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527 CMR 12.00: 1996 MASSACHUSETTS ELECTRICAL CODE (AMENDMENTS)

The 1996 Massachusetts Electrical Code (527 CMR 12.00) of the Board of

Fire Prevention Regulations shall be the 1996 National Electrical Code

modified as follows:

Delete pages 70-1 through 70-2 and pages 70-10 through 70-20 and

substitute the following:

Rule 1. All installations, repairs and maintenance of electrical wiring and electrical fixtures used for light, power, signaling and communications purposes in buildings and structures subject to the provisions of M.G.L. c. 143, shall be reasonably safe to persons and property.

Rule 2. Conformity of installations, repairs, and maintenance of electrical wiring and electrical fixtures used for light, heat, ower, signaling and communications with regulations set forth in the Code, which is hereby filed with the Secretary of the Commonwealth, shall be considered complying with these requirements.

Rule 3. Additions or modifications to an existing installation shall be made in accordance with this Code without bringing the remaining part of the installation into compliance with the requirements of this Code. The installation shall not create a violation of this Code, nor shall it increase the magnitude of an existing violation.

Rule 4. Where an actual hazard exists, the owner of the property shall be notified in writing by the authority enforcing this Code.

(See M.G.L. c. 166, 32 and 33, for enforcement authority.)

Rule 5. References are made in this Code to other standards. Those standards, where duly adopted by law or regulation, may be enforced by the appropriate official. They are not considered part of this code and they are not enforceable under M.G.L. c. 143 3L.

Rule 6. The approving authority may be guided in his approval of specific items of equipment and materials contemplated by the Code, by proof that such equipment and materials have been tested and conform to suitable recognized industry standards.

Rule 7. 527 CMR 12.00 shall be effective on all installations for which a permit has been granted subsequent to December 31, 1995.

Rule 8. In accordance with M.G.L. c. 143, 3L, permit application form to provide notice of installation of wiring shall be uniform throughout the Commonwealth, and shall be filed on the prescribed form.

Rule 9. Installations covered by 527 CMR 12.00 shall also comply with M.G.L. c. 141.

Rule 10. Electrical installations shall not be concealed or covered from view until inspected by the inspector of wires within and not more than 24 hours for exterior excavations, nor more than 72 hours for interior installations after proper notice to the inspector, Saturdays, Sundays and holidays excluded.

527-90-4. Revise the first two paragraphs to read as follows:

90-4. Enforcement. This Code shall be used by the authority enforcing the Code and exercising legal jurisdiction over electrical nstallations. The authority having jurisdiction of enforcement of the Code shall accept listed and labeled equipment or materials where used or installed in accordance with instructions included with the listing or labeling. The authority shall have the responsibility for deciding upon the approval of unlisted or unlabeled equipment and materials, and for granting the special permission contemplated in a number of the rules.

The authority having jurisdiction may waive specific requirements in this Code only in those sections where it is specifically so stated or contemplated and only where it is assured that equivalent objectives of maintaining effective safety can be achieved.

527-90-6. Revise to read as follows:

90-6. Appeals. To promote uniformity of interpretation and application of the provisions of this Code, appeal procedures have been established in accordance with 527 CMR 50.09. The Board of Fire Prevention Regulations shall, upon the request of the Board of Electricians' Appeals, render advisory interpretations to the Board of Electricians' Appeals.

It is customary to revise this Code periodically to conform with developments in the art and the result of experience, and the current edition of the Code shall always be used.

527-90-10. Add new section 90-10 to read:

90-10. References to Commonwealth of Massachusetts Codes, Regulations, and Laws. References are included in Appendix A for Building Codes, Elevator Regulations, Division of Industrial Safety, Architectural Regulations, Permit Applications, and Massachusetts General Laws. See Appendix A.

527-110-14(a). Exception. Revise to read as follows:

Exception: Connection by means of wire binding screws or studs and nuts having upturned lugs or equivalent shall be permitted for No. 10 or smaller conductors. Where stranded conductors are terminated on and not looped through such terminals, the terminals shall be identified for such use, or the strands shall be made solid.

527-110-16(a). In Table 110-16(a), revise Exception No. 2 to read as follows:

Exception No. 2: By special permission, smaller spaces may be permitted (1) where it is judged that the particular arrangement of the installation will provide adequate accessibility; or (2) where all uninsulated parts are at a voltage no greater than 30 volts RMS, 42 volts peak, or 60 volts dc.

527-200-6(d). Revise Section 200-6(d) to read as follows:

(d) Grounded Conductors of Different Systems. Where conductors of different systems are installed in the same raceway, box, auxiliary gutter, or other types of enclosures, each grounded conductor shall have an outer covering similar to 200-6(a) or (b),, and shall be identified by system. Where the identification is by color, white shall be used on systems not exceeding 150 volts to ground, and gray shall be used for systems exceeding 150 volts to ground. Where additional systems are present, each other system conductor, if required, shall have an outer covering of white with an identifiable colored stripe (not green) running along the insulation, or other means of identification as allowed by 200-6(a) or (b).

527-210-5(a). Revise Section 210-5(a) and add a new Exception No. 3 to read as follows:

(a) Grounded Conductor. The grounded conductor of a branch circuit shall be identified by a continuous white or natural gray color. Where more than one voltage system is present in the building, white shall be on used on systems not exceeding 150 volts to ground, and gray shall be used for systems exceeding 150 volts to ground. Where additional systems are present, each other system grounded conductor, if required, shall have an outer covering of white with an identifiable colored stripe (not green) running along the insulation, or other and different means of identification.

(Exception No. 1 and Exception No. 2 unchanged)

Exception No. 3: Grounded conductors in multiconductor cables, where only one voltage system is present, or where identified in accordance with 210-5(a) at every splice and termination, shall be permitted to be identified by a continuous white or natural gray color.

527-210-7(d). Exception. Revise the exception to read as follows:

Exception: Where a grounding means does not exist within the receptacle enclosure, a nongrounding type of receptacle shall be used.

527-210-7(d)(3)c. Delete this paragraph.

527-210-8(a)(1). Add the following exception and fine print note:

Exception: One receptacle located within dedicated space for each laundry appliance which in normal use is not easily moved from one place to another.

(FPN): See definition of receptacle in Article 100.

527-210-8(a)(3). Designate the existing exception as Exception No. 1 and add a second exception as follows:

Exception No. 2: Ground-fault circuit-interrupter protection for personnel shall not be required for a 125-volt, 15-or 20-ampere outdoor receptacle where the sole purpose of the receptacle is for a wheelchair lift and the receptacle is a NEMA L5-15R or 20R receptacle and is in addition to the receptacle(s) required by Section 210-52(e) and is in accordance with the provisions of Section 410-57.

527-210-8(a)(5) Exception No. 3. Insert a new Exception No. 3 as follows:

Exception No. 3: A receptacle supplying a permanently installed fire alarm or burglar alarm system.

527-210-52(a). Revise the final paragraph to read as follows:

The receptacles required by this section shall be in addition to any receptacle that is part of any lighting fixture or appliance, or that is located within cabinets or cupboards, or that is controlled by a wall switch in accordance with Section 210-70(a), or that is located over 5 1/2 feet 1.68m) above the floor.

527-210-52(c)(5) and Exception. Revise to read as follows:

(5) Receptacle Outlet Location. Receptacle outlets shall be located above but not more than 18 inches (458 mm) above a counter top. Receptacle outlets shall not be installed in a face-up position in the

work surfaces or counter tops. Receptacle outlets rendered not readily accessible by appliances fastened in place or appliances occupying dedicated space shall not be considered as these required outlets.

Exception: Receptacle outlets shall be permitted to be installed not more than 12 inches (305 mm) below island and peninsular counter tops, and not more than 12 inches (305 mm) below all counter tops in construction for the physically impaired. Receptacles mounted below the counter top in accordance with this exception shall not be located where the counter top extends more than 6 inches (153 mm) beyond its support base.

527-210-60. Delete the exception and revise to read as follows:

210-60. Guest Rooms. The total number of receptacle outlets in guest rooms of hotels, motels, and similar occupancies shall not be less than the minimum number that would comply with the provisions of Section 210-52. The receptacle outlets shall be permitted to be located as convenient for the permanent fixture layout. At least two receptacle outlets shall be readily accessible.

527-210-70. Revise to read as follows:

210-70. Lighting Outlets Required. Lighting outlets shall be installed where specified in 210-70(a) through (d).

(a) Dwelling Unit(s).

(1) Rooms and Garages. At least one wall switch-controlled lighting

outlet shall be installed in every habitable room; in bathrooms, attached garages, and detached garages with electric power.

Exception No. 1: In habitable rooms, other than kitchens or bathrooms, one or more receptacles controlled by a wall switch shall be permitted in lieu of lighting outlets.

Exception No. 2: Lighting outlets shall be permitted to be controlled by occupancy sensors that are (1) in addition to wallswitches, or (2) located at a customary wall switch location and equipped with a manual override that will allow the sensor to function as a wall switch.

(2) Stairs, Halls, Entrances and Exits. At least one wall switch-controlled lighting outlet shall be installed in hallways, stairways, and at outdoor entrances or exits. For interior stairways connecting finished areas or areas with a second exit, where the difference between floor levels is six steps or more, there shall be a wall switch at each floor level to control that outlet. A vehicle door in a garage is not considered as an outdoor entrance or exit.

Exception: Remote, central, or automatic control of lighting shall be permitted.

(3) Attics, Utility Rooms, Basements and Underfloor Spaces. For attics, underfloor spaces, utility rooms and basements, at least one lighting outlet containing a switch or controlled by a wall switch shall be installed where these spaces are used for storage or contain equipment requiring servicing. At least one point of control shall be

the usual point of entry to these spaces. The lighting outlet shall be provided at or near the equipment requiring servicing.

(b) Guest Rooms. At least one wall switch-controlled lighting outlet or switch-controlled receptacle shall be installed inguest rooms in hotels, motels, or similar occupancies.

(c) Other Locations. For attics and underfloor spaces containing equipment requiring servicing such as heating, air conditioning, and refrigeration equipment at least one wall switch-controlled lighting outlet shall be installed in such spaces. The wall switch shall be located at the usual point of entry to the attic or underfloor space.
A lighting outlet containing a switch or controlled by a wall switch shall be provided at or near the equipment requiring servicing.

(d) All Occupancies. The operation of a single ground-fault circuit-interrupter protective device that also protects receptacle outlet(s) shall not de-energize all lighting outlets in a given area.

527-220-3(b). Revise the listed items in Table 220-3(b) as follows:

Type of Occupancy	Unit Load per Sq. Ft. (Volt-Amperes)
Banks	2 1/2<**> (reduced from 3 1/2)
Garages	1/4 (reduced from 1/2)
Office Buildings	3<**> (reduced from 3 1/2)

Warehouses (storage) 1/2 (increased from 1/4)

527-220-3(c)(5). Delete this paragraph.

527-220-12. Revise to read as follows:

220-12. Show Window and Track Lighting. For show window lighting, a load of not less than 200 volt-amperes shall be included for each linear foot (305 mm) of show window, measured horizontally along its base. For track lighting, an additional load of 150 volt-amperes shall be included for every 2 feet (610 mm) of track installed, where required by the provisions of Section 410-102.

Table 220-36. Revise the body of the table to read as follows:

CONNECTED LOAD	ALL ELECTRIC	NOT ALL ELECTRIC
0 - 200 kVA	80%	100%
Next 125 kVA	10%	50%
Next 475 kVA	50%	45%
All over 800 kVA	50%	20%

Note: Add all electrical loads, including both heating and cooling loads, to compute the total connected load.

527-230-32. Add a third sentence as follows:

Service laterals that are not encased in concrete and that are buried 18 inches (457 mm) or more below grade shall have their location identified by a warning ribbon placed in the trench at least 12 inches

305 mm) above the underground installation.

527-230-40. Amend Exception No. 1 to read:

Exception No. 1: By special permission, where there is no available space for service equipment accessible to all the occupants, buildings with more than one occupancy shall be permitted to have one set of service entrance conductors run to each occupancy or to a group of occupancies.

527-230-50(a). Revise Section 230-50(a) as follows:

(a) Service-entrance cables. Service-entrance cables, where judged subject to physical damage, such as where installed in exposed places near some sidewalks, walkways, driveways, or wherever subject to contact with awnings, shutters, swinging signs, or similar objects, shall be protected in any of the following ways:

(1) by rigid metal conduit;

(2) by intermediate metal conduit;

(3) by rigid nonmetallic conduit suitable for the location;

(4) by electrical metallic tubing;

(5) by other approved means.

527-230-70. Add a fine print note as follows:

(FPN): See Section 380-8(a) for mounting height.

527-230-70(a). Revise Section 230-70(a) to read as follows:

(a) Location. The service disconnecting means shall be installed at a readily accessible location either outside and attached to or

immediately adjacent to the building or structure served, or inside nearest the point of entrance of the service conductors.

527-230-72(c). Add a second exception as follows:

Exception No. 2: In a multiple occupancy building where each occupant has grouped, readily accessible means to disconnect all ungrounded conductors within that occupancy with no more than six motions of the hand, the service disconnecting means shall be permitted to be accessible to authorized management personnel only.

527-230-205(a). Revise to read as follows:

(a) Location. The service disconnecting means shall be located in accordance with Section 230-70.

Exception No. 1: Where under single management, the service disconnecting means shall be permitted to be located in a separate building or structure on the same premises. In such case, the service disconnecting means shall be capable of being electrically opened by a readily accessible control device located as near as practicable to where the feeder conductors enter the building served. The control device shall be permanently marked to identify its function and shall provide visual indication of the "on" or "off" status of the remote service disconnect.

Exception No. 2: Where the service equipment is not in a vault or metal-enclosed switchgear, the overcurrent protection and disconnecting means shall be either of the following:

a. An air load-interrupter switch or other switch capable of interrupting the rated circuit load fuses on a pole or elevated

structure outside the building, provided the switch is operable by persons using the building.

b. An automatic-trip circuit breaker of suitable rating and interrupting capacity. The circuit breaker shall be located outside the building as near as practicable to where the feeder conductors enter the building. The location shall be permitted on a pole, roof, foundation, or other structure.

527-240-24(b). Add a third exception as follows:

Exception No. 3: In a multiple occupancy building where each occupant has grouped, readily accessible means to disconnect all ungrounded conductors within that occupancy with no more than six motions of the hand, the overcurrent devices protecting the source of supply to that occupancy shall be permitted to be accessible to authorized management personnel only.

527-250-24(a). Revise Exception No. 2 to read as follows:

Exception No. 2: A grounded circuit conductor connection to the grounding electrode shall not be required at a separate building or structure if an equipment grounding conductor is run with the circuit conductors for grounding any noncurrent-carrying metal equipment, interior metal piping systems, and building or structural metal frames, and the equipment grounding conductor is bonded at a separate building or structure disconnecting means to existing grounding electrodes described in Part H. Where there are no existing electrodes, a grounding electrode meeting the requirements of Part H

shall be installed where more than one branch circuit originates at the building or structure. Where livestock is housed, that portion of the equipment grounding conductor run underground to the disconnecting means shall be insulated or covered copper.

527-250-44. Revise the final reference to (f) and add subsection (f) as follows:

(f) Metal Framing Members. Where nonmetallic sheathed cables are used with nonmetallic boxes in metal framing, the metal framing sections likely to become energized shall be bonded to the equipment grounding conductor for the circuit from which they are likely to become energized.

527-250-50(a) and (b) Exception. Revise Section 250-50(a) and (b) Exception to read as follows:

Exception for 250-52(a) and (b): For replacement of nongrounding-type receptacles with grounding-type receptacles and for branch circuit extensions only in existing installations that do not have an equipment grounding conductor in the branch circuit, the grounding conductor of a grounding-type receptacle outlet shall be permitted to be grounded to a water pipe that is bonded in accordance with Section 250-80(a). A warning sign shall be placed at the principal water shut-off for the building worded as follows: "WARNING. INTERIOR PIPING USED FOR GROUNDING. CONTINUITY MUST BE MAINTAINED."

527-250-80(a). Revise the second paragraph to read as follows:

The nearest available point on the interior water piping system shall be bonded to the source or disconnecting means enclosure, the grounded conductor, the grounding electrode conductor where of sufficient size, or to the one or more grounding electrode conductors of a separately derived system. The bonding conductor shall be sized in accordance with Section 250-94 and installed in accordance with Sections 250-92(a) and (b). The points of attachment of the bonding jumper shall be accessible.

527-250-81(c). Add a fine print note as follows:

(FPN): These electrodes, where available due to the footings not yet having been poured, are usually far lower in impedancethan made electrodes.

527-300-4(b)(1). Revise to read as follows:

(1) In both exposed and concealed locations, where nonmetallic sheathed cables pass through either factory or field punched, cut or drilled holes in metal members, which may contain holes of varying configurations, all edges of factory prepunched or field cut holes shall be knurled or shall have smooth rounded edges on both sides, so as not to damage cables during installation.

All field punched or factory prepunched holes not knurled shall contain identifying grommets or bushings securely fastened in the openings, which shall encompass the total perimeter of the opening. Grommets or bushings shall be installed prior to installation of cables.

527-300-5(a). Add a fine print note to this subsection as follows:

(FPN): Cables suitable for direct burial are often sleeved in various raceways for design reasons. If such cable is installed with sufficient cover for direct burial, then the characteristics of that raceway need not be evaluated. Other rules of this Code that apply to raceways generally may apply. See Section 300-5(h).

527-300-11(a). Revise to read as follows:

(a) Secured in Place. Raceways, cable assemblies, boxes, cabinets, and fittings shall be securely fastened in place. Support wires that do not provide secure support shall not be permitted as the sole support.

(1) Fire-Rated Assemblies. Wiring located above the suspended elements of a fire-rated floor/ceiling or roof/ceiling assembly shall not be secured to, or supported by, the ceiling assembly, including the support wires. An independent means of secure support shall be provided.

Exception: The ceiling system shall be permitted to support wiring and equipment that have been tested as part of the fire-rated assembly.

(2) Nonfire-Rated Assemblies. Branch-circuit wiring associated with equipment that is located within, supported by, or secured to a suspended ceiling that is not an integral portion of a fire-rated

floor/ceiling or roof/ceiling assembly shall be permitted to be supported by the ceiling support wires.

527-300-14. Revise to read as follows:

300-14. Length of Free Conductors at outlets, Junctions, and Switch Points. At least six inches (152 mm) of free conductor, measured from the point in the box where it emerges from its raceway or cable sheath, shall be left at each outlet, junction, and switch point for splices or the connection of fixtures or devices. Where the opening to an outlet, junction, or switch point is less than six inches (152 mm) in any dimension, each conductor shall be long enough to extend at least three inches (76.2 mm) outside the opening.

527-300-17. Add a second paragraph to Section 300-17 as follows:

Where different raceway wiring methods are joined together without a pull point at the transition, there shall not be more than the equivalent of four quarter bends (360 degrees total) between pull points, e.g., conduit bodies and boxes.

527-305-4(c). Revise the exception to read as follows:

Exception: Temporary wiring installed for the purposes specified in Section 305-3(b) or 305-3(c) shall be permitted to be run as open conductors. Where the wiring is installed in accordance with Section 305-3(b), the voltage to ground shall not exceed 150 volts, the wiring shall not be subject to physical damage, and the conductors shall be supported on insulators at intervals of not more than ten feet (3.05

m), or for festoon lighting the conductors shall be so arranged that excessive strain is not transmitted tothe lamp holders.

527-305-6(b). Revise to read as follows:

(b) Assured Equipment Grounding Conductor Program. Where the conditions of maintenance and supervision ensure that only qualified personnel are involved, an assured equipment grounding conductor program shall be permitted. A written procedure shall be continuously enforced at the site by one or more designated persons to assure that equipment grounding conductors for all cord sets, receptacles that are not part of the permanent wiring of a building or structure, and equipment connected by cord and plug are installed and maintained in accordance with the applicable requirements of Section 210-7(c), 250-45, 250-59, and 305-4(d).

527-310-12(a). Add a fourth paragraph and exception to Section 310-12(a) as follows:

Grounded system conductors of electric light and power circuits shall be identified by system where more than one voltage system is present in the building. The identification shall be visible at every splice and termination in the wiring system. Where the identification is by color, white shall be used on systems not exceeding 150 volts to ground, and gray shall be used on systems exceeding 150 volts to ground. Where additional systems are present, each other system grounded conductor, if required, shall have an outer covering of white

with an identifiable colored stripe (not green) running along the insulation, or other and different means of identification as allowed by this section of the Code. The means of identification, where other than by color, shall be permanently posted at each switchboard and panel board in the building.

Exception: Identification by voltage system shall be permitted to be omitted on grounded conductors in multiconductor cables where only one system voltage is present at the point of splice or termination.

527-310-12(c). Add a second paragraph, exception, and fine print note as follows:

Ungrounded system conductors of electric light and power circuits shall be identified by phase or line, and by system where more than one voltage system is present in the building. The identification shall be visible at every splice and termination in the wiring system. The method of identification of each conductor, whether by color coding, marking tape, tagging, or other equally effective means, shall be permanently posted at each switchboard and panel board in the building.

Exception: Identification shall be permitted to be omitted on ungrounded conductors in multiconductor cables where only onevoltage system is present at the point of splice or termination.

(FPN): An example of color coding is:

120/240 volt, single-phase, three-wire: Black, Red 120/208 volt,

three-phase, four-wire: Black, Red, Blue 277/480 volt, three-phase,
four-wire: Brown, Orange, Yellow

527-310-Tables. Revise the table in Note 8(a) to the ampacity Tables
310-16 through 310-19 to read as follows:

Percent of Values in Table 310-16, 310-17, 310-18, and 310-19 as
adjusted for Ambient

Number of Current Carrying Conductors	Temperature if Necessary
4 through 6	80
7 through 24	70
25 through 42	60
43 and above	50

(FPN): Overheating may occur where continuous, fully loaded conductor
diversity is less than 50% and the number of current carrying
conductors exceeds nine. See Section 310-10.

527-310-Tables. Revise Note 8(a) to Tables 310-16 through 310-19 by
adding a sixth exception as follows:

Exception No. 6: Derating factors shall not apply where 30 or fewer
current carrying conductors occupy no more than 20% of the interior
cross sectional area of Underfloor Raceways, Article 354; Cellular
Metal Floor Raceways, Article 356; and Cellular Concrete Floor
Raceways, Article 358.

527-318-6(a). Revise this section to read as follows:

(a) Complete System. Cable trays shall be installed as a complete system between enclosures, or between raceways and enclosures, or between raceways as applicable. Field bends or modifications shall be so made that the electrical continuity of the cable tray system and support for the cables shall be maintained.

Exception No. 1: Where cable trays support cabled wiring methods recognized in Chapter 3 of this Code, the cables shall be permitted to pass from one cable tray to another, or from a cable tray to equipment where the cable is terminated, provided that the cable is supported and protected in accordance with its applicable article. A bonding jumper sized in accordance with Section 250-79 shall connect the two sections of cable tray, or the cable tray and the equipment.

Exception No. 2: Where cable trays support individual conductors, the conductors shall be permitted to pass from one cable tray to another, or from a cable tray to raceways, or to equipment where the cable is terminated, provided the distance between cable trays or between the cable tray and the equipment, does not exceed six feet (1.83 m). The conductors shall be secured to the cable tray(s) at the transition and they shall be protected, by guarding or by location, from physical damage. A bonding jumper sized in accordance with Section 250-79 shall connect the two sections of cable tray, or the cable tray and the raceway or equipment.

527-336-5(1). Designate the existing exception as Exception No. 1 and add a second exception as follows:

Exception No. 2: Type NM, Type NMC, and Type NMS cables shall be permitted to be used in one and two-family dwellings, multi-family dwellings and other structures, provided that where such dwellings or structures exceed three floors above grade the cables shall not be permitted to leave the floor or dwelling unit from which the cables originate.

527-336-9. Revise Section 336-9 to read as follows:

336-9. Through or Parallel to Framing Members. Types NM, NMC, or NMS cable shall comply with Section 300-4 where installedthrough studs, joists, rafters, and similar members. In both exposed and concealed locations, where the cable is installed parallel to framing members, such as joists, rafters, or studs, the cable shall be secured so that the nearest outside surface of the cable is not less than 3/4 inch (19.1 mm) from the nearest edge of the framing member where nails or screws are likely to penetrate. Where this distance cannot be maintained, the cable shall be protected from penetration by nails or screws by a steel plate, sleeve, or equivalent at least 1/16 inch (1.59 mm) thick.

Exception No. 1. For concealed work in finished buildings, or finished panels for prefabricated buildings where such support is impracticable, it shall be permitted to fish the cable between access points.

Exception No. 2: For mobile homes and recreational vehicles.

527-336-18. Revise Section 336-18 as follows (FPN and exceptions unchanged from the NEC):

336-18. Supports. Nonmetallic-sheathed cable shall be secured by staples, cable ties, straps, or similar fittings so designed and installed so as to not damage the cable. Where staples are used for cable sizes smaller than three No. 8 conductors, they shall be of the insulated type, or listed noninsulated staples driven by staple guns shall be permitted. Cable shall be secured in place at intervals not exceeding 4 1/2 feet (1.37 m) and within 12 inches (305 mm) from every cabinet, box, or fitting. For other than within 12 inches (305 mm) of a cable termination at a cabinet, box, or fitting, cables passing through successive holes in adjacent framing members no more than 24 inches (610 mm) apart shall be considered to be secured.

527-336-30(b) and Exception. Delete the exception and revise the last paragraph to read as follows:

Types NM, NMC, and NMS cable shall have conductors rated at 90øC (194øF). Where installed in thermal insulation, the ampacity of conductors shall be that of 60øC (140øF) conductors.

527-338-4. Identify the existing fine print note as (FPN No. 1) and add a second fine print note as follows:

(FPN No. 2): This section includes service entrance cables with a round configuration commonly known as SER cable. The interior installation of this cable is governed by the same rules as apply to nonmetallic sheathed cable.

527-347-3(g). Add a new (g) to read as follows:

(g) Where used in buildings more than 70 feet (21.3 m) above mean grade, unless encased in not less than two inches (50.8 mm) of concrete or concealed behind a thermal barrier as described in Section 331-3(2) and Section 331-3(5).

527-347-9. Revise to read as follows:

347-9. Expansion Joints. Expansion joints in rigid nonmetallic conduit shall be provided to compensate for thermal expansion and contraction where the length change in a straight run at a securely mounted item such as a box, cabinet, elbow, or other conduit termination will exceed 1/8 inch (3.18 mm), or exceed 1/4 inch (6.36 mm) in a straight run between two such items.

527-364-6. Revise as follows:

364-6. Installation Requirements.

(a) Through Walls and Floors. It shall be permissible to extend unbroken lengths of busways through dry walls. It shall be permissible to extend busways vertically through dry floors if totally enclosed (unventilated) where passing through and for a minimum distance of six feet (1.83 m) above the floor to provide adequate protection from physical damage.

(FPN): See Section 300-21, Spread of Fire or Products of Combustion.

(b) Protection from Liquids, Moisture and Other Contaminants. Busway shall be protected from liquids, moisture, and other contaminants or corrosion which may result in electrical failure.

(1) During Construction. Indoor busways shall be protected from moisture during storage as well as during or after installation. Special consideration shall be given to riser busways to protect them from moisture from uncompleted roofs, walls, etc. Outdoor busways shall be treated the same as indoor busways until after busway is properly installed, as it is not weather resistant until completely and properly installed. Busway shall have the exposed ends of uncompleted runs protected to prevent accidental contamination during the construction period.

(2) Protection from Snow Buildup. Outdoor busway shall be mounted in such a manner as to prevent snow or ice buildup forcing water into the busway through weep holes. This may require that consideration be given to horizontal snow or ice buildup or drifting of snow.

(3) Curbing. Four inch (102 mm) minimum curbs shall be installed around all floor openings for riser busways to prevent floor level liquids from entering the opening.

(4) Protection from Falling Liquids. Slant shields, drip pans, or other approved protective shields shall be installed toprotect indoor busway in locations where there is a possibility of water spillage or dripping condensate from roof drains, water pipes, and the like.

(5) Tests Prior to Energizing. Busway system joint tightness and joint resistance, phasing, and insulation resistance shall be verified

by test prior to energizing the system for the first time. A written record of these tests shall be made available to the authority having jurisdiction.

527-364-8(b)(2). Revise the rule and the exception to read as follows:

(2) The length of the cord or cable from a busway plug-in device to a suitable tension take-up support device shall not exceed eight feet (2.44 m).

Exception: By special permission in industrial establishments only, where the conditions of maintenance and supervision ensure that only qualified persons will service the installation, bus drop cable shall be permitted to extend horizontally greater lengths than eight feet (2.44 m) where the longer length is essential for periodic repositioning of equipment. The bus drop cable shall be supported at intervals not to exceed 8 feet (2.44 m), and suitable tension take-up devices shall be installed at the end of the horizontal run to relieve strain in both the horizontal and vertical directions.

527-370-23(b). Revise the second sentence to read as follows:

Enclosures not over 100 cubic inches (1640 cm2) containing branch-circuit wiring associated with equipment that is located within, supported by, or secured to a suspended ceiling shall be permitted to be supported by the support wires where the suspended ceiling is not an integral part of a fire-rated floor or roof/ceiling assembly.

527-370-27(c). Revise to read as follows:

(c) Boxes at Fan Outlets. Outlet boxes used to support a ceiling (paddle) fan shall be listed for the application, unless the fan is supported directly by the building structure in accordance with Section 422-18. In addition, ceiling outlet boxes in habitable rooms, stairways, foyers, and bathroom areas where such fans are not excluded by Section 410-4(d), that are not used to support fans, shall be considered as likely to support a fan. These boxes shall be listed as being suitable for the sole support of a fan not exceeding 35 pounds (15.88 kg) in weight, with or without accessories, where all of the following conditions are met:

(1) Interior Use. The box is located in the interior of a dwelling unit.

(2) Distance from Walls. The box is located more than three feet (914 mm) from any wall.

(3) Height. The box is not less than 7 1/2 feet (2.29 m) above the floor.

(4) Circuits. The box is supplied by a general-purpose branch circuit.

527-400-5. Revise the table following the first paragraph to read as follows:

Number of Current Carrying Conductors	Percent of Values in Tables 400-5(a) and

400-5(b)

4 through 8	80
7 through 24	70
25 through 42	60
43 and above	50

527-400-8. Revise and designate the existing exception as Exception No. 1 and add a second exception as follows:

Exception No. 1: Flexible cord and cable shall be permitted to have one connection to the building surface for a suitable tension take-up device. Length of cord or cable from the supply termination to the take-up device shall be limited to eight feet (2.44 m).

Exception No. 2: Flexible cord shall be permitted to be installed in raceways where its calculated ampacity has been further derated by a factor of 0.8, or where its ampacity has been calculated under Section 310-15(b).

527-410-4(d). Revise to read as follows:

(d) Above Bathtubs. No parts of cord-connected fixtures, hanging fixtures, suspended ceiling (paddle) fans, lighting track, or pendants shall be located within a zone measured three feet (914 mm) horizontally and eight-feet (2.44 m) vertically from the top of the bathtub rim. This zone is all encompassing and includes the zone directly over the tub.

527-410-16(c). Add a second paragraph as follows:

In addition to, or in lieu of, the mechanical fastening means,

electric fixtures containing ballasts, shall be supported directly to the building structure by wire, chain, or threaded rod of sufficient strength to carry the fixture. Fluorescent fixtures shall be supported at each end of a diagonal axis of the fixture.

527-410-57(b) Exception. Revise to read as follows:

Exception: An enclosure with a self-closing cover that is identified for use in wet locations, but that is not weatherproofwhen an attachment plug cap is inserted, shall be permitted where a receptacle is installed in a wet location for use with portabletools or other portable equipment normally connected to the outlet only when attended.

527-422-18. Add a paragraph after 422-18(b) to read as follows:

In addition, ceiling fans that utilize plastic swivel mounts must be supported by a #12 jack chain or other equivalent means.

527-430-6(a). Revise Section 430-6(a) by adding a third exception, as follows:

Exception No. 3: Where a motor operated applicance is rated in both horsepower and amperes, the ampere rating on the name plate shall be permitted to determine the circuit characteristics under this section. Where applicable, this rating shall not be less than the current marked on the motor name plate.

527-430-31. Revise the first fine print note to read as follows:

(FPN): For protection of fire pump supply conductors, see Article 695.

527-430-94. Revise the first sentence of this section to read as follows:

Motor control centers shall be provided with overcurrent protection in accordance with Part E of this article.

527-430-97. Add a new subsection (f) as follows:

(f) Ratings. The rating of the common power bus shall not be less than that required for equivalent feeder conductors in Section 430-24.

527-511-1. Add a fine print note as follows:

(FPN): The scope of this article is intended to include commercial repair and storage facilities for motor boats.

527-511-10. Revise and add an exception as follows:

511-10. Ground-Fault Circuit-Interrupter for Personnel. All 125-volt single phase 15- and 20-ampere receptacles installed in areas where electrical diagnostic equipment, electrical hand tools, portable lighting equipment, or portable appliances are to be used shall have ground-fault circuit-interrupter protection for personnel.

Exception: Where an individual branch circuit supplies a single receptacle that is located and identified for the specific use of computerized diagnostic equipment, it shall be permitted to omit the ground-fault circuit-interrupter protection for personnel.

527-517-13(a) Exception No. 3. Revise the exception to read as follows:

Exception No. 3: Lighting fixtures more than 7 1/2 feet (2.29 m) above the floor in patient care areas shall be permitted to utilize any of the types of equipment grounding conductors included in Section 250-91(b), and any of the wiring methods otherwise permitted for the location by Chapter 3 of this Code.

527-517-13(b). Add an exception as follows:

Exception: Wiring that is used to supply fixtures more than 7 1/2 feet (2.29 m) above the floor in a patient care area shall be permitted to utilize any of the wiring methods recognized in Chapter 3 of this Code provided all of the following conditions are met:

a. No portion of the wiring installed in accordance with this exception and located at or below the 7 1/2 foot (2.29 m) level is exposed;

b. No outlet(s) supplied by such wiring is (are) located at or below the 7 1/2 foot (2.29m) level in any patient care area;and

c. No control point(s) supplied by such wiring is (are) located in any patient vicinity.

527-517-30(b)(5). Revise to read as follows:

(5) Other Loads. Loads served by the generating equipment not specifically named in Sections 517-32, 517-33, and 517-34 shall be served by their own transfer switches such that these loads:

a. Shall not be transferred if the transfer will overload the generating equipment; and

b. Shall be automatically shed upon generating equipment overloading.

527-517-45(b)(3). Add the following second paragraph:

For the purpose of this section, the term "electrical life support equipment" includes electric hemodialysis and other equipment that, if inadvertently disconnected, could endanger the patient's life.

527-518-2. Revise the second paragraph to read:

Occupancy of any room or space for assembly purposes by less than 100 persons shall be permitted to be wired by wiring methods of Chapter 3 and shall be subject to the applicable provisions thereof.

527-550-2. Add a fine print note as follows:

(FPN): Manufactured housing that is not designed to be trans-portable on running gear, and that is not produced under regulations that expressly cover such housing, is classified under Article 545.

527-645-5(d)(3). Revise Section 645-5(d)(3) by adding the following sentence at the end:

The ventilation system shall be so arranged, with approved smoke detection devices, that upon the sensation of fire or products of combustion in the underfloor space the circulation of air will cease.

527-645-10. Insert the following sentence at the end of the paragraph:

Where a push button is used as a means to disconnect power, except for listed assemblies, pushing the button in shall disconnect the power.

527-680-7. Add a fine print note to Section 680-7 as follows:

(FPN): Unlisted swimming pool pump motors for permanently installed pools may be supplied with undersized cords, cords of excessive length, cord connectors on outdoor applications that are unsuitable for wet locations, and other violations of this Code. The fact that a manufacturer may supply them in this form is not intended to excuse compliance with the rules of this Code.

Listed storable swimming pool pump motors with long factory-supplied cords are prominently marked as such and are not covered in Part B of Article 680. They are not intended for use with permanently installed pools and they need not be bonded where used as intended. See Section 680-3.

527-680-10. In Exception No. 2, first sentence, delete "a nonmetallic raceway system" and substitute "rigid nonmetallic conduit."

527-680-12. Revise this section to read as follows:

Disconnecting Means. One or more disconnecting means shall be installed for motor-operated pool, spa, or hot tub heating equipment. The disconnecting means shall be located within sight of the equipment supplied, and at least five feet (1.52 m) horizontally from the inside walls of the pool, spa, or hot tub.

527-680-20(b)(1). Revise the second paragraph to read as follows:

Conduit shall extend from the forming shell to a suitable junction box or other enclosure located as provided in Section 680-21. Conduit shall be rigid metal, intermediate metal, or rigid nonmetallic conduit.

527-680-22(a). Add the following as a second exception to Section 680-22(a), renumbering the remaining two accordingly.

Exception No. 2: Where reinforcing steel is effectively insulated by an encapsulating non-conductive compound at the time of manufacture, it shall be permitted to be unbonded provided No. 8 or larger bare solid copper conductors are run in the pour around the perimeter of the pool below the normal water line, and through the pour at other locations such that no point in the pour, measured through the pour, is more than 15 feet (4.58 m) from a bonding conductor.

527-680-22(a) Exception No. 4. Add a second paragraph as follows:

Where a double-insulated water pump motor is installed under the provisions of this exception, a solid No. 8 copper conductor that is of sufficient length to make a bonding connection to a replacement motor shall be extended from the bonding grid to an accessible point in the motor vicinity. Where there is no connection between the swimming pool bonding grid and the equipment grounding system for the premises, this bonding conductor shall be connected to the equipment

grounding connection of the motor circuit.

527-680-72. Add a new Section 680-72 and exception thereto as follows:

680-72. Bonding. All metal surfaces, metal conduit, metal piping and electric equipment, within five feet (1.52 m) measured in any direction, of the inside walls of the hydro-massage bathtub and not separated by a permanent barrier shall be bonded together and to the pump motor in accordance with the provisions of Section 680-41(e).

Exception: Small conductive surfaces not likely to become energized, such as air and water jets and drain fittings where not connected to metallic piping, towel bars, mirror frames, and similar nonelectric equipment need not be bonded.

527-700-9(c). Delete

527-700-10. Add new Section 700-10 to read:

527-700-10. Fire Separation: Emergency system feeders, wiring to elevator machine rooms including the cab lighting disconnecting means, and wiring to fire pumps shall comply with (a) and (b) below:

(a) All required emergency systems generation and distribution equipment shall be located in 2-hour fire resistive rated rooms, closets or shafts. Equipment, conduit, piping, or ductwork alien to the emergency system shall not be located within these rooms, closets, or shafts.

(b) All portions of emergency system feeders located outside of rooms, closets, or shafts required by Section 700-10(a) shall be enclosed within 2 hour fire resistive rated enclosures or be part of an assembly that has a 2 hour fire resistive rating.

(FPN): Details of some such electrical circuit protective assemblies may be found in directories of building materials published by qualified testing laboratories.

Exception to (a) and (b) above: In buildings or structures less than 70' (21.3 m) in height, or for new emergency feeders or equipment in existing buildings, alternative methods of protection may be accepted by the authority having jurisdiction where it is assured that equivalent objectives can be achieved.

(FPN): Many techniques intended to prevent the deflection of steel members at high temperatures will not materially increase the survival time of circuits in electric raceways.

527-700-12(e). Delete the second sentence of the second paragraph which reads:

"Flexible cord- and plug-connection shall be permitted provided that the cord does not exceed three feet (914 mm) in length."

527-701-11(f). Delete the second sentence of the second paragraph which reads:

"Flexible cord- and plug-connection shall be permitted provided that the cord does not exceed three feet (914 mm) in length."

527-702-6. Revise this section by adding the following paragraph at the end:

Transfer equipment shall be required for all permanently installed standby systems subject to the provisions of this articleand for which an electric-utility supply is either the normal or standby source.

527-710-4(a). In the first paragraph after "in rigid nonmetallic conduit" insert the words: "suitably encased in not less than two inches (50.8 mm) of concrete, or in Schedule 80 rigid nonmetallic conduit with or without concrete encasement except as provided in Section 347-3(g) of this Code."

527-725-23. Add a new Exception No. 4 as follows:

Exception No. 4: Conductors qualifying under the provisions of Section 725-27(c) shall be protected by over current devicesrated or set not over five amperes for No. 20 and larger conductors, and not over three amperes for No. 22 conductors.

527-725-27. Add a new subsection (c) as follows:

(c) Instrumentation Tray Cable, Type ITC. Class 1 control circuits other than those covered in Section 725-8(a) shall be permitted in the form of multiconductor factory-assembled cables containing two or more conductors with insulation rated for 300 volts, cabled with or without grounding conductor(s), and enclosed in a nonmetallic jacket. The cables shall be permitted to be shielded, and a metallic sheath or armor shall be permitted to be applied over the nonmetallic jacket.

(1) Uses Permitted. Type ITC cable shall be permitted to be used only in industrial establishments where the conditions of maintenance and supervision assure that only qualified persons will service the installation. The cable shall only be permitted to be used where provided with additional protection and support as follows:

a. In cable trays.

b. In raceways.

c. In hazardous locations as permitted in Article 501, 502 and 503.

d. As arial cable on a messenger.

e. Direct buried where identified for the use.

f. Under raised floors in control rooms and rack rooms where arranged to prevent damage to the cable.

(2) Uses Not Permitted. Type ITC cable shall not be installed for circuits operating at more than 150 volts nominal, or more than 5.0 amperes. Type ITC cable shall not be installed with power, lighting, or other nonpower limited circuits.

Exception No. 1: Type ITC cable shall be permitted to terminate within enclosures where conductors are permanently and effectively separated from other nonpower limited conductors in accordance with the requirements for the separation of Class 2 and Class 3 circuits from nonpower limited circuits in Section 725-54(a)(1) Exception No. 2. For the purposes of applying this exception only, the insulation

on type ITC cables shall be assumed to be equivalent to Class 3 insulation.

Exception No. 2: Type ITC cable shall be permitted to be installed with power, lighting, or other nonpower limited circuitswhere otherwise permitted for Class 1 circuits by this article, and, in addition, where a smooth metallic sheath, welded and corrugated metallic sheath, or interlocking metallic tape armor is applied over the nonmetallic jacket.

(3) Construction. The insulated conductors of Type ITC cable shall be sizes No. 22 through No. 12. The conductor material shall be copper or thermocouple alloy.

(4) Marking. Type ITC cable shall be marked in accordance with Section 310-11.

(5) Bends. Bends in Type ITC cable shall be made so as to not damage the cable.

527-760-21. Add a second sentence and fine print note as follows:

These circuits shall not be powered through ground-fault circuit-interrupters.

(FPN): See Section 210-8(a)(5) Exception No. 3 for receptacles in dwelling-unit unfinished basements that supply power for fire alarm systems.

527-760-41. Add a second sentence and fine print note as follows:

These circuits shall not be powered through ground-fault circuit-interrupters.

(FPN): See Section 210-8(a)(5) Exception No. 3 for receptacles in dwelling-unit unfinished basements that supply power for fire alarm systems.

APPENDIX A
780 CMR: MASSACHUSETTS STATE BUILDING CODE

High Rise Buildings	602.0 complete
HPM Use Facilities (Hazardous Product Materials)	603.0 complete
Alarm (in all buildings with atrium)	606.2.3
Use Group I-2 Smoke/Heat Detection	610.6 through 610.6.2
Use Group I-3 Remote Release	6-11.5.1 through 611.5.4
Lighting Control (theaters)	613.4
Footlights and Stage Electrical Equipment	615.2.3
Automatic Fire Detection Systems (airport traffic control towers)	616.4
Standby Power, Light, and Emergency Systems (")	616.5
Child Day Care Centers	633.0 complete
Historic Buildings	635.0 complete
Limited Group Residence	636.0 complete
Detoxification Facilities	637.0 complete
Light and Ventilation Required (bathroom, toilet, general)	703.0 through 707.0
Exit Signs and Lights	823.1 through 823.4
Means of Egress Lighting	824.0 complete
Penetrations	901.2
Installation of Ceiling Fixtures (fire resistive rated ceilings)	913.1
Smoke Actuated Closing Devices	916.5.1

Plenums	929.0 complete
Fire Protective Signaling Systems	1017.0 complete
Automatic Fire Detection Systems	1018.0 complete
Smoke Control Systems	1019.0 complete
Supervision (fire suppression systems)	1020.1
Fire Protection Systems	1020.2
Cutting, Knotching, and Boring in Wood Frame Members	1701.3.3.1 through 1701.3.3.3
Electrical Lighting Fixtures	2001.5.4
Grounding of Metal Roofs	2301.5 through 2301.5.1
Power Venters (power exhausters)	2513.0 complete
Elevator, Dumbwaiter and Conveyor Equipment Installation Requirements	Article 26 complete
Illuminated Signs	2914.0 complete
Portable Signs	2915.0 complete
Precautions During Building Operations (lighting)	3017.0 complete

780 CMR: ARTICLE 31 ENERGY CONSERVATION

Recessed Light Fixtures (IC labeled)	3106.4.1 and 3420.2.1
Air Leakage for all Buildings(around wiring; outlet plate gaskets)	3107.4
Heating, Ventilating, and Air-Conditioning Equipment	3111.0 complete
Electrical Power Distribution	3112.0 complete
Lighting Systems	3113.0 complete
Assumed Combined Lighting and Equipment power Densities for Shell Buildings	3114.3.4

Building Design by Systems Analysis	3115.0 complete
Energy Provisions for Existing Buildings	3207.0 complete

780 CMR: ARTICLE 34 ONE AND TWO FAMILY DWELLINGS

Mechanical Ventilation	3401.5.2 through 3401.5.2.1
Fire Protection	3401.14 through 3401.16
Cutting, Knotching, and Boring in Wood Frame Members	3403.2.5
Mechanical Equipment, General	3410.0
Recessed Lighting Fixtures	3420.2.1

524 CMR 15.00 through 35.00 (Elevator Regulations)

Division of Industrial Safety

454 CMR 10.00: Construction Industry Rules and Regulations Part 17,
Tunnels and Shafts, Caissons, Cofferdams, and Compressed Air

10.175 Tunnels and ShaftsSection 12 Electrical Equipment 10.178
Compressed Air Section 11 Electricity

521 CMR: Architectural Access Board

Where switches, locks and controls are provided for public use, they
shall be placed no higher than 48 inches nor lower than 36 inches from
the floor, with the exception of thermostats, intercoms, and fire
alarms which may be centered no higher than 54 inches, and electrical
outlets which may be centered no lower than 18 inches from the floor.

All controls and alarms, including but not limited to intercoms and

electrical distribution panels, in units for the handicapped, shall be located between 36 inches and 54 inches above the floor. Electrical outlets shall be centered no lower than 18 inches above the floor.

All such controls shall be located at least 18 inches from an interior corner.

[EDITORS' NOTE: This Figure Is Electronically Non-Transferrable]

[Replaced, Register No. 781, effective January 1, 1996.]

REGULATORY AUTHORITY

527 CMR 12.00: M.G.L. c. 22, 14; c. 143, 3L; c. 148, 10.

527 CMR 13.00: EXPLOSIVES