	Construction other than wood plank and beam containing heated or mechanically cooled space	0.05	
Windows and Skylights	All construction enclosing heated or mechanically cooled space	For windows, see Note 2. For skylights - no current restriction on "U" value	2, 5 6, 7
Floors	Floor sections over area exposed to outside air or unheated areas Unheated slab on grade Heated slab on grade	U-0.08 R-5.50 R-7.75	3
Mechanical Equipment	Heating, cooling, sizing and efficiency	780 CMR 13.00	9
Equipment Controls	Humidistats, thermostats & zoning	780 CMR 13.00	9
Duct and Pipe Insulation and Construction	Located in or on buildings	780 CMR 13.00	
Electrical Power Distribution.	-	780 CMR 13.00	
Lighting	Lighting	780 CMR 13.00	

**Note 1.** Wood plank and beam assemblies are constructions in which the finished interior surface is the underside of the roof deck.

**Note 2.** For existing low-rise residential buildings, commencing January 1, 1999, the maximum allowed thermal transmittance of replacement windows, with or without a storm window, shall be 0.44 and such windows and window with storm window combinations will be NFRC listed labeled. For all other existing building types (commercial/high-rise), window thermal transmittance requirements shall conform to the requirements of 780 CMR 13.00. Refer also to 780 CMR 3407.0 Exceptions 1. and 2.

**Note 3.** Insulation may be omitted from floors over unheated areas when foundation walls are provided with a U value of 0.17.

**Note 4.** The U value requirement of 0.17 for foundation walls may be omitted when floors over unheated spaces are provided with a U value of 0.08.

**Note 5.** Refer to 780 CMR 13.00 and 61.00, as applicable for allowable air infiltration rates for residential doors and windows. Allowable rate for commercial doors is 11 cfm/lin. ft of operable sash crack.

**Note 6.** The first floor exterior envelope of business and mercantile use groups shall have an overall thermal transmittance value not greater than .65 in lieu of individual component values for walls and fenestration.

**Note 7.** When the glass area is increased, the glass and wall components which are altered shall comply with the component values in Table 3407. The extent of wall made to comply shall be equivalent to the decreased opaque wall area.

**Note 8.** When any alterations to the exterior wall component exposes the wall cavity or, when a finished system is added to a wall having no cavity, the wall must comply with the values in Table 3407.

**Note 9.** When mechanical system compliance is required on an existing system, only the portions of the system altered and any other portions which can reasonably be incorporated need comply.



## 780 CMR 3408.0 STRUCTURAL REQUIREMENTS FOR EXISTING BUILDINGS

### 3408.1 General Requirements.

**3408.1.1 Basic Requirement.** The structural work for alterations, repairs, and additions to existing buildings shall be designed and constructed in accordance with the Code requirements for new construction for the loads specified in 780 CMR 3408.0, except as otherwise provided in 780 CMR 3408.0.

**3408.1.2 Prior Building Codes.** The structural systems of existing buildings shall, as a minimum, conform to the basic code. Structural systems and elements that do not so comply shall be reinforced so that they do so comply or, alternatively, so that they comply with the requirements for new construction of 780 CMR .

**3408.1.3 Structurally Separate Additions.** Additions to existing buildings which are structurally separate therefrom shall comply with the requirements for new construction.

**3408.1.4 Structurally Separate Portions of Existing Buildings.** Where portions of an existing building are structurally separate, each portion shall be considered a separate building for the purposes of 780 CMR 3408.0.

### 3408.2 Definitions.

**Basic Code.** The building code in-force on the date of the application for the building permit for the original building. If subsequent changes have been made to the lateral force resisting system of the building and the changed lateral force resisting system conforms to the requirements for new construction of the building code in-force on the date of the application for the building permit for said changes, the basic code shall be the building code for the latest of such structural changes.

**Box System.** Term used in the seismic provisions of the 1<sup>st</sup> to 5<sup>th</sup> Editions of the State Building Code. The meaning is the same as *Wall System, Bearing* as defined in ASCE 7, Section 9.2.1.

**Cladding.** Elements of the building envelope at the sides of a building which do not support any gravity load other than their own weight and are not designed to resist imposed in-plane forces.

**Dual Bracing System.** Term used in the seismic provisions of the 1<sup>st</sup> to 5<sup>th</sup> Editions of the State Building Code. The meaning is the same as *Frame System, Dual frame system*, as defined in ASCE 7, Section 9.2.1.

**Effective Seismic Weight.** Effective seismic weight shall be as defined by 780 CMR 1615.0, except as provided in 780 CMR 3408.4.1.

**Space Frame.** Term used in the seismic provisions

of the 1<sup>st</sup> to 5<sup>th</sup> Editions of the State Building Code. The meaning is the same as *Frame System, Space frame system*, as defined in ASCE 7, Section 9.2.1. (Used in definition of *Frame System, Building frame system* in ASCE 7, Section 9.2.1).

**Structural Engineer of Record (SER).** A *registered design professional* qualified in the structural design of buildings who is responsible for the structural engineering design of a construction project and whose professional seal and signature appear on the structural design documents submitted with the application for building permit.

**URM.** Unreinforced masonry.

### 3408.3 Classification of Existing Buildings.

**Post-1975** - Buildings whose basic code has an effective date on or after January 1, 1975. (Governed by 780 CMR, the Massachusetts State Building Code).

**Pre-1975** - Buildings whose basic code has an effective date prior to January 1, 1975, or for which there was no building code. (Prior to 780 CMR, the Massachusetts State Building Code).

### 3408.4 Levels of Work on Existing Buildings.

The work involved in alterations, repairs, and additions to existing buildings, and changes of use of existing buildings, shall be classified as described in 780 CMR 3408.4. For an existing building where more than one level of work applies, the requirements for the highest level of work shall apply.

**3408.4.1 Explanation of Terms.** The explanation of terms that follow are for the purposes of classifying the levels of work in 780 CMR 3408.4 and for use in Figure 3408-1, only.

1. Floor or roof area shall be measured to the inside face of exterior masonry or concrete walls, to the inside face of exterior wood stud walls, or to the inside face of the principal framing members of curtain walls.
2. *Effective seismic weight* shall include only that effective seismic weight above mean exterior grade, exclusive of slabs on grade, foundation walls, and framed floors that are laterally braced by foundation walls.
3. Effective seismic weight of existing buildings previously used for storage or manufacturing. For the purpose of determining the seismic weight before any renovations, the following allowances shall be used in lieu of both the 25% of storage live load and the operating weight of equipment. 30 psf of floor area if the unreduced live load capacity of the floor is 100 psf or more; 20 psf of floor area if the unreduced live load capacity of the floor is less than 100 psf but at least 80 psf; or zero, otherwise. Neither a partition allowance nor the weight of any in-place partitions shall be

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included if any of these allowances are taken, except when zero is used.

**3408.4.2 Level 1 Work.** Work that is not specified for Levels 2, 3, 4, or 5.

**3408.4.3 Level 2 Work.** Work or change of use involving any of the following.

1. Change of use of an area which is more than 35% of the existing floor area of the building.
2. For Pre-1975 buildings, when rehabilitation or remodeling is accumulated over a floor area of 20,000 sf or 50% of the total floor area of the building, whichever is less, starting from January 1, 2007. The terms rehabilitation and remodeling for the purposes of this clause shall mean any of the following work: removal or repair of ceilings, partitions, or interior facing of exterior walls; new ceilings, partitions, or interior facing of exterior walls; reconstruction or repair of floors; new mechanical or electrical distribution systems within an area; or new elevators, escalators, or stairs within an area or serving an area.
3. Increase in total framed floor and roof area due to structurally attached additions up to a lifetime limit of 10% of the total framed floor and roof area of the building that existed on February 28, 1997, or on the date of the certificate of occupancy if the building was built thereafter.
4. Increase in effective seismic weight, with or without structurally attached additions, up to a lifetime limit of 10% of the effective seismic weight of the building that existed on February 28, 1997, or on the date of the certificate of occupancy if the building was built thereafter.
5. Structural work involving any of the following.
  - A. More than 25% of the total tributary area of horizontal framing members or 20,000 sf of tributary area of horizontal framing members, whichever is less, of any existing framed floor or roof.
  - B. More than 25% of the total area of shear walls above the foundation.
  - C. More than 25% of the total length of columns and diagonal braces.
  - D. Openings in any framed floor or roof that have an area more than 5% of the area of the framed floor or roof.
  - E. Changes to any structural wall that reduce its in-plane shear resistance by more than 15%.
  - F. Changes to any floor or roof diaphragm that reduce its in-plane shear resistance by more than 15%.
  - G. Removal or reconfiguration of lateral load resisting frames, or foundations supporting them.

**6. Exemption for Pile Foundations.** Structural repairs of pile foundations are exempt from Level 2 Work.

**3408.4.4 Level 3 Work.** Structural work involving any of the following:

1. Removal, or removal and reconstruction, of between 15% and 40% of the total tributary area of horizontal framing of existing framed floors and roofs.

**Exception.** Demolition of a previous addition to the building; demolition of an appendage to the building such as a loading dock outside of the exterior wall line; or demolition of a mechanical penthouse; with the condition that the demolition does not reduce the existing lateral load resistance of the remaining portion of the building below that provided before demolition.

2. New shear walls and vertical frames which provide more than 35 % of the lateral force resistance required for Level 2 Work, in either of two orthogonal directions.

**3408.4.5 Level 4 Work.** Work involving any of the following.

1. Increase in total framed floor and roof area due to structurally attached additions that is more than 10% of the total framed floor and roof area of the building that existed on February 28, 1997, or on the date of the certificate of occupancy if the building was built thereafter.
2. Increase in effective seismic weight, with or without structurally attached additions, that is more than 10% of the effective seismic weight of the building that existed on February 28, 1997, or on the date of the certificate of occupancy if the building was built thereafter.

**3408.4.6 Level 5 Work.** Work involving any of the following.

1. The removal, or the removal and reconstruction, of more than 40% of the total tributary area of horizontal framing of existing framed floors and roof.

**Exception.** Demolition of a previous addition to the building; demolition of an appendage to the building such as a loading dock outside of the exterior wall line; or demolition of a mechanical penthouse; with the condition that the demolition does not reduce the existing lateral load resistance of the remaining portion of the building below that provided before demolition.

2. Structurally attached additions that have a total framed floor and roof area greater than 100% of the total framed floor and roof area of the building that existed on February 28, 1997, or on the date of the certificate of occupancy if the building was built thereafter.
3. Increase in effective seismic weight, with

or without structurally attached additions, that is more than 100% of the effective seismic weight of the building that existed on February 28, 1997, or on the date of the certificate of occupancy if the building was built thereafter.

4. New shear walls and vertical frames which provide more than 90% of the lateral force resistance required for Level 3 Work, in either of two orthogonal directions.

### **3408.5 Restricted Uses.**

**3408.5.1 Restricted Uses Defined.** For the purposes of 780 CMR 3408.0, restricted uses shall be as follows:

1. Assembly Groups A-1 and A-2 for an occupant load of 600 or more.
2. Assembly Group A-3 for an occupant load of 1200 or more.
3. Assembly Groups A-4 and A-5 for an occupant load of 600 or more.
4. Hazardous Group H.
5. Institutional Group I-2 for an occupant load of 400 or more.
6. Institutional Group I-3.
7. Buildings in Seismic Use Group III, as defined in ASCE, Table 9.1.3.

**3408.5.2 Change of Use and Work for Restricted Uses.** Change of use of an existing building to a restricted use, or work above Level 2 for existing buildings with restricted uses, shall comply with the requirements for Level 5 Work.

### **3408.6 Structural Investigation of Existing Buildings.**

#### **3408.6.1 Level 1 Work.**

**3408.6.1.1 Responsibility of the SER.** Whenever there is any structural work for Level 1 Work, the SER shall perform the following tasks.

1. Verify that the work to be performed is in fact Level 1 Work.
2. Make a field investigation of the areas and structural members affected by the proposed structural work.
3. Evaluate the capacity of existing structural elements affected by the proposed structural work.

**3408.6.1.2 Responsibility of the Architect.** The architect of record shall verify that the changes to the existing building are in fact Level 1 Work, and so certify on the construction drawings.

#### **3408.6.2 Levels 2, 3, 4, and 5 Work.**

**3408.6.2.1 Initial Survey of Existing Building.** The SER shall make an initial survey of the existing building consisting of the following tasks. Alternatively, a registered architect, who will be the architect of record for the project, may substitute for the SER for the

parts of the investigative work that do not require a structural evaluation.

1. Gather and catalog relevant available information on the existing building, such as drawings, specifications, shop drawings, geotechnical engineering reports, previous condition appraisal reports, and building department records.
2. Perform a field survey to either verify the available drawings or to establish dimensions of the existing building, including layout and sizes, of relevant structural components.
3. Perform a field survey to visually assess the condition of the structural components of the existing building.
4. Identify load paths (or lack thereof) to the foundation for gravity load and lateral load, based on information gathered in the above tasks.

#### **3408.6.2.2 Foundation and Geotechnical Explorations.**

**3408.6.2.2.1 Level 2 Work.** If the work does not involve an addition or does not include an increase in gravity loads, and does not involve new shear walls or vertical frames or reinforcement of existing shear walls or vertical frames to resist the lateral loads required in 780 CMR 3408.7.3, and if there is no indication of settlement or lateral movement of basement walls or foundations, no foundation or geotechnical exploration is required. Otherwise, explorations shall be performed as necessary to determine the foundation design parameters of the subsoils and the type and condition of existing foundations.

**3408.6.2.2.2 Levels 3, 4, and 5 Work.** Explorations shall be performed as necessary to determine the foundation design parameters of the subsoils, the type and condition of existing foundations, and the potential for liquefaction of soils during an earthquake where required in 780 CMR 3408.9.11.

#### **3408.6.2.3 Structural Evaluation of the Existing Building.**

**3408.6.2.3.1 Existing Structural Materials.** The SER shall determine the strengths of existing structural materials in accordance with 780 CMR 3408.9.2.3 and 3408.9.2.4.

**3408.6.2.3.2 Repairs.** The SER shall evaluate structurally hazardous conditions and determine which existing structural elements or systems are in need of repair or other remedial action, and determine the character and extent of the repairs or remedial action.

#### **3408.6.2.3.3 Gravity Load Capacity -**

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**Level 2 Work.** Where there are structural changes to floors or roofs, the SER shall determine the total service load capacity, and the net unreduced service live load capacity or the net service snow load capacity, as applicable, in the affected areas.

**3408.6.2.3.4 Gravity Load capacity - Levels 3, 4, and 5 Work.** The SER shall determine the total service load capacity of the floors and roofs, the net unreduced service live load capacity of the floors, and the net service snow load capacity of the roofs.

**3408.6.2.3.5 Lateral Load Capacity - Levels 2, 3, 4, and 5 Work.** The SER shall determine the lateral load capacity of the existing building and its lateral load components relative to the lateral load resistance required for the level of work to be performed, and determine what is needed to provide the required lateral load resistance.

**3408.6.2.4 Structural Details.** The SER shall evaluate the following details.

1. Connectivity of the structural elements.
2. Existence of anchors connecting floor and roof decks to concrete or masonry walls, and if they exist, their ability to provide lateral support to the walls and transfer in-plane shear from the decks to the plane of the walls.
3. Existence of unreinforced masonry parapets, how they are supported at the roof diaphragm, their height measured from the roof diaphragm, and their thickness.
4. For masonry walls, the ratio of the distance between lateral supports to the thickness of wall.
5. Existence of brittle connections of precast concrete cladding components.

**3408.6.3 Report on Structural Investigation.** The SER shall submit a report on his structural investigation to the building official with the application for the building permit.

**3408.6.4 Condition of Permit.** The submission of the SER's report on his structural investigation and review thereof by the building official shall be a condition for the issuance of the building permit. The building official shall maintain this report for future renovations of the building.

**3408.6.5 Field Observations During Construction.** The SER shall make periodic field visits during the progress of the construction work on the existing building in order to observe and verify the assumed conditions on which the structural design was based, and shall modify the design, as necessary, should the observed conditions differ in any significant manner from those on which the structural design was based. The SER shall provide a written notification to the

building official of changes to the contract documents submitted with the application for building permit.

### **3408.7 Lateral Load for Existing Buildings and Structurally Attached Additions.**

**3408.7.1 Application of Lateral Load.** Where the work includes structurally attached additions to an existing building, the specified lateral loads in 780 CMR 3408.7 shall be applied to the existing building and additions acting together as a single structure.

**3408.7.2 Level 1 Work.** There are no requirements for lateral load for Level 1 Work.

**3408.7.3 Level 2 Work.** For Level 2 Work, each of the following lateral loads shall be applied to the building separately:

1.  $\frac{2}{3}$  of the wind load specified in 780 CMR 1609.0.
2. A lateral load in any direction which is 1% of the unfactored gravity load for Allowable Stress Design or 1.5% of the unfactored gravity load for Strength Design, distributed the same as the gravity load. For the purposes of this clause only, the gravity load shall be defined as  $D + 0.5S$ , where the notation is as defined in 780 CMR 16.00.
3. The wind load specified in the basic code, if any.
4. For Post-1975 buildings, the seismic load in accordance with the seismic provisions for new buildings of the basic code.

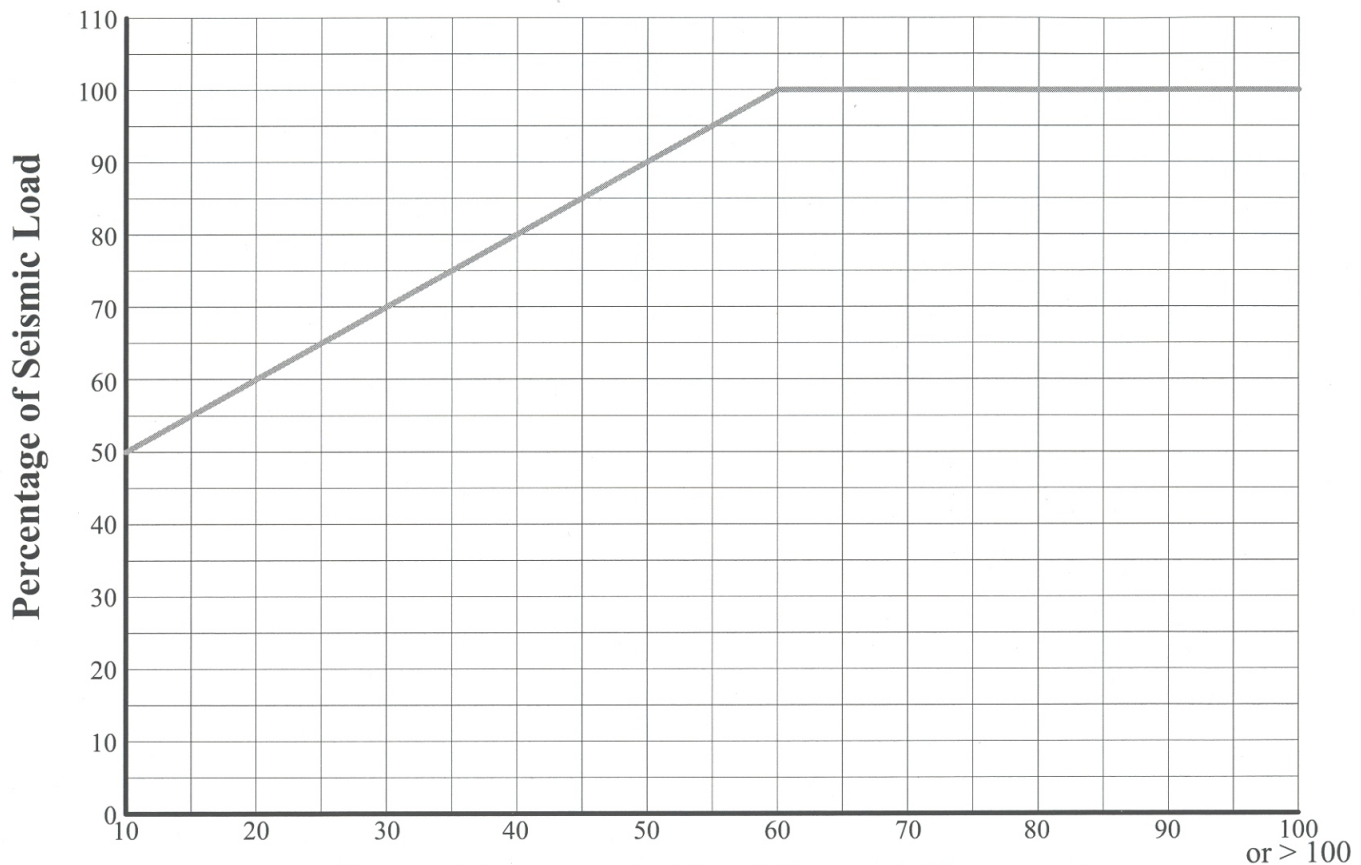
**3408.7.4 Level 3 Work.** For Level 3 Work, each of the following lateral loads shall be applied to the building separately:

1. The wind load specified in Section 1609.
2. 35% of the seismic load specified in 780 CMR 1614.0 and 1615.0, in accordance with the seismic criteria of 780 CMR 1614.0, 1615.0, and 3408.10, with a minimum seismic base shear of 0.01W.
3. For Post-1975 buildings, the seismic load in accordance with the seismic provisions for new buildings of the basic code.

**3408.7.5 Level 4 Work.** For Level 4 Work, each of the following lateral loads shall be applied to the building separately:

1. The wind load specified in 780 CMR 1609.0.
2. A percentage, given in Figure 3408-1, of the seismic load specified in 780 CMR 1614.0 and 1615.0, in accordance with the seismic criteria of 780 CMR 1614.0, 1615.0, and 3408.10. In Figure 3408-1, the meaning of the term *effective seismic weight* in the title of the abscissa shall be in accordance with Clauses 3408.4.1, Items 2. and 3.
3. For Post-1975 buildings, the seismic load in accordance with the seismic provisions for new buildings of the basic code.

**FIGURE 3408.1 PERCENTAGE OF THE SEISMIC LOAD SPECIFIED  
IN 780 CMR 1614.0 AND 1615.0**



**3408.7.5.1 Buildings Designed for Additional Stories.** For Post-1975 buildings which have been designed for additional stories, the seismic load and seismic criteria for new buildings of the basic code may be used in lieu of the criteria in 780 CMR 3408.7.5, Items 2. and 3., with the following conditions:

1. The building (or an addition for which provision was made for the additional stories) was constructed under a building permit whose date is not more than 15 years prior to the date of the application for a building permit for the additional stories.
2. The number of additional stories shall not be more than the number of additional stories provided for in the original design.
3. The size of any story shall not be larger than the footprint of the story immediately below. For partial stories, account shall be taken of torsion induced by the eccentricity.
4. For buildings whose basic code was prior to the 6<sup>th</sup> Edition of the State Building Code and have rigid or semi-rigid diaphragms, new shear walls or frames shall be located as necessary such that the eccentricity of the shear center at each level from the center of mass at that level is not more than 20% of the building width in each of two orthogonal directions. Alternatively, new shear walls or frames shall be located as necessary so that the building complies with ASCE 7, Section 9.5.5.5.2, as modified by 780 CMR 1615.0. The mass at any level

shall be all of the mass of the building at and above that level.

5. Buildings whose basic code was prior to the 6<sup>th</sup> Edition of the State Building Code and which have weak stories, as defined in ASCE 7, Table 9.5.2.3.3, shall be reinforced as necessary so that the building meets the criteria of ASCE 7, Section 9.5.2.6.2.4.

**3408.7.6 Level 5 Work.** For Level 5 work, each of the following lateral loads shall be applied to the building separately.

- 1 The wind load specified in 780 CMR 1609.0.
- 2 The seismic load specified in 780 CMR 1614.0 and 1615.0, in accordance with the seismic criteria of 780 CMR 1614.0 and 1615.0.

**3408.7.7 Historic Buildings.** House museums are exempt from the lateral load requirements of 780 CMR 3408.7. Preserved historic buildings shall meet all of the lateral load requirements of 780 CMR 3408.7.

**3408.8 Gravity and Other Loads for Existing Buildings and Structurally Attached Additions.**

**3408.8.1 Live Load.** Live load shall be in accordance with 780 CMR 1607.0, with the following exceptions:

**3408.8.1.1 Reduced Live Load.** Except for Use Groups, F, I, and S, wherever there is a new use in an existing building, and the new use requires a live load in accordance with

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780 CMR 1607.0 that is greater than the original live load capacity, the floors may be posted for the original live load capacity, provided that the use is controlled in a way acceptable to the building official, and so that the public safety is not endangered thereby.

**3408.8.1.2 Level 1 Work.** Level 1 Work is exempt from the live load requirements of 780 CMR 1607.0 except in areas being altered or repaired.

**3408.8.2 Snow Load.** Snow load shall be in accordance with 780 CMR 1608.0, with the following exceptions.

**3408.8.2.1 Ground Snow Load.** For determining snow loads on existing buildings, ground snow load may be reduced to 85% of that required by 780 CMR 1608.0. There shall be no reduction of ground snow load for additions, or for drift loads on existing buildings created by higher additions.

**3408.8.2.2 Level 1 Work.** Level 1 Work is exempt from the snow load requirements of 780 CMR 1608.0, except for snow drift loads due to new roof top equipment or structures.

**3408.8.2.3 Historic Buildings.** House museums are exempt from the snow load requirements of 780 CMR 3408.8.2.

**3408.8.3 Lateral Soil and Hydrostatic Loads.** For additions, lateral soil and hydrostatic loads shall be in accordance with 780 CMR 18.00. There are no requirements for lateral soil and hydrostatic loads for existing basement or foundation walls provided said walls and the structure supporting them laterally do not exhibit structural distress due to lateral soil or hydrostatic load; otherwise, lateral soil and hydrostatic loads shall be in accordance with 780 CMR 18.00.

**3408.8.4 Flood Loads.** Flood load shall be in accordance with 780 CMR 1612.0 for Level 4 and Level 5 Work. There are no flood load requirements for Levels 1, 2, and 3 Work.

**3408.8.5 Dead Loads.** Dead loads shall be in accordance with 780 CMR 1606.0.

### 3408.9 Structural Design and Construction.

**3408.9.1. Stiffness and Deflection Control.** For Levels 2, 3, 4, and 5 Work, except for Level 2 Work where there are no changes to the existing lateral load resisting system, the building design shall comply with the following deflection criteria.

1. For seismic load on buildings with URM bearing or enclosure walls, the maximum inelastic story drift in the direction of the seismic load shall not exceed  $0.007h$ , where  $h$  is the story height. Inelastic story drift shall be calculated in accordance with ASCE 7, Section 9.5.5.7 or 9.5.6.6, except that the drift deter-

mination shall be made for each shear wall and vertical frame. The drift of URM bearing or enclosure walls perpendicular to the direction of the seismic load shall not exceed  $0.010h$ .

2. For wind load, or the lateral load defined in 780 CMR 3407.7.3, Item 2., on buildings with URM bearing or enclosure walls, the maximum story drift at each shear wall and vertical frame shall not exceed  $0.002h$ . The drift of URM bearing or enclosure walls perpendicular to the direction of the lateral load shall not exceed  $0.0025h$ . These values apply to unfactored load levels.

3. For seismic loads on buildings without URM bearing or enclosure walls, the maximum inelastic story drift shall be calculated in accordance with ASCE 7, Section 9.5.5.7 or 9.5.6.6.

**3408.9.1.1 Reinforced Concrete Moment Frames.** For seismic load on existing reinforced concrete moment frames of Pre-1975 buildings, including flat slab or flat plate buildings, whether supplemented with new lateral load resisting elements or not, the inelastic story drift shall not exceed 0.01 times the story height.

### 3408.9.2 Existing Structural Members and Systems.

**3408.9.2.1 Strength of Existing Structural Members and Systems.** Strength of existing systems, members, and connections shall be determined in accordance with the Code requirements for new construction and currently accepted engineering practice, using the actual strength and other physical properties of the existing materials, except as provided in 780 CMR 3408.9.2.2. and 3408.9.2.4.

**3408.9.2.2 Compliance with Previous Codes.** For evaluating capacity of existing structural systems, members, or connections for compliance with the basic code, structural design codes and standards in effect at the time of the basic code may be used.

**3408.9.2.3 Strength of Materials.** The strength of existing materials shall be determined by tests or from generally accepted historical records.

**3408.9.2.4 Archaic Materials.** Strength of existing systems, members, and connections made from materials no longer produced (archaic materials) may be evaluated from the archaic material codes and engineering practices at, or later than, the time said existing systems and elements were constructed. Existing systems and elements made from archaic materials shall not be used to resist seismic load.



**3408.9.2.5 Deficient or damaged structural members.** Existing structural members or their connections that are found to be deteriorated or damaged, either prior to or during an alteration or addition, shall be repaired, replaced, or reinforced. Existing structural members shall be considered deteriorated or damaged if their capacity is less than 85% of their original strength. Repairs, replacement, or reinforcement shall be in accordance with currently accepted engineering practice.

**3408.9.2.6 Reuse of Existing Structural Members.** Existing structural members in sound structural condition may be reused.

**3408.9.3 Sheathing for Light-framed Shear Walls.** The following types of existing sheathing over light-framed wood walls may be used to resist in-plane shear, where the walls are anchored to floors and to the floor or roof construction above such that they can transfer the shear between stories and to the foundation. wood structural panels, diagonal boards, wood siding over horizontal or diagonal boards, plaster on wood or metal lath, and stucco on metal lath. Gypsum sheathing, lath, wall board, and drywall; fiberboard; and particle board are not permitted for resisting in-plane shear.

**Exception.** Existing gypsum sheathing, lath, wall board, and drywall; fiberboard; and particle board may be used to resist in-plane shear if originally designed in accordance with 780 CMR for that purpose.

**3408.9.4 Connections of Lateral Load Resisting Frames and Walls to Diaphragms.** For Levels 2, 3, 4, and 5 Work, all vertical lateral load resisting frames and shear walls (including all masonry and concrete enclosure, bearing, and fire walls) shall be connected to floor and roof diaphragms. The connections shall resist the in-plane forces between diaphragms and vertical frames, and between diaphragms and shear walls. The connections shall also resist imposed forces that are transverse to the vertical frames and shear walls. The in-plane and transverse design forces for these connections shall not be less than 190 lbs per foot for Allowable Stress Design or 280 lbs/foot for Strength Design.

**3408.9.5 Shear Walls and Frames for Levels 2, 3, 4, and 5 Work.**

**3408.9.5.1 Distribution of Lateral Load with Flexible Diaphragms.** For buildings with flexible diaphragms, such as wood floor and roof decks or unfilled metal roof decks, and with masonry or concrete shear walls or steel braced frames, the lateral load from each level shall be proportioned to shear walls and braced frames in accordance with their tributary width perpendicular to the load, unless a different distribution is justified by a lateral load

analysis which accounts for the flexibility of the diaphragms and the stiffnesses of the shear walls and frames.

**3408.9.5.2. Lines of Shear Walls or Frames with Flexible Diaphragms.** For buildings or portions of buildings with flexible diaphragms, such as wood floor and roof decks or unfilled metal roof decks, there shall be a minimum of two lines of shear walls or frames to resist lateral load in each orthogonal direction (or the equivalent), located at or as close as practicable to the opposite sides of the building or portion of the building.

**3408.9.5.3 Ductility Requirements for New Shear Walls and Frames.** For Level 2 Work, where new shear walls or frames are required, said frames and shear walls shall be detailed in accordance with the seismic requirements of 780 CMR 19.00, 21.00., 22.00, or 23.00, as applicable. The new frames and shear walls shall be one of the types permitted in ASCE 7, Table 9.5.2.2, as revised by 780 CMR 1615.0.

**3408.9.6 Row Buildings.**

**3408.9.6.1 Party Walls.** A party wall is defined as a wall on a lot line owned in common by the two abutters. For the purposes of 780 CMR 3408.9.6, where a wall is on one side of a lot line and owned by one of the abutters, and the face of that wall nearest the lot line is within two inches of the lot line, the wall shall be considered to be a party wall.

**3408.9.6.2 Lateral Resistance Parallel to Front and Rear Walls.** When lateral load resistance of an existing building within a row of buildings with party walls is to be determined, said resistance parallel to the front and rear walls shall be the resistance of the entire row of buildings.

**3408.9.6.3 Maintaining lateral load resistance.** When an existing building within a row of buildings with party walls is altered, demolished, or replaced, the lateral load resistance and stiffness parallel to the front and rear walls contributed by the existing building to the row of buildings shall be maintained or replaced.

**3408.9.6.4 Lateral Support of Party Walls.** Where a building within a row of buildings is removed or partially removed, the party walls on each side of the removed structure shall be laterally supported by means other than friction.

**3408.9.6.5 New buildings.** New structures that replace an existing building in a row of buildings shall not impose lateral forces on the other buildings in the row in excess of what the existing building could have imposed.



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**3408.9.7 Precast Concrete Cladding Connections B Levels 4 and 5 Work.** Connections of existing precast concrete cladding elements for Levels 4 and 5 Work shall be made to conform to the requirements of 780 CMR 1615.0.

**3408.9.8 Special Requirements for URM Walls.**

**3408.9.8.1 Lateral Support.** For Levels 2, 3, 4, and 5 work, the ratio of distance between lateral supports to the nominal thickness of wall shall be 18 or less; otherwise the walls shall be strongbacked. Strongbacks shall be designed to resist the full transverse (out of plane) design load on the URM walls, with a maximum transverse displacement of 1/600 of the distance between lateral supports. In ASCE 7, Equation 9.6.1.3-1,  $a_p$  shall be taken as 1.0 and  $R_p$  shall be taken as 1.5 for URM walls.

**3408.9.8.2 Tying Back Parapets.** For Levels 2, 3, 4, and 5 Work, the top of masonry parapets extending from URM walls with a height to thickness ratio of more than three shall be tied back to the roof. The height of parapet shall be measured from the level of where the URM walls are connected to the roof diaphragm.

**3408.9.8.3 New Buildings Using Existing Masonry Facades.** Existing URM facades may be used to enclose new buildings provided:

1. that the walls are laterally supported by the new building in such a way that there is no imposed in-plane shear transferred to the facade from the building;
2. that seismic load induced into the plane of the walls due to their own mass can be resisted by the respective walls; and
- 3 that the walls conform to the criteria of 780 CMR 3408.9.8.1 and 3408.9.8.2.

**3408.9.9 Limits to Vertical Additions Having URM or Unreinforced Concrete Bearing Walls.**

For Level 4 Work, structurally attached vertical additions to existing buildings having URM or unreinforced concrete bearing or enclosure walls shall be limited as follows:

1. Only a lifetime one story is permitted to be added to one and two story buildings, and no vertical addition is permitted for buildings with more than two stories.
2. The area of the permitted vertical addition shall not exceed the footprint of the uppermost existing floor.

**Exception.** There is no limit to the number of stories of a vertical addition if the addition has a new lateral load resisting system such that lateral loads on the addition are not imposed on the existing URM walls, and if no additional gravity load is imposed on the existing URM walls.

**3408.9.10 Seismic design with URM and unreinforced concrete shear walls.**

**3408.9.10.1 Uncracked Shear Walls.**

Existing URM and unreinforced concrete shear wall elements acting with a new lateral load resisting system shall be considered to remain uncracked during the design earthquake when the calculated in-plane seismic shear force on the elements multiplied by the system overstrength factor ( $\Omega_o$ ) of the new lateral load resisting system is less than or equal to the shear capacity of the elements.

**3408.9.10.2 Levels 3 and 4 Work.** When the in-plane seismic shear force in a URM or unreinforced concrete shear wall, calculated in accordance with the design coefficients in Table 3408-1, exceeds the in-plane shear capacity, a new lateral load resisting system of a type permitted in ASCE 7, Table 9.5.2.2, as revised by 780 CMR 1615.0, shall be added to the building to resist the seismic load. The new lateral load resisting system shall be designed to act with existing shear wall elements that remain uncracked in accordance with 780 CMR 3408.9.10.1, accounting for the relative stiffness of the new elements and the uncracked existing shear wall elements, using as an R factor the R factor for the new lateral load resisting system.

**3408.9.10.3 Level 5 Work.** The primary lateral load resisting system, in accordance with 780 CMR 3408.7.6, Item 2., shall be designed to resist seismic load independent of the URM or unreinforced concrete shear walls. The primary lateral load resisting system shall also be designed to interact with existing shear wall elements that remain uncracked in accordance with 780 CMR 3408.9.10.1, accounting for the relative stiffness of the elements of the primary system and the uncracked existing shear wall elements, using as an R factor the R factor for the primary lateral load resisting system.

**3408.9.11 Liquefaction of Underlying Soils.**

For additions in Level 4 or Level 5 Work, the potential for liquefaction shall be considered in accordance with 780 CMR 1804.6.

**3408.10 Supplementary Seismic Provisions for Existing Construction.**

Where seismic resistance is required in 780 CMR 3408.0, existing lateral force resisting systems that are not permitted in 780 CMR 1615.0 may be used for seismic resistance in accordance with the following requirements.

**3408.10.1 Limitation.** 780 CMR 3408.10 does not apply to Level 5 Work.

**3408.10.2 Design Coefficients and Factors.** Values of the Response Modification Coefficient, R, System Over-strength Factor,  $\Omega_o$ , and the

Deflection Amplification Factor,  $C_d$ , for systems not permitted in 780 CMR 1615.0 shall be in accordance with Table 3408-1. Except as provided in Table

3408-1, there are no seismic design or detailing rules for the systems listed in the table.

**TABLE 3408-1 DESIGN COEFFICIENTS AND FACTORS FOR SEISMIC FORCE RESISTING SYSTEMS NOT PERMITTED IN 780 CMR 1615.0**

Basic Seismic Force Resisting System <sup>1</sup>	Response Modification Coefficient, R	System Overstrength Factor, $\Omega_0$	Deflection Amplification Factor, $C_d$
<b>Bearing Wall Systems</b>			
Steel concentrically braced frame (CBF) with diagonal <sup>3</sup> or X-bracing			
CBF per 6th Ed SBC <sup>2</sup> except AISC 1992 Seismic Provisions, Sect 9.5	3.5	2	3.5
Otherwise <sup>4</sup>	3	3	3
Steel CBF with V, inverted V, or K bracing			
V or Inverted V bracing per 6th Ed. SBC <sup>2</sup>	3	3	3
V or Inverted V bracing, otherwise <sup>4</sup>	3	3	3
K bracing	1.25	1.25	1.25
Reinforced concrete shear walls with boundary elements and without coupling beams, in accordance with 780 CMR 1113.5.1.4a, 5th Ed.	5	2.5	5
Reinforced concrete shear walls with reinforcing steel less than required by, or spaced further apart than, that required in ACI 318, Sec. 11.10.9	1.5	1.5	1.5
Unreinforced concrete shear walls	1.25	1.25	1.25
Reinforced masonry shear walls classified in accordance with 780 CMR 3408.10.2.1			
Class A	4.5	2.5	3.5
Class B	2.25	2.25	2.25
Class C	1.25	1.25	1.25
Unreinforced masonry shear walls	1.25	1.25	1.25
Light-framed walls sheathed with wood structural panels or diagonal sheathing	4	2.5	3
Other light-framed walls sheathed with materials permitted in 780 CMR 3408.10.6	2	2	2
<b>Building Frame Systems</b>			
Steel concentrically braced frame (CBF) with diagonal <sup>3</sup> or X-bracing			
CBF per 6th Ed SBC <sup>2</sup> except AISC, 1992 Seismic Provisions, Sect 9.5	4	2	3.5
Otherwise <sup>4</sup>	3	3	3
Steel CBF with V, inverted V, or K bracing			
V or Inverted V bracing per 6th Ed. SBC <sup>2</sup>	3	3	3
V or Inverted V bracing, otherwise <sup>4</sup>	3	3	3
K bracing	1.5	1.5	1.5
Reinforced concrete shear walls with boundary elements and without coupling beams, in accordance with 780 CMR 1113.5.1.4a, 5th Ed.	6	2.5	5
Reinforced concrete shear walls with reinforcing steel less than required by, or spaced further apart than, that required in ACI 318-02, Sec. 11.10.9	1.5	1.5	1.5
Unreinforced concrete shear walls	1.5	1.5	1.5
Reinforced masonry shear walls classified in accordance with 780 CMR 3408.10.2.1			
Class A	5	2.5	4
Class B	2.25	2.25	2.25
Class C	1.5	1.5	1.5
Unreinforced masonry shear walls	1.5	1.5	1.5
Light-framed walls sheathed with wood structural panels or diagonal sheathing	4	2.5	3
Other light-framed walls sheathed with materials permitted in 780 CMR 3408.10.6	2.5	2.5	2.5

**TABLE 3408-1 DESIGN COEFFICIENTS AND FACTORS FOR SEISMIC FORCE RESISTING SYSTEMS NOT PERMITTED IN 780 CMR 1615.0 - continued**

Basic Seismic Force Resisting System <sup>1</sup>	Response Modification Coefficient, R	System Overstrength Factor, $\Omega_0$	Deflection Amplification Factor, Cd
<b>Moment Resisting Frame Systems</b>			
Steel moment frames			
Special Moment Frame per 6th Ed. SBC <sup>2</sup>	8	3	5.5
Ordinary Moment Frame per 6th Ed. SBC <sup>2</sup>	3.5	3.5	3.5
Moment frame, otherwise <sup>4</sup>	3	3	3
Reinforced concrete moment frames classified in accordance with 780 CMR 3408.10.2.2			
Class A	5	3	4.5
Class B	2.5	2.5	2.5
<b>Dual Systems</b> (See ASCE 7, Section 9.5.2.2.1)			
Steel concentrically braced frame (CBF) with steel moment frames (MF)			
CBF and Special MF, per 6th Ed. SBC <sup>2</sup>	5	2.5	4.5
CBF and MF, per 1st-5th Ed. SBC <sup>2</sup> , except V, Inverted V, or K Bracing	3.5	2.5	3.5
CBF and MF, per 1st-5th Ed. SBC <sup>2</sup> , with V or Inverted V Bracing	3	2.5	3
Otherwise	1.5	1.5	1.5
Reinforced concrete shear walls with boundary elements and without coupling beams, in accordance with 780 CMR 1113.5.1.4a, 5th Ed., with reinforced concrete moment frames in accordance with 780 CMR 3408.10.2.2, Class A.	6	2.5	5
Ordinary reinforced concrete shear wall, as defined in 7th Ed. SBC, with reinforced concrete moment frames in accordance with 780 CMR 3408.10.2.2, Class A	5.5	2.5	4.5

**Notes:**

1. Systems of previous editions of the State Building Code that meet the ductility requirements of the 7th Edition of the Code are not included in this table.
2. SBC = State Building Code.
3. A diagonal brace is one that frames from a beam to column connection diagonally to another beam to column connection or to a column at its base plate.
4. The seismic resistance of the frame shall be based on its seismic connections being subject to two times the computed forces and moments resulting from seismic load.

**3408.10.2.1 Classification of Reinforced Masonry.** Existing reinforced masonry shear walls shall be classified for Table 3408-1, as follows:

**Class A** Minimum total cross-sectional area of reinforcement in the vertical and horizontal direction is 0.002 times the gross cross-sectional area of wall, with a minimum in each direction of 0.0007 times the gross cross-sectional area of wall. Maximum spacing of reinforcing steel bars in grouted cells or bond courses is 6'-0" in one direction and 4'-0" in the other direction, but not less than  $\frac{1}{3}$  of the length or height of the wall, whichever is smaller, in each direction. Otherwise meets requirements for reinforced masonry of the basic code.

**Class B** Same as Class A, except spacing limits for the reinforcing steel bars are exceeded.

**Class C** Less than the minimum cross-sectional area of reinforcement required for

Class A.

**3408.10.2.2 Classification of Reinforced Concrete Moment Frames.** Existing reinforced concrete moment frames shall be classified for Table 3408-1, as follows:

**Class A** Design in accordance with 780 CMR 1113.5.1, 1113.5.1.1, 1113.5.1.2 and 1113.5.1.3, 5<sup>th</sup> Edition; and ACI 318-83, Sections 11.12.1.1 and 11.12.1.2 for reinforcing of the beam-column joints.

**Class B** Does not meet all the requirements for Class A.

**3408.10.3 Alternate Methods of Analysis and Design.** In lieu of the requirements of 780 CMR 1615.0 and 780 CMR 3408.10.2, analysis and design for existing buildings may be in accordance with SEI/ASCE 31 for the loading specified in 780 CMR 1614.0, except that sheathing over light-framed wood walls that is not permitted in 780 CMR 3408.9.3 shall not be used to resist in-plane shear for shear walls, and wood foundations other than piles and poles shall not be used to resist any load. The SER shall document

the use of SEI/ASCE 31 in a report to the building official, and include in said report the assumptions, the methods of analysis, and a description of the analytical results

### 780 CMR 3409.0 HISTORIC BUILDINGS

**3409.1 Scope.** The provisions of 780 CMR 3409.0 shall govern all buildings and structures in the Commonwealth which are legally designated as *historic buildings*. 780 CMR 3409.0 shall preempt all other regulations of 780 CMR governing the reconstruction alterations change of use and occupancy, repairs maintenance and additions for the conformity of historic buildings and structures to 780 CMR, with the exception of 780 CMR 122.0 for appeals, or unless otherwise specified (*see* 780 CMR 120.Y). There is no obligation for owners of historic properties to apply for 780 CMR 3409.0.

**3409.1.1 Key Definitions.** The following five definitions are found in 780 CMR 3401.1, but are also presented here as such definitions form a significant portion of 780 CMR 3409.0.

**Historic Buildings.** (a) Any building or structure individually listed on the National Register of Historic Places or (b) any building or structure evaluated by MHC to be a contributing building within a National Register or State Register District. (c) any building or structure which has been certified by the Massachusetts Historical Commission to meet eligibility requirements for individual listing on the National Register of Historic Places. *Historic building* shall be further defined as a *house museum* or *preserved buildings*. All entries into the *house museum* list shall be certified by the Massachusetts Historical Commission. The Board of Building Regulations and Standards shall ratify all buildings or structures certified by the Massachusetts Historical Commission to qualify for *house museum* listing (*see* Appendix 780 CMR 120.Y).

**Preserved Buildings.** (a) Any building or structure individually listed on the National Register of Historic Places or (b) any building or structure certified as a *historic building* by the Massachusetts Historical Commission and not designated a *house museum* in Appendix 780 CMR 120.Y).

**Restoration.** *Restoration* is the process of accurately reconstructing or repairing the forms and details of a building or structure or portion thereof as it appeared at a particular period or periods of time by means of removal of later work/or the replacement of missing original work

**House Museum.** A *house museum* is an *historic building* or structure. The principal use of such a building or structure must be as an exhibit of the building or the structure itself which is open to the public not less than 12 days per year, although additional uses, original and/ or ancillary to the principal use shall be permitted within the same

building up to maximum of 40% of the gross floor area. *House museums* shall be those listed in Appendix 780 CMR 120.Y. All entries into the *house museum* list shall be certified by the Massachusetts Historical Commission. The Board of Building Regulations and Standards shall ratify all buildings or structures certified by the Massachusetts Historical Commission to qualify for *house museum* listing (*See* Appendix 780 CMR 120.Y).

### 3409.2 House Museum.

**3409.2.1 State Building Code Exceptions.** A *house museum* shall be subject to the following exceptions:

1. Repairs, maintenance and restoration shall be allowed without conformity to 780 CMR generally, if the provisions of 780 CMR 3409.2.2 have been met.
2. In case of fire or other casualty to a *house museum*, said building may be rebuilt, in total or in part, using such techniques and materials as are necessary to restore it to its original condition and use group.
3. If a *historic building* or structure, as a result of proposed work, would become eligible for certification as a *house museum* and the Massachusetts Historical Commission so certifies by affidavit, such affidavit is submitted to the building official with the permit application, and the building official shall then allow the work to proceed under the provisions of 780 CMR 3409.2.

**3409.2.2 Mandatory Safety Requirements.** All *house museums* shall comply to the following requirements.

**3409.2.2.1 Fire Protection Equipment.** Fire protection equipment shall be provided according to the following requirements:

1. **Manual Fire Extinguishing Equipment.** All use groups, other than Residential R-3 and R-4, shall have approved manual fire extinguishing equipment, as determined by the head of the local fire department.
2. **Fire Protective Signaling Systems (Fire Alarm Systems).** All residential buildings in use groups R-1, R-2 and R-3 shall conform to the applicable requirements of 780 CMR 918.0 and 919.0 as applicable. All other use groups shall comply with 780 CMR 3409.2.2.1 items 2.(a) and (b).

(a) **Locations.** Provide smoke detectors in accordance with manufacturers listing and spacing requirements, but not less than one, for every 1200 square feet of floor area per level. In addition, all lobbies, common corridors, hallways and exitway access and discharge routes shall be provided with approved smoke detectors installed in accordance with the

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manufacturers listing and spacing requirements but not more than 30 feet spacing between detectors. All required smoke detectors shall have an alarm audible throughout the structure or building.

(b) Single station and multiple station smoke detection devices. Smoke detectors of single station and multiple station types shall meet the requirements of UL 217 and be listed or approved by a nationally-recognized fire-testing laboratory. All other smoke detectors shall be listed in accordance with UL 268.

**3. Manual Pull Stations.** A manual fire alarm pull station shall be provided in the natural path of egress in all use groups except R-3 and R-4. Manual pull stations shall be connected to the building fire warning system in conformance with NFPA 72.

**3409.2.2.1.1 Supervision.** Fire protective signaling systems required by 780 CMR 3409.2.2.1 shall be supervised in accordance with the requirements of 780 CMR 9.00.

**Exception.** Residential single and multiple station smoke detectors.

**3409.2.2.2 Exit Signs and Emergency Lights.** Approved exit signs and emergency lighting, where designated by the local building official, shall be provided in compliance with 780 CMR 10.00.

**Exception.** All *house museums* need not comply with 780 CMR 10.00 if not occupied after daylight hours, except that paths of egress shall have exit signs.

**3409.2.2.3 Maximum Occupancy.** Occupancy shall be limited by the actual structural floor load capacity as certified by a qualified Massachusetts *registered professional engineer* or *architect* or in accordance with 780 CMR 10.00, whichever is less. Said floor load shall be posted in accordance with the procedures set forth in 780 CMR 120.0, 780 CMR 10.00 and 780 CMR 1617.2. The owner shall submit evidence of this certification and related computations to the building official upon request.

**3409.2.2.4 Limited Egress.** Where one or more floors of a *house museum* are limited to one *means of egress*, the occupancy load shall be computed as follows:

1. **Floors below the First Story.** Not more than one occupant per 100 square feet of gross floor area with a maximum occupancy of 49.
2. **First Story.** Not more than one occupant per 50 square feet of gross floor

area.

**3. Second Story And Above.** Not more than one occupant per 100 square feet of gross floor area, or 30 occupants per unit of egress width, whichever condition results in the lesser occupancy load.

**3409.2.2.5 Inspections.** The *building official* and the fire official shall inspect all *house museums* not less frequently than once every year in order to determine that the building or structure continues to conform to 780 CMR 3409.2. A qualified Massachusetts *registered professional engineer* or *architect* shall certify every five years thereafter as to the exact floor load capacity of the building or structure. The building official shall certify all *house museums* not less frequently than once every year. Fees shall be established at \$25.00 per building per inspection.

**3409.2.2.6 Accessibility for Persons with Disabilities.** Accessibility requirements shall be in accordance with 521 CMR.

**3409.2.2.7 Energy Conservation.** House museums are exempt from the requirements of 780 CMR 3407.0 and the energy conservation requirements of 780 CMR. Muntins, glazing, sills, molding, shutters) shall be permitted without requiring energy code compliance.

**3409.2.2.8 Structural Requirements.** House museums need not comply with the wind load and seismic load requirements of 780 CMR 3408.0.

### 3409.3 Partially Preserved Buildings.

**3409.3.1 State Building Code Provisions.** A *preserved building* shall be subject to the following provisions.

1. **Existing Systems** - individual components of an existing *building system* may be repaired or replaced in kind without requiring that system to comply fully with the code for new construction. (See 780 CMR 34.00, 780 CMR 3404.3. *New Systems*.)
2. **Replacement in Kind** - when the repair of historic materials including patching, splicing, piecing-in, consolidating or reinforcing is not possible, compatible materials may be substituted which closely convey the form and design as well as the visual appearance of the existing feature.

**3409.3.2 State Building Code Exceptions.** A *preserved building* shall be subject to the following exceptions. Repairs or in kind replacement of the following features will be allowed on partially preserved buildings so as not to compromise the architectural integrity of the historical characteristics and qualities which contributed to the eligibility for listing in the National Register of Historic Places.

1. **Roofing** - repair or in kind replacement of an existing historic roof system (i.e., slate, wood, clay, tile, metal) shall be permitted without requiring structural compliance for equivalent new construction providing that dead and live loading requirements have not changed.
2. **Windows** - repair or in kind replacement of existing historic windows (i.e., frames, sash, muntions, glazing, sills, molding, shutters) shall be permitted without requiring energy code compliance.
3. **Entries/Porches** - repair or in kind replacement of existing individual decorative features of an existing system (i.e. columns, balustrades, stairs, pilasters, doors, sidelights) shall be permitted.
4. **Wood Siding/Decorative Elements** - Repair or in kind replacement of an existing system including such items as clapboards, shingles, cornices, brackets, and window and door surrounds shall be permitted.
5. **Masonry** - repair or in kind replacement of masonry units as part of an existing system (i.e., brick, stone, terra cotta, concrete and stucco) shall be permitted.
6. **Metals** - repair or in kind replacement of existing architectural metals (i.e. cast and wrought iron, steel, tin, copper and copper alloys, aluminum, zinc) shall be permitted.
7. **Interior Features** - repair or in kind replacement of non-structural interior features that are important in defining the overall historic character of a building (i.e., columns, cornices, baseboards, fireplace mantels, paneling, window trim, doors, moldings, railings, flooring, plasterwork) shall be permitted.

**3409.3.3 Applicability.** 780 CMR 3409.3 and 780 CMR 34.00 shall apply to all *preserved buildings*.

**3409.3.4 Continuation of Use and Occupancy.** The legal use and occupancy of any *preserved building* may be continued without change or further compliance to 780 CMR.

**3409.3.5 Inspection Certification and Fees.** *preserved buildings* shall not require annual inspection unless otherwise stipulated in 780 CMR 106.5 and Table 106.

**3409.3.6 Fire Damage.** If a building or structure is damaged from fire or other casualty it may be restored to its original construction or it shall meet the requirements of 780 CMR provided these requirements do not compromise the features for which the building was considered Historic when listed in the National Register of Historic Places.

**3409.3.7 Change in Occupancy.** See 780 CMR 34.00.

**3409.3.8 New Systems.** See 780 CMR 34.

**3409.3.9 Lesser and Equal Hazard.** See 780 CMR 34.00. A *preserved building* classified under unprotected construction Type 2C or 5B shall have waived the requirement to add one to the Hazard Index number (See 780 CMR 34.00, Table 3403).

**3409.3.10 Greater Hazard.** See 780 CMR 34.00. A *preserved building* classified under unprotected construction Type 2C or 5B shall have waived the requirement to add one to the Hazard Index number (See 780 CMR 34.00, Table 3403).

**3409.3.11 Energy Conservation.** Preserved buildings are exempt from the energy requirements of 780 CMR 13.00 and 61.00.

**Exception.** Additions to partially preserved buildings shall comply with the energy provisions of 780 CMR 13.00 or of 780 CMR 61.00, as applicable.

**3409.3.13 Accessibility for Persons with Disabilities.** Accessibility requirements shall be in accordance with 521 CMR.

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