780 CMR 31.00

SPECIAL CONSTRUCTION

780 CMR 3101.0 GENERAL

3101.1 Scope. The provisions of 780 CMR 31.00 shall govern special building construction including membrane structures, temporary structures, pedestrian walkways and tunnels, awnings and canopies, marquees, signs, and towers and antennas; ***portions of 780 CMR 31.00 may reference either the International Fire Code (IFC) or the International Mechanical Code therefore also see 780 CMR 3101.2 and 3101.3.***

3101.2 The ICC International Fire Code (IFC), the ICC International Mechanical Code (IMC) and the Specific Specialized Code - The Board of Fire Prevention Regulations (527 CMR). 780 CMR contains design and construction requirements for all USE Group buildings and their building permittable systems and also references additional applicable design and construction requirements of the IFC and the IMC for the various USE Groups and industrial processes within such USE Groups, including H-USES. It is the intention in referencing the IFC and the IMC that only the IFC and IMC requirements narrow to Building Code matters; i.e., USE Group classification, general building limitations of height and area, fireresistant materials and construction, interior finishes, required fire protection systems (otherwise not specifically regulated by 527 CMR), means of egress, interior environment, energy conservation, exterior wall coverings, roof and roof coverings, structural loads, structural tests and inspections, foundations and retaining walls, construction materials, glass and glazing, plastics, mechanical systems, special construction, site work, demolition and construction in the public right-of-way, building permittable work in existing buildings and control of manufactured buildings and manufactured components, etc., as historically addressed in 780 CMR: the Massachusetts State Building Code are intended regulated by 780 CMR.

Exception: The design and construction requirements of bunkers and magazines for the storage of explosive materials, flammable/ combustible liquids and chemical process safety, shall default to the specific requirements of 527 CMR and are not enforceable by Building Officials but rather by the Head of the Fire Department or his/her designee.

Note that the IFC and the IMC are not only building and building permittable systems design and construction documents but also include fire prevention requirements and the fire prevention requirements of the IFC and IMC are not requirements regulated by 780 CMR nor enforceable by Building Officials / For fire prevention requirements do not refer to the IFC or IMC but rather to 527 CMR, the Massachusetts Board of Fire Prevention Regulations. If there is conflict between 780 CMR and 527 CMR, the more stringent standard shall apply.

3101.3 The ICC International Fire Code (IFC), the ICC International Mechanical Code (IMC) and the Family of Massachusetts Specialized Codes (refer to 780 CMR, 101.5). 780 CMR contains design and construction requirements for all USE Group buildings and their building permittable systems and also references additional applicable design and construction requirements of the IFC and the IMC for the various USE Groups and industrial processes within such USE Groups, including H-USES. It is the intention in referencing the IFC and the IMC that only the IFC and IMC requirements narrow to Building Code matters (see 780 CMR 3101.11 are regulated by 780 CMR. Where the IFC and IMC reference requirements related to: architectural access; environmental protection; electrical; elevator; fire prevention (otherwise not specifically regulated by 527 CMR); gas; or sanitary code requirements, such requirements are not regulated by 780 CMR nor enforceable by Building Officials (Building Officials do enforce architectural access requirements set forth in 521 CMR) / For Specialized Code requirements do not refer to the IFC or IMC but rather to the appropriate Specialized Code requirements of Massachusetts (refer to 780 CMR 101.5).

780 CMR 3102.0 MEMBRANE STRUCTURES

3102.1 General. The provisions of 780 CMR 3102.0 shall apply to air-supported, air-inflated, membrane-covered cable and membrane-covered frame structures, collectively known as membrane structures, erected for a period of 180 days or longer. Those erected for a shorter period of time shall comply with the requirements of *the International Fire Code (IFC)*. Membrane structures covering water storage facilities, water clarifiers, water treatment plants, sewage treatment plants, greenhouses and similar facilities not used for human occupancy, are required to meet only the requirements of 780 CMR 3102.3.1 and 3102.7.

3102.2 Definitions. The following words and terms shall, for the purposes of this section and as used elsewhere in 780 CMR, have the meanings shown in 780 CMR 3102.2:

AIR-INFLATED STRUCTURE. A building where the shape of the structure is maintained by air

pressurization of cells or tubes to form a barrel vault over the usable area. Occupants of such a structure do not occupy the pressurized area used to support the structure.

AIR-SUPPORTED STRUCTURE. A building wherein the shape of the structure is attained by air pressure and occupants of the structure are within the elevated pressure area. Air-supported structures are of two basic types:

Double Skin. Similar to a single skin, but with an attached liner that is separated from the outer skin and provides an airspace which serves for insulation, acoustic, aesthetic or similar purposes.
Single Skin. Where there is only the single outer skin and the air pressure is directly against that skin.

CABLE-RESTRAINED, AIR-SUPPORTED STRUCTURE. A structure in which the uplift is resisted by cables or webbings which are anchored to either foundations or dead men. Reinforcing cable or webbing is attached by various methods to the membrane or is an integral part of the membrane. This is not a cable-supported structure.

MEMBRANE-COVERED CABLE STRUCTURE. A nonpressurized structure in which a mast and cable system provides support and tension to the membrane weather barrier and the membrane imparts stability to the structure.

MEMBRANE-COVERED FRAME STRUCTURE. A nonpressurized building wherein the structure is composed of a rigid framework to support a tensioned membrane which provides the weather barrier.

NONCOMBUSTIBLE MEMBRANE STRUCTURE. A membrane structure in which the membrane and all component parts of the structure are noncombustible.

3102.3 Type of Construction. Noncombustible membrane structures shall be classified as Type IIB construction. Noncombustible frame or cable-supported structures covered by an approved membrane in accordance with 780 CMR 3102.3.1 shall be classified as Type IIB construction. Heavy timber frame-supported structures covered by an approved membrane in accordance with Section 3102.3.1 shall be classified as Type IV construction. Other membrane structures shall be classified as Type V construction.

Exception. Plastic less than 30 feet (9144 mm) above any floor used in greenhouses, where occupancy by the general public is not authorized, and for aquaculture pond covers, is not required to be flame resistant.

3102.3.1 Membrane and Interior Liner Material. Membranes and interior liners shall be either noncombustible as set forth in 780 CMR 703.4, or flame resistant as determined in accordance with NFPA 701 and the manufacturer's test protocol.

Exception. Plastic less than 20 mil (500 mm) in thickness used in greenhouses, where occupancy by the general public is not authorized, and for aquaculture pond covers, is not required to be flame resistant.

3102.4 Allowable Floor Areas. The area of a membrane structure shall not exceed the limitations set forth in Table 503, except as provided in 780 CMR 506.0.

3102.5 Maximum Height. Membrane structures shall not exceed one story nor shall such structures exceed the height limitations in feet set forth in Table 503.

Exception. Noncombustible membrane structures serving as roofs only.

3102.6 Mixed Construction. Membrane structures shall be permitted to be utilized as specified in this section as a portion of buildings of other types of construction. Height and area limits shall be as specified for the type of construction and occupancy of the building.

3102.6.1 Noncombustible Membrane. A noncombustible membrane shall be permitted for use as the roof or as a skylight of any building or atrium of a building of any type of construction provided it is at least 20 feet (6096 mm) above any floor, balcony or gallery.

3102.6.1.1 Flame-resistant Membrane. A flame-resistant membrane shall be permitted to be used as the roof or as a skylight on buildings of Type IIB, III, IV and V construction provided it is at least 20 feet (6096 mm) above any floor, balcony or gallery.

3102.7 Engineering Design. The structure shall be designed and constructed to sustain dead loads; loads due to tension or inflation; live loads including wind, snow or flood and seismic loads and in accordance with 780 CMR 16.00.

3102.8 Inflation Systems. Air-supported and air-inflated structures shall be provided with primary and auxiliary inflation systems to meet the minimum requirements of 780 CMR 3102.8.1 through 3102.8.3.

3102.8.1 Equipment Requirements. This inflation system shall consist of one or more blowers and shall include provisions for automatic control to maintain the required inflation pressures. The system shall be so designed as to prevent overpressurization of the system.

3102.8.1.1 Auxiliary Inflation System. In addition to the primary inflation system, in buildings exceeding 1,500 square feet (140 m^2) in area, an auxiliary inflation system shall be

provided with sufficient capacity to maintain the inflation of the structure in case of primary system failure. The auxiliary inflation system shall operate automatically when there is a loss of internal pressure and when the primary blower system becomes inoperative.

3102.8.1.2 Blower Equipment. Blower equipment shall meet the following requirements:

1. Blowers shall be powered by continuous-rated motors at the maximum power required for any flow condition as required by the structural design.
2. Blowers shall be provided with inlet screens, belt guards and other protective devices as required by the building official to provide protection from injury.
3. Blowers shall be housed within a weather-protecting structure.
4. Blowers shall be equipped with backdraft check dampers to minimize air loss when inoperative.
5. Blower inlets shall be located to provide protection from air contamination. The location of inlets shall be approved.

3102.8.2 Standby Power. Wherever an auxiliary inflation system is required, an approved standby power-generating system shall be provided. The system shall be equipped with a suitable means for automatically starting the generator set upon failure of the normal electrical service and for automatic transfer and operation of all of the required electrical functions at full power within 60 seconds of such service failure. Standby power shall be capable of operating independently for a minimum of four hours.

3102.8.3 Support Provisions. A system capable of supporting the membrane in the event of deflation shall be provided for in air-supported and air-inflated structures having an occupant load of more than 50 or where covering a swimming pool regardless of occupant load. The support system shall be capable of maintaining membrane structures used as a roof for Type I construction not less than 20 feet (6096 mm) above floor or seating areas. The support system shall be capable of maintaining other membranes at least 7 feet (2134 mm) above the floor, seating area or surface of the water.

780 CMR 3103.0 TEMPORARY STRUCTURES

3103.1 General. The provisions of 780 CMR 3103.0 shall apply to structures erected for a period of less than 180 days. Tents and other membrane structures erected for a period of less than 180 days shall comply with the *International Fire Code*. Those erected for a longer period of time shall comply with applicable sections of 780 CMR.

Exception. Provisions of the *International Fire Code* shall apply to tents and membrane structures erected for a period of less than 180 days.

3103.1.1 Permit Required. Temporary structures that cover an area in excess of 120 square feet (11.16 m^2), including connecting areas or spaces with a common means of egress or entrance which are used or intended to be used for the gathering together of ten or more persons, shall not be erected, operated or maintained for any purpose without obtaining a permit from the building official.

3103.2 Construction Documents. A permit application and construction documents shall be submitted for each installation of a temporary structure. The construction documents shall include a site plan indicating the location of the temporary structure and information delineating the means of egress and the occupant load.

3103.3 Location. Temporary structures shall be located in accordance with the requirements of Table 602 based on the fire-resistance rating of the exterior walls for the proposed type of construction.

3103.4 Means of Egress. Temporary structures shall conform to the means of egress requirements of 780 CMR 10.00 and shall have a maximum exit access travel distance of 100 feet (30 480 mm).

780 CMR 3104.0 PEDESTRIAN WALKWAYS AND TUNNELS

3104.1 General. 780 CMR 3104.0 shall apply to connections between buildings such as pedestrian walkways or tunnels, located at, above or below grade level, that are used as a means of travel by persons. The pedestrian walkway shall not contribute to the building area or the number of stories or height of connected buildings.

Note that pedestrian walkways and tunnels shall also conform to applicable requirements of 521 CMR.

3104.2 Separate Structures. Connected buildings shall be considered to be separate structures.

Exceptions:

1. Buildings on the same lot in accordance with 780 CMR 503.1.3.
2. For purposes of calculating the number of Type B units required by Chapter 11, structurally connected buildings and buildings with multiple wings shall be considered one structure.

3104.3 Construction. The pedestrian walkway shall be of noncombustible construction.

Exception. Combustible construction shall be permitted where connected buildings are of combustible construction.

3104.4 Contents. Materials and decorations in the walkway shall conform to the requirements of

780 CMR 8.00 and the requirements of 527 CMR the Massachusetts Fire Code as applicable.

3104.5 Fire Barriers Between Pedestrian Walkways and Buildings. Walkways shall be separated from the interior of the building by fire barrier walls with a fire-resistance rating of not less than two hours. This protection shall extend vertically from a point ten feet (3048 mm) above the walkway roof surface or the connected building roof line, whichever is lower, down to a point ten feet (3048 mm) below the walkway and horizontally ten feet (3048 mm) from each side of the pedestrian walkway. Openings within the ten-foot (3048 mm) horizontal extension of the protected walls beyond the walkway shall be equipped with devices providing a ¾-hour fire protection rating in accordance with 780 CMR 715.0.

Exception. The walls separating the pedestrian walkway from a connected building are not required to have a fire-resistance rating by 780 CMR 3104.5 where any of the following conditions exist:

1. The distance between the connected buildings is more than 10 feet (3048 mm), the pedestrian walkway and connected buildings are equipped throughout with an automatic sprinkler system in accordance with NFPA 13 and the wall is constructed of a tempered, wired or laminated glass wall and doors subject to the following:
   1.1. The glass shall be protected by an automatic sprinkler system in accordance with NFPA 13 and the sprinkler system shall completely wet the entire surface of interior sides of the glass wall when actuated.
   1.2. The glass shall be in a gasketed frame and installed in such a manner that the framing system will deflect without breaking (loading) the glass before the sprinkler operates.
   1.3. Obstructions shall not be installed between the sprinkler heads and the glass.
2. The distance between the connected buildings is more than 10 feet (3048 mm), and both sidewalls of the pedestrian walkway are at least 50 percent open with the open area uniformly distributed to prevent the accumulation of smoke and toxic gases.
3. Buildings are on the same lot, in accordance with Section 503.1.3.
4. Where exterior walls of connected buildings are required by Section 704 to have a fire-resistance rating greater than 2 hours, the walkway shall be equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13.

Exceptions 1. through 4. shall apply to pedestrian walkways having a maximum height above grade of three stories or 40 feet (12 192 mm), or five stories or 55 feet (16 764 mm) where sprinklered.

3104.6 Public Way. Pedestrian walkways over a public way shall also comply with 780 CMR 32.00.

3104.7 Egress. Access shall be provided at all times to a pedestrian walkway that serves as a required exit.

3104.8 Width. The unobstructed width of pedestrian walkways shall not be less than 36 inches (914 mm). The total width shall not exceed 30 feet (9144 mm).

3104.9 Exit Access Travel. The length of exit access travel shall not exceed 200 feet (60 960 mm).

Exceptions:

1. Exit access travel distance on a pedestrian walkway equipped throughout with an automatic sprinkler system in accordance with NFPA 13 shall not exceed 250 feet (76 200 mm).
2. Exit access travel distance on a pedestrian walkway constructed with both sides at least 50 percent open shall not exceed 300 feet (91 440 mm).
3. Exit access travel distance on a pedestrian walkway constructed with both sides at least 50 percent open, and equipped throughout with an automatic sprinkler system in accordance with NFPA 13, shall not exceed 400 feet (122 m).

3104.10 Tunneled Walkway. Separation between the tunneled walkway and the building to which it is connected shall not be less than two-hour fire-resistant construction and openings therein shall be protected in accordance with Table 715.3.

3104.11 Ventilation. Smoke and heat vents shall be provided for enclosed walkways and tunneled walkways as required for Group F-1 occupancies in accordance with 780 CMR 910.0.

780 CMR 3105.0 AWNINGS AND CANOPIES

3105.1 General. Awnings or canopies shall comply with the requirements of 780 CMR 3105.0 and other applicable sections of 780 CMR.

3105.2 Definition. The following term shall, for the purposes of 780 CMR 3105.0 and as used elsewhere in 780 CMR, have the meaning shown in 780 CMR 3105.2.

RETRACTABLE AWNING. A retractable awning is a cover with a frame that retracts against a building or other structure to which it is entirely supported.

3105.3 Design and Construction. Awnings and canopies shall be designed and constructed to withstand wind or other lateral loads and live loads as required by 780 CMR 16.00 with due allowance for shape, open construction and similar features that relieve the pressures or loads. Structural members

shall be protected to prevent deterioration. Awnings shall have frames of noncombustible material, fire-retardant-treated wood, wood of Type IV size, or 1-hour construction with combustible or noncombustible covers and shall be either fixed, retractable, folding or collapsible.

3105.4 Canopy Materials. Canopies shall be constructed of a rigid framework with an approved covering, that is flame resistant in accordance with NFPA 701 or has a flame spread index not greater than 25 when tested in accordance with ASTM E 84.

780 CMR 3106.0 MARQUEES

3106.1 General. Marquees shall comply with 780 CMR 3106.0 and other applicable sections of 780 CMR.

3106.2 Thickness. The maximum height or thickness of a marquee measured vertically from its lowest to its highest point shall not exceed three feet (914 mm) where the marquee projects more than two-thirds of the distance from the property line to the curb line, and shall not exceed nine feet (2743 mm) where the marquee is less than ⅔ of the distance from the property line to the curb line.

3106.3 Roof Construction. Where the roof or any part thereof is a skylight, the skylight shall comply with the requirements of 780 CMR 24.00. Every roof and skylight of a marquee shall be sloped to downspouts that shall conduct any drainage from the marquee in such a manner so as not to spill over the sidewalk.

3106.4 Location Prohibited. Every marquee shall be so located as not to interfere with the operation of any exterior standpipe, and such that the marquee does not obstruct the clear passage of stairways or exit discharge from the building or the installation or maintenance of street lighting.

3106.5 Construction. A marquee shall be supported entirely from the building and constructed of noncombustible materials. Marquees shall be designed as required in 7802 CMR 16.00. Structural members shall be protected to prevent deterioration.

780 CMR 3107.0 SIGNS

3107.1 General. Signs shall be designed, constructed and maintained in accordance with 780 CMR.

780 CMR 3108.0 RADIO AND TELEVISION TOWERS

3108.1 General. Subject to the provisions of 780 CMR 16.00 and the requirements of 780 CMR 15.00 governing the fire-resistance ratings of buildings for the support of roof structures, radio and television towers shall be designed and constructed as provided in 780 CMR 3108.0.

3108.2 Location and Access. Towers shall be located and equipped with step bolts and ladders so as to provide ready access for inspection purposes. Guy wires or other accessories shall not cross or encroach upon any street or other public space, or over above-ground electric utility lines, or encroach upon any privately owned property without written consent of the owner of the encroached-upon property, space or above-ground electric utility lines.

3108.3 Construction. Towers shall be constructed of approved corrosion-resistant noncombustible material. The minimum type of construction of isolated radio towers not more than 100 feet (30 480 mm) in height shall be Type IIB.

3108.4 Loads. Towers shall be designed to resist wind loads in accordance with TIA/EIA-222. Consideration shall be given to conditions involving wind load on ice-covered sections in localities subject to sustained freezing temperatures.

3108.4.1 Dead Load. Towers shall be designed for the dead load plus the ice load in regions where ice formation occurs.

3108.4.2 Wind Load. Adequate foundations and anchorage shall be provided to resist two times the calculated wind load.

3108.5 Grounding. Towers shall be permanently and effectively grounded ***per the requirements of 527 CMR 12.00: the Massachusetts Electrical Code.***

780 CMR 3109.0 SWIMMING POOL ENCLOSURES AND SAFETY DEVICES

3109.1 General. Refer to Appendix 780 CMR 120.M.

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