NEC 2011 Code Changes

Articles 530.20-551.80

CHANGES FROM 2008 TO 2011 CODE ARE IN RED

Chapter 5 – Special Occupancies

ARTICLE 530 – Motion Picture and Television Studios and Similar Locations

530.20 Grounding (NEC 2008)

Type MC cable, Type MI cable, metal raceways, and all non-current-carrying metal parts of appliances, devices and equipment will be connected to an equipment grounding conductor. This will not apply to pendant and portable lamps, to stage lighting and stage sound equipment, or to other portable and special stage equipment operating at not over 150 volts dc to ground.

530.20 Grounding (NEC 2011)

Type MC cable, Type MI cable, *Type AC cable containing an insulated equipment grounding conductor,* metal raceways, and all non-current-carrying metal parts of appliances, devices and equipment will be connected to an equipment grounding conductor. This will not apply to pendant and portable lamps, to *portable* stage lighting and stage sound equipment, or to other portable and special stage equipment operating at not over 150 volts dc to ground.

530.21 Plugs and Receptacles (NEC 2008)

(A) Rating

Plugs and receptacles will be rated in amperes. The voltage rating of the plugs and receptacles will be no less than the circuit voltage. Plug and receptacle ampere ratings for ac circuits will not be less than the feeder or branch-circuit overcurrrent device ampere rating. Table 210.21(B)(2) will not apply.

530.21 Plugs and Receptacles (NEC 2011)

(A) Rating

Plugs and receptacles, *including cord connectors and flanged surface devices,* will be rated in amperes. The voltage rating of the plugs and receptacles will be no less than the *nominal* circuit voltage. Plug and receptacle ampere ratings for ac circuits will not be less than the feeder or branch-circuit overcurrrent device ampere rating. Table 210.21(B)(2) will not apply.

V. Cellulose Nitrate Film Storage Vaults

530.51 Lamps in Cellulose Nitrate Film Storage Vaults (NEC 2008)

Lamps in cellulose nitrate film storage vaults will be installed in rigid fixtures of the glass-enclosed and gasketed type. Lamps will be controlled by a switch having a pole in each ungrounded conductor. This switch will be located outside of the vault and provided with a pilot light to indicate whether the switch is on or off. This switch will disconnect from all sources of supply all ungrounded conductors termination in any outlet in the vault.

530.51 Lamps in Cellulose Nitrate Film Storage Vaults (NEC 2011)

Lamps in cellulose nitrate film storage vaults will be installed in rigid *luminaires* of the glass-enclosed and gasketed type. Lamps will be controlled by a switch having a pole in each ungrounded conductor. This switch will be located outside of the vault and provided with a pilot light to indicate whether the switch is on or off. This switch will disconnect from all sources of supply all ungrounded conductors termination in any outlet in the vault.

ARTICLE 540 – Motion Picture Projection Rooms

540.11 Location of Associated Electrical Equipment (NEC 2008)

(A) Motor Generator Sets, Transformers, Rectifiers, Rheostats, and Similar Equipment

Motor-generator sets, transformers, rectifiers, rheostats, and similar equipment for the supply or control of current to projection or spotlight equipment will, where nitrate film is used, be located

in a separate room. Where placed in the projection room, they will be located or guarded so that arcs or sparks cannot come in contact with film, and the communicator end or ends of motor generator sets will adhere to one of the conditions in section 540.11(A)(1) through (A)(6).

(2) Separate Rooms or Housings

Be enclosed in separate rooms or housings built of noncombustible material constructed so as to exclude flying or lint, and properly ventilated from a source of clean air.

540.11 Location of Associated Electrical Equipment (NEC 2011)

(A) Motor Generator Sets, Transformers, Rectifiers, Rheostats, and Similar Equipment

Motor-generator sets, transformers, rectifiers, rheostats, and similar equipment for the supply or control of current to projection or spotlight equipment will, where nitrate film is used, be located in a separate room. Where placed in the projection room, they will be located or guarded so that arcs or sparks cannot come in contact with film, and the communicator end or ends of motor generator sets will adhere to one of the conditions in section 540.11(A)(1) through (A)(6).

(2) Separate Rooms or Housings

Be enclosed in separate rooms or housings built of noncombustible material constructed so as to exclude flying or lint *with approved ventilation* from a source of clean air.

ARTICLE 547 – Agricultural Buildings

547.8 Luminaires (NEC 2008)

(C) Exposed to Water

Luminaires exposed to water from condensation, building cleansing water, or solution will be watertight.

547.8 Luminaires (NEC 2011)

(C) Exposed to Water

Luminaires exposed to water from condensation, building cleansing water, or solution will be *listed as suitable for use in wet locations.*

547.9 Electrical Supply to Buildings or Structures from a Distribution Point (NEC 2008)

(A) Site-Isolating Device

(2) Location

The site-isolating device will be pole-mounted and will meet the clearance requirements of section 230.24

(8) Accessibility

Where the site-isolating device is not readily accessible, it will be capable of being remotely operated by an operating handle installed at a readily accessible location. The operating handle of the site-isolating device, when in its highest position, will not be more than 2.0 m abovegrade or a working platform.

(B) Service Disconnection Means and Overcurrent Protection at the Building or Structure

(3) Grounding and Bonding

(1) The equipment grounding conductor is the same size as the largest supply conductor if of the same material, or is adjusted in size according to the equivalent size columns of Table 250.122 if of different materials.

(C) Service Disconnecting Means and Overcurrent Protection at the Distribution Point

Where the service disconnecting means and overcurrent protection for each set of feeder conductors are located at the distribution point, feeders to buildings or structures will meet the requirements of section 250.32 and Article 225, Parts I and II.

(D) Identification

Where a site is supplied by more than one service with any two services located a distance of 150 m or less apart, as measured in a straight line, a permanent plaque or directory will be installed at each of these distribution points denoting the location of each of the other distribution points and the buildings or structures served by each.

547.9 Electrical Supply to Buildings or Structures from a Distribution Point (NEC 2011)

A distribution point will be allowed to supply any building or structure located on the same premises. The overhead electrical supply will adhere to section 547.9(A) and (B), or with section 547.9(C). The underground electrical supply will adhere to section *547.9(C)*.

(A) Site-Isolating Device

(2) Location

The site-isolating device will be pole-mounted and *be no less than the height above grade required by section 230.24 for the conductors it supplies.*

(8) Accessibility

The site-isolating *device will* be capable of being remotely operated by an operating handle installed at a readily accessible location. The operating handle of the site-isolating device, when in its highest position, will not be more than 2.0 m abovegrade or a working platform.

(B) Service Disconnection Means and Overcurrent Protection at the Building or Structure

(3) Grounding and Bonding

(1) The equipment grounding conductor is *no smaller than* the largest supply conductor if of the same material, or is adjusted in size according to the equivalent size columns of Table 250.122 if of different materials.

(C) Service Disconnecting Means and Overcurrent Protection at the Distribution Point

Where the service disconnecting means and overcurrent protection for each set of feeders *or branch circuit's* conductors are located at the distribution point, *the* feeders *or branch circuits* to *buildings* or *structures* will *adhere to* the *provisions* of section 250.32 and Article 225, Parts I and II.

(D) Identification

Where a site is supplied by more than one *distribution point*, a permanent plaque or directory will be installed at each of these distribution points denoting the location of each of the other distribution points and the buildings or structures served by each.

ARTICLE 550 – Mobile Homes, Manufactures Homes, and Mobile Home Parks

550.10 Power Supply (NEC 2008)

(A) Feeder

The power supply to the mobile home will be a feeder assembly consisting of no more than one listed 50-ampere mobile home power-supply cord with an integrally molded or securely attached plug cap or a permanently installed feeder.

550.10 Power Supply (NEC 2011)

(A) Feeder

The power supply to the mobile home will be a feeder assembly consisting of no more than one listed 50-ampere mobile home power-supply *cord or* a permanently installed feeder.

550.13 Receptacle Outlets (NEC 2008)

(B) Ground-Fault Circuit Interrupters

All 125-volt, single-phase, 15- and 20-ampere receptacle outlets installed outdoors, in compartments accessible from outside the unit, or in bathrooms, including receptacles in

luminaires, will have GFCI protection. GFCI protection will be provided for receptacle outlets serving countertops in kitchens, and receptacle outlets located within 1.8 m of a wet bar sink.

Exception: Receptacles installed for appliances in dedicated spaces, such as for dishwashers, disposals, refrigerators, freezers, and laundry equipment.

Feeders supplying branch circuits will be allowed to be protected by a ground-fault circuit-interrupter in lieu of the provision for such interrupters specified herein.

(D) Receptacle Outlets Required

Except in the bath, closet, and hall areas, receptacle outlets will be installed at wall spaces 600 mm wide or more so that no point along the floor line is more than 1.8 m measures horizontally from an outlet in that space. In addition, a receptacle outlet will be installed in the following locations:

(F) Receptacle Outlets Not Permitted

Receptacle outlets will not be allowed in the following locations:

(1) Receptacle outlets will not be installed within a bathtub or shower space.

550.13 Receptacle Outlets (NEC 2011)

(B) Ground-Fault Circuit Interrupters

All 125-volt, single-phase, 15- and 20-ampere receptacle outlets installed outdoors, in compartments accessible from outside the unit, or in bathrooms, including receptacles in luminaires, will have GFCI protection. GFCI protection will be provided for receptacle outlets serving countertops in kitchens, and receptacle outlets located within 1.8 m of a wet bar sink.

The exceptions in section 210.8(A) will be allowed.

Feeders supplying branch circuits will be allowed to be protected by a ground-fault circuit-interrupter in lieu of the provision for such interrupters specified herein.

(D) Receptacle Outlets Required

Except in the bath, closet, and *hallway* areas, receptacle outlets will be installed at wall spaces 600 mm wide or more so that no point along the floor line is more than 1.8 m measures horizontally from an outlet in that space. In addition, a receptacle outlet will be installed in the following locations:

(F) Receptacle Outlets Not Permitted

Receptacle outlets will not be allowed in the following locations:

(1) Receptacle outlets will not be installed within *or directly over* a bathtub or shower space.

550.15 Wiring Methods and Materials (NEC 2008)

(H) Under-Chassis Wiring (Exposed to Weather)

Where outdoor or under-chassis line-voltage (120 volts nominal, or higher) wiring is exposed to moisture or physical damage, it will be protected by rigid metal conduit or intermediate metal conduit. The conductors will be suitable for wet locations.

550.15 Wiring Methods and Materials (NEC 2011)

(H) Under-Chassis Wiring (Exposed to Weather)

Where outdoor or under-chassis line-voltage (120 volts nominal, or higher) wiring is exposed to moisture or physical damage, it will be protected by rigid metal conduit or intermediate metal conduit, *except as provided in (1) or (2)*. The conductors will be suitable for wet locations.

(1) *Where closely routed against frames and equipment enclosures, reinforced thermosetting resin conduit listed for aboveground use, Type MI cable, electrical metallic tubing, or rigid polyvinal chloride conduit will be allowed.*

(2) *Where extending vertically from a direct-burial depth of at least 457 mm below grade and terminated to a factory-installed conduit or enclosure. Schedule 80 PVC or RTRC listed for exposure to physical damage.*

550.16 Grounding (NEC 2008)

(C) Bonding of Non-Current-Carrying Metal Parts

(1) Exposed Non-Current-Carrying Metal Parts

All exposed non-current-carrying metal parts that may become energized will be effectively bonded to the grounding terminal or enclosure of the distribution panelboard. A bonding conductor will be connected between the distribution panelboard and accessible terminal on the chassis.

550.16 Grounding (NEC 2011)

(C) Bonding of Non-Current-Carrying Metal Parts

(1) Exposed Non-Current-Carrying Metal Parts

All exposed non-current-carrying metal parts that *are likely to* become energized will be effectively bonded to the grounding terminal or enclosure of the distribution panelboard. A bonding conductor will be connected between the distribution panelboard and accessible terminal on the chassis.

550.25 Arc-Fault Circuit-Interrupter Protection (NEC 2008)

(A) Definition

Arc-fault circuit interrupters are defined in Article 210.12(A)

(B) Bedrooms of Mobile Homes

All 120-volt branch circuits that supply 15- and 20-ampere outlets installed in bedrooms of mobile homes and manufactured homes will adhere to section 210.12(B)

550.25 Arc-Fault Circuit-Interrupter Protection (NEC 2011)

(A) Definition

Arc-fault circuit interrupters are defined in Article 100

(B) *Mobile Homes and Manufactured Homes*

All 120-volt branch circuits that supply 15- and 20-ampere outlets installed in bedrooms of mobile homes and manufactured homes will adhere to section 210.12(B)

550.32 Service Equipment (NEC 2008)

(A) Mobile Home Service Equipment

The mobile home service equipment will be located adjacent to the mobile home and not mounted in or on the mobile home. The service equipment will be located in sight from and not more than 9.0 m from the exterior wall of the mobile home it serves. The service equipment will be allowed to be located elsewhere on the premises, provided that a disconnecting means suitable for use as service equipment is located within sight from and not more than 9.0 m from the exterior wall of the mobile home it serves and is rated not less then that required for service equipment per section 550.32(C). Grounding at the disconnecting means will be in accordance with section 250.32

550.32 Service Equipment (NEC 2011)

(A) Mobile Home Service Equipment

The mobile home service equipment will be located adjacent to the mobile home and not mounted in or on the mobile home. The service equipment will be located in sight from and not more than 9.0 m from the exterior wall of the mobile home it serves. The service equipment will be allowed to be located elsewhere on the premises, provided that a disconnecting means suitable

for use as service equipment is located within sight from and not more than 9.0 m from the exterior wall of the mobile home it serves and is rated not less then that required for service equipment *according to* section 550.32(C). Grounding at the disconnecting means will be in accordance with section 250.32

ARTICLE 551 – Recreational Vehicles and Recreational Vehicle parks

551.2 Definitions (NEC 2008)

Air-Conditioning or Comfort-Cooling Equipment

All of that equipment intended or installed for the purpose of processing the treatment of air so as to control simultaneously its temperature, humidity, cleanliness, and distribution to meet the requirements of the conditioned space.

Low Voltage

An electromotive force rated 24 volts, nominal, or less, supplied from a transformer, converter, or battery.

551.2 Definitions (NEC 2011)

Air-Conditioning or Comfort-Cooling Equipment

All of that equipment intended or installed for the purpose of processing the treatment of air so as to control simultaneously *or individually* its temperature, humidity, cleanliness, and distribution to meet the requirements of the conditioned space.

Low Voltage

An electromotive force rated 24 volts, nominal, *or less*.

551.30 Generator Installations (NEC 2008)

(B) Generator Protection

Equipment will be installed to ensure that the current-carrying conductors from the engine generator and from an outside source are not connected to a vehicle circuit at the same time. Receptacles used as disconnecting means will be accessible (as applied to wiring methods) and capable of interrupting their rated current without hazard to the operator.

551.30 Generator Installations (NEC 2011)

(B) Generator Protection

Equipment will be installed to ensure that the current-carrying conductors from the engine generator and from an outside source are not connected to a vehicle circuit at the same time. *Automatic transfer switches in such applications will be listed for use in one of the following:*

(1) Emergency Systems

(2) Optional standby systems

551.33 Alternate Source Restrictions (NEC 2008)

Transfer equipment, if not integral with the listed power source, will be installed to ensure that the current-carrying conductors from other sources of ac power and from an outside source are not connected to the vehicle circuit at the same time.

551.33 Alternate Source Restrictions (NEC 2011)

Transfer equipment, if not integral with the listed power source, will be installed to ensure that the current-carrying conductors from other sources of ac power and from an outside source are not connected to the vehicle circuit at the same time. *Automatic transfer switches in such applications will be listed for use in one of the following:*

(1) Emergency systems

(2) Optional standby systems

551.46 Means for Connecting to Power Supply (NEC 2008)

(2) Permanently Connecting

Each power-supply assembly will be connected directly to the terminals of the distribution panelboard or conductors within a junction box and provided with means to prevent strain from being transmitted to the terminals. The ampacity of the conductors between each junction box and the terminals of each distribution panelboard will be at least equal to the ampacity of the power-supply cord. The supply end of the assembly will be equipped with an attachment plug of the type described in section 551.46(C). Where the cord passes through the walls or floors, it will be protected by means of conduit and bushings or something similar. The cord assembly will have permanent provisions for protection against corrosion and mechanical damage while the vehicle is in transit.

551.46 Means for Connecting to Power Supply (NEC 2011)

(2) Permanently Connecting

Each power-supply assembly will be connected directly to the terminals of the distribution panelboard or conductors within a junction box and provided with means to prevent strain from being transmitted to the terminals. The ampacity of the conductors between each junction box and the terminals of each distribution panelboard will be at least equal to the ampacity of the power-supply cord. The supply end of the assembly will be equipped with an attachment plug of the type described in section 551.46(C). Where the cord passes through the walls or floors, it will be protected by means of conduit and bushings or something similar. The cord assembly will have permanent provisions for protection against corrosion and mechanical damage while the vehicle is in transit, *or while the cord assembly is being stored or removed for use.*

551.47 Wiring Methods (NEC 2008)

(I) Cable Supports

Where connected with cable connectors or clamps, cables will be supported within 300 mm of outlet boxes, distribution panelboards, and splice boxes on appliances. Supports will be provided every 1.4 m at other places.

(L) Metal Faceplates

Where connected with cable connectors or clamps, cables will be supported within 300 mm of outlet boxes, distribution panelboards, and splice boxes on appliances. Supports will be provided every 1.4 m at other places.

(P) Method of Connecting Expandable Units

(2) Direct Wired

(e) Where the flexible cord passes through the floor to an exposed area inside of the recreational vehicle, it will be protected by means of conduit and bushings or equivalent.

Where subject to physical damage, the flexible cord will be protected with RMC, IMC, Schedule 80 PVC, or other approved means and will extend at least 150 mm above the floor. A means will be provided to secure the flexible cord where it enters the recreational vehicle.

(R) Prewiring for Generator Installation

(1)Conduit conductors will be appropriately sized in relation to the anticipated load and will be protected by an overcurrent device according to their ampacities. Where the generator provides overcurrent protection for the conductors, additional overcurrent protection is not required.

(4) A label conforming to section 551.46(D) will be placed on the cover of each junction box containing incomplete circuitry and will read either:

ONLY INSTALL A GENERATOR LISTED SPECIFICALLY FOR RV USE GENERATOR CIRCUIT. THIS CONNECTION IS FOR GENERATORS RATED 110-125-VOLT AC, 60 HZ, _____AMPERES MAXIMUM.

or

ONLY INSTALL A GENERATOR LISTED SPECIFICALLY FOR RV USE GENERATOR CIRCUIT. THIS CONNECTION IS FOR GENERATORS RATED 120/240-VOLT AC, 60 HZ, _____ AMPERES MAXIMUM.

551.47 Wiring Methods (NEC 2011)

(I) Cable Supports

Where connected with cable connectors or clamps, cables will be supported within 300 mm of outlet boxes, distribution panelboards, and splice boxes on appliances. Supports will be provided *at intervals not exceeding* 1.4 m at other places.

(L) *Receptacle* Faceplates

Metal faceplates will *adhere to section 406.5(A)*. Nonmetallic faceplates will *adhere to section 406.5(C)*.

(P) Method of Connecting Expandable Units

(2) Direct Wired

(e) Where the flexible cord passes through the floor to an exposed area inside of the recreational vehicle, it will be protected by means of conduit and bushings or equivalent.

Where subject to physical damage, the flexible cord will be protected with RMC, IMC, Schedule 80 PVC; *reinforced thermosetting resin conduit listed for exposure to physical damage,* or other approved means and will extend at least 150 mm above the floor. A means will be provided to secure the flexible cord where it enters the recreational vehicle.

(R) Prewiring for Generator Installation

(1)Conduit conductors will be appropriately sized in relation to the anticipated load *as stated on the label required in (R)(4)*.

(4) A label conforming to section 551.46(D) will be placed on the cover of each junction box containing incomplete circuitry and will read either:

GENERATOR

ONLY INSTALL A GENERATOR LISTED SPECIFICALLY FOR RV USE *HAVING OVERCURRENT PROTECTION* RATED 110/125-VOLT AC, 60 HZ, _____AMPERES MAXIMUM

or

GENERATOR

ONLY INSTALL A GENERATOR LISTED SPECIFICALLY FOR RV USE *HAVING OVERCURRENT PROTECTION* RATED 120/240-VOLT AC, 60 HZ, _____ AMPERES MAXIMUM.

551.54 Grounding (NEC 2008)

(C) Insulated Grounded Conductor

The grounded circuit conductor will be insulated from the equipment grounding conductors and from equipment enclosures and other grounded parts. The grounded circuit conductor terminals in the distribution panelboard and in ranges, clothes dryers, counter-mounted cooking units, and wall-mounted ovens will be insulated from the equipment enclosure. Bonding screws, straps, or buses in the distribution panelboard or in appliances will be removed and discarded. Connection of electric ranges and electric clothes dryers utilizing a grounded conductor, if cord-connected, will be made with 4-conductor cord and 3-pole, 4-wire grounding-type plug caps and receptacles.

551.54 Grounding (NEC 2011)

(C) Insulated Grounded Conductor *(Neutral Conductor)*

The grounded circuit conductor *(neutral conductor)* will be insulated from the equipment grounding conductors and from equipment enclosures and other grounded parts. The grounded circuit conductor *(neutral conductor)* terminals in the distribution panelboard and in ranges, clothes dryers, counter-mounted cooking units, and wall-mounted ovens will be insulated from the equipment enclosure. Bonding screws, straps, or buses in the distribution panelboard or in appliances will be removed and discarded. Connection of electric ranges and electric clothes dryers utilizing a grounded conductor, if cord-connected, will be made with 4-conductor cord and 3-pole, 4-wire grounding-type plug caps and receptacles.

551.55 Interior Equipment Grounding (NEC 2008)

(D) Grounding Connection in Nonmetallic Box

A connection between the one or more grounding conductors brought into a nonmetallic outlet box will be arranged so that a connection can be made to any fitting or device in that box that requires grounding.

551.55 Interior Equipment Grounding (NEC 2011)

(D) Grounding Connection in Nonmetallic Box

A connection between the one or more *equipment* grounding conductors brought into a nonmetallic outlet box will be arranged so that a connection *of the equipment grounding conductor* can be made to any fitting or device in that box that requires grounding.

551.56 Bonding of Non-Current-Carrying Metal Parts (NEC 2008)

(A) Required Bonding

All exposed non-current-carrying metal parts that may become energized will be effectively bonded to the grounding terminal or enclosure of the distribution panelboard.

551.56 Bonding of Non-Current-Carrying Metal Parts (NEC 2011)

(A) Required Bonding

All exposed non-current-carrying metal parts that *are likely to* become energized will be effectively bonded to the grounding terminal or enclosure of the distribution panelboard.

551.60 Factory Tests (Electrical) (NEC 2008)

Each recreational vehicle designed with a 120-volt or a 120/240-volt electrical system will withstand the applied potential without electrical breakdown fo a 1-minute, 900-volt ac or 1280-volt dc dielectric strength test, or a 1second, 1080-volt ac or 1530-vold dc dielectric strength test, with all switches closed, between ungrounded and grounded conductors and the recreational vehicle ground. During the test, all switches and other controls will be in the "on" position. Fixtures including luminaires and permanently installed appliances will not be required to withstand this test. The test will be performed after branch circuits are complete prior to energizing the system and again after all outer coverings and cabinetry have been secured.

551.60 Factory Tests (Electrical) (NEC 2011)

Each recreational vehicle designed with a 120-volt or a 120/240-volt electrical system will withstand the applied potential without electrical breakdown fo a 1-minute, 900-volt ac or 1280-volt dc dielectric strength test, or a 1second, 1080-volt ac or 1530-vold dc dielectric strength test, with all switches closed, between ungrounded and grounded conductors and the recreational vehicle ground. During the test, all switches and other controls will be in the "on" position. Fixtures including luminaires and permanently installed appliances will not be required to withstand this test. The test will be performed after branch circuits are complete prior to energizing the system and again after all outer coverings and cabinetry have been secured. *The dielectric test will be performed according to the test equipment manufacturer's written instructions.*

551.80 Underground Service, Feeder, Branch-Circuit, and Recreational Vehicle Site Feeder-Circuit Conductors (NEC 2008)

(B) Protection Against Physical Damage

Direct-buried conductors and cables entering or leaving a trench will be protected by rigid metal conduit, intermediate metal conduit, electrical metallic tubing with supplementary corrosion protection, rigid nonmetallic conduit, liquidtight flexible nonmetallic conduit, liquidtight flexible metal conduit, or other approved raceways or enclosures. Where subject to physical damage, the conductors or cables will be protected by rigid metal conduit, intermediate metal conduit, or Schedule 80 PVC conduit. All such protection will extend at least 450 mm into the trench from finished grade.

551.80 Underground Service, Feeder, Branch-Circuit, and Recreational Vehicle Site Feeder-Circuit Conductors (NEC 2011)

(B) Protection Against Physical Damage

Direct-buried conductors and cables entering or leaving a trench will be protected by rigid metal conduit, intermediate metal conduit, electrical metallic tubing with supplementary corrosion protection, rigid nonmetallic conduit, liquidtight flexible nonmetallic conduit, liquidtight flexible metal conduit, or other approved raceways or enclosures. Where subject to physical damage, the conductors or cables will be protected by rigid metal conduit, intermediate metal conduit, or Schedule 80 PVC conduit. All such protection will extend at least 450 mm into the trench from finished grade.