

## ARTICLE III. ELECTRICITY

### DIVISION 1. GENERALLY

#### Sec. 22-66. Definitions.

The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

*Electrical equipment* means conductors and other equipment installed for the utilization of electricity for light, heat or power. It does not include radio apparatus or equipment for wireless reception of sounds and signals; and it does not include apparatus, conductors or other equipment installed for or by public utilities including common carriers, which are under the jurisdiction of the state commerce commission, for use in their operation as public utilities.

(Code 1982, 153.02)

Cross reference—Definitions generally, 1-2.

#### Sec. 22-67. Standard and specifications adopted.

- (a) There are adopted, as safe and practical standards for the installation, alteration, and use of electrical equipment in the city, the rules and regulations of the National Fire Protection Association for electrical wiring and apparatus, contained in the code known as the National Electrical Code of 2002 except such portions as are hereafter modified, or amended, a copy of which code is now on file in the office of the city clerk, the electrical inspector, and the building inspector; and the same are adopted and incorporated as fully as if set out at length herein; and from the date on which this section shall take effect the provisions thereof shall be controlling within the limits of the city; and the National Electrical Code of 2002 -and the amendments thereto adopted shall be known as the electrical code.
- (b) Building, electrical and fire inspectors shall apply these codes; and the most restrictive code shall be applied.

(Code 1982, 153.35; Ord. No. 11G, 2, 2-5-96; Ord. No. 26G, 1, 4-15-96)

#### Sec. 22-68. Amendments to the National Electrical Code Electric Service.

- (a) Residential new service shall be in metal conduit only.
- (b) Commercial or industrial new service shall be in metal conduit only; Apartments, townhouses, condos, over two units and multifamily, all wiring, new service and subpanels shall be in metal conduit only; For minimum service, use 100-amp, 16-circuit-breaker cabinet with 100 amp main breaker. The minimum breaker panel size for 200-amp service shall be 30 space.

- (c) Service on pole or outside run to main cabinet or subcabinet shall also have main breaker or disconnect inside cabinet.
- (d) Two separate eight (8) foot ground rods placed at least (6) feet apart. Ground wire to come out the meter base, and connect to ground rod with ground clamp. Ground wire goes to terminal at meter socket and on into terminal in breaker panel, bonding bushings required around concentric or eccentric knockouts
- (e) Ground clamp to be six inches above grade.
- (f) Service shall be grounded to a metallic cold water pipe and to a supplementary electrode. Water meter requires a bonding jumper.
- (g) Minimum 100-amp service will be #3 copper or #2 aluminum and 1 ¼ -inch conduit.
- (m) Minimum 200-amp service will be #3/0 copper, 4/0 aluminum and two-inch conduit.
- (n) At no time shall aluminum wire ever be used as service entrance conductors.
- (o) Dwellings that have an area greater than 1,600 square feet shall have a minimum service rating of 200 amps.
- (p) Entrance cable shall not be used for service or electric stove runs. The use of service entrance cable will only be approved by inspector in some farm building applications.
- (q) Type of wiring.
  - (1) Romex with a bare conductor for equipment ground.
  - (2) In basement and garage, exposed wiring to be in conduit, basement, upper runs drop to box and use conduit. In basement and garage, wiring to be covered by drop ceiling or drywall.
  - (3) Termination at permanently installed wiring devices shall be of the binding head screw or screw tightened clamp type or set screw type or manually torqued hardware.
  - (4) Premises wiring methods utilized for component interconnection, box dimensions, and switches and receptacles with integral enclosures shall not be allowed in dwelling occupancies. Surface wiring methods listed and otherwise approved by the National Electrical Code may be allowed. Terminations at permanently installed wiring devices shall be of binding head screw or screw tightened clamp type or set screw type or manually torqued hardware. Splices and taps shall be installed by methods in compliance with provisions of article 110 and other applicable articles of the National Electrical Code.
  - (5) Note: Insulation will no longer be a means of cover.
  - (6) Metal buildings and metal sheds shall be done in conduit only. Commercial, farm, agricultural and industrial buildings shall be in metal conduit only. All dwellings or structures exceeding three floors above grade shall be in metal conduit only.
  - (7) The use of electrical nonmetallic tubing (ENT) shall be prohibited in commercial, residential, industrial and in all applications.

- (8) The use of metal clad cable shall be prohibited in all applications, commercial, residential and industrial.
- (10) All agricultural buildings shall be in metal conduit.
- (11) Mobile homes shall conform to current National Electrical Code and current Belvidere code.
- (12) Switches, devices and fixtures to be rated according to conductor size.

All commercial and industrial outlets to be 20 amp rated.

- (13) Garage receptacles on 20-amp separate circuit with 20-amp GFI rated receptacles.
- (14) The refrigerator or freezer or central vacuum to be single receptacle and does not have to be on a GFI.

(15) (16) Basement to be on separate circuit lights also.

(17) Laundry equipment and sump pump to be on single circuit receptacle and not on a GFI circuit.

(18) Industrial and commercial to comply with ground fault requirements of Belvidere

(19) The use of metal staples is prohibited.

(20) No stacking of more than two # 14-12-10 Romex, the use of stackers is required.

(21) Armor cable may be used if preapproved by the electrical inspector.

(r) Circuits and required outlets.

(1) Receptacles and lights eight openings on #14 wire use 15-amp breaker; ten openings on #12 wire use 20-amp breaker.

(2) Install one wall switch to control light outlet in every room, hallways, stairways, garage and outdoor entrances.

(s) Splices and Connections.

(1) Wires shall be twisted and mechanically secured with wire nuts.

(2) Romex must be stripped before putting in boxes.

(3) All receptacles to be bonded.

(4) No more than two wires will be allowed on a receptacle.

(5) Joints are to be made up for rough-in inspection.

(t) Laundry. One 20-amp circuit for receptacle, receptacles to be rated 20-amp is required.

(u) Kitchen.

(1) Lighting to be on one circuit, dishwasher on one circuit, receptacles shall be on two 20-amp circuits, receptacles to be rated 20-amp. Receptacle to be installed on each counter space wider than 9 inches.

(2) Microwave to be on separate 20-amp circuit.

(v) Garage.

(1) At least one 20-amp circuit with receptacle rate 20-amp is required.

(2) Each finished and unfinished wall in garage is to have two 20-amp receptacles on a GFI.

(w) Closets. Closets less than three-foot depth will have to have approved closet fixtures if light is installed.

(x) Basement.

(1) Finished walls to have a receptacle every 12 feet of wall space.

(1) Entire bathroom on ground-faults, lights included.

(2) Bathrooms, saunas, swimming pools, garages and outside receptacles on ground-fault.

(3) Device box to have proper amount of cubic inches for wires and ground-fault receptacle.

(4) Garage door opener outlet does not have to be ground-fault.

(5) (6) GFI receptacles required within six feet of any sink or laundry tub area.

(7) (8) Outside outlet required adjacent to patio doors.

(9) Note: All GFI outlets have to be identified as GFI outlets.

(z) Boxes.

(1) Wiring device boxes shall have sufficient cubic inches for wires installed.

(2) All ceiling boxes have to be metal, and ceiling fan approved. Boxes required in dining room, living room, kitchen, family room, offices, bedrooms, and all habitable rooms

Commercial and industrial bathrooms accessible to the public to have emergency lights installed

(cc) Bathtub and shower designated zone, the zone measures 3 foot horizontally and 8 foot vertically from the top of the bathtub rim or shower stall threshold. No outlets or switches to be in the designated zone..

(cc) Water pump, furnace, and air conditioner.

(1) Furnace and air conditioner shall have disconnect switch for the appliance.

(2) Water pump shall have disconnect switch if not in same room as breaker panel and if over 12 feet from panel.

(dd) Miscellaneous.

(1) Electrical contractors will have circuits identified for the final inspection.

(2) Electrical contractors are to have their business identification on the meter socket or base and on the main breaker panel; example:  
NAME AND PHONE NUMBER.

Electrical contractors shall have available address and lot number on the service meter socket, along with name and phone number.

(3) All homes under construction shall have addresses and lot numbers visible to inspectors from the road at all times.

(4) All can lights shall be IC or double housing type when covered by insulation

(5) (ee) Mobile homes.

- (1) The connection from the distribution panels in a mobile home to a power source shall be made with proper conduit that has been approved by the city/county.
  - (2) Approval of electrical before occupancy.
- (ff) Smoke alarms.
- (1) To be installed in hallways, basement areas, on all levels and in all bedrooms and sleeping areas. Smoke alarms are to be hardwired 120-volt interconnected with battery backup. This applies to all residential, multifamily and apartment units. This also includes new construction and new remodeling.
  - (2) Commercial and industrial to have alarm systems or hardwired 120-volt interconnecting battery back-up smoke detectors.
  - (3) New and old multifamily, apartment, commercial and industrial buildings to have emergency lights and exit lights installed where deemed necessary by the building, electrical and fire department officials.
- (gg) Inspections to be called in by the electrical contractor. Inspections called in need permit number and address.
- (1) Service (do not call for inspection unless backfill is in area of meter)
  - (2) Rough-in.
  - (3) Final before occupancy.
- (Code 1982, 153.36; Ord. No. 977F, 3—5, 7-17-95)

#### **Sec. 22-69. Defective conditions.**

Where installation of any wiring or electrical devices or material is found to be in a dangerous or unsafe condition the electrical inspector shall at once notify in writing the person owning, using, or operating the same, specifying wherein the same is dangerous or unsafe; and such person shall, within the time specified in such notice, make such repairs or changes as may be necessary to place such wiring, devices, and materials in a safe condition.

(Code 1982, 153.37)

#### **Sec. 22-70. Existing residences.**

*(a) Electric service.* Existing electric service shall be a minimum of 100-ampere 240-volt, three-wire with distribution panel and wiring properly installed and protected. Main disconnect and overcurrent protective devices to be accessible to each tenant. All overcurrent devices such as fuses or breakers shall be used to protect branch circuit conductors. All panels to be dead front.

*(b) Service grounding.* When grounding on house side of water meter, jumper to be installed around water meter.

(c) *Electric wiring and facilities.* No dwelling or dwelling unit shall be deemed to comply with the requirements of this article relating to electric wiring and facilities unless:

(1) Exposed wire. Every exposed wire has insulation which is in good condition.

(2) Switch outlet plate. Every switch and outlet plate is fastened in position.

(3) Short circuit. No short circuit or break exists in any electric lines.

(4) Fixtures. Every fixture and outlet functions properly and is fastened in place.

(5) Shock hazard. No obvious shock hazard exists.

(6) Temporary wiring. No temporary wiring is used, except cords which run directly from portable electric fixtures to convenience outlets, and which do not lie beneath floor-covering materials, pierce walls, or extend through doorways, transoms or other similar apertures through structural elements.

(7) Overload. No electric circuit is overloaded as a result of connecting appliances which operate at high wattages to outlets supplied with wire of adequate size.

(8) Exposed noncurrent metal parts. All exposed noncurrent metal parts of the electrical system that are within eight feet vertically or five feet horizontally of ground or grounded metal object subject to contact by persons shall be grounded.

(9) Exposed tube wiring. There shall be no exposed knob and tube wiring in basements, garages, etc.

(10) Maintenance in good condition. Every outlet and fixture shall be properly maintained in good and safe condition and shall be connected to source of electric power in safe condition.

(11) Hall and stairway lighting. Every hall and stairway in multiple dwelling containing five or more dwelling units shall be adequately lighted at all times. Every hall and stairway in structures devoted to solely dwelling occupancy and containing not more than four dwelling units shall be supplied conveniently located light switches, controlling an adequate lighting system, which may be turned on when needed, instead of full time lighting.

(12) Wall switches. All habitable rooms shall have wall to control a light or receptacle outlet.

Stairways from one living level to another shall have three-way switches at each level.

Wall switch and permanently mounted light shall be installed at all exterior doorway entrances.

Wall switch or switches shall for attic stairway and basement stairway lights.

Wall switches and permanently installed lights shall be installed in dining rooms, kitchens, and bathrooms.

(13) Light fixtures. Permanently installed light fixtures shall be installed in utility rooms, over laundry tubs, in area of electric panel or panels, and in other areas requiring general illumination.

Permanently installed light fixtures to be installed and controlled by wall switch or switches in dining rooms, kitchens, and halls or stairways and bathrooms.

(14) Convenience of receptacle outlets. In all habitable rooms, a minimum of two duplex wall receptacle shall be installed, each on opposite walls.

In living rooms, recreation rooms and family rooms, a minimum of three duplex receptacles shall be installed, each on separate walls.

In bathrooms, one wall-mounted receptacle shall be installed adjacent to sink on G.F.C.I. Receptacle outlets shall not be installed within or adjacent to shower or bathtub space.

In kitchens, a minimum of three wall receptacles shall be installed, two receptacles to be accessible at all times.

One receptacle shall be installed within six feet of laundry tubs.

Receptacle outlets installed in basements, garages, open porches, breezeways, or other locations used by person standing on the ground or on grounding conductive material shall be installed on a grounded system and shall be G.F.C.I. protected.

No receptacle, unless in an approved box, shall be installed in the floor.  
(Code 1982, 153.38)

#### **Sec. 22-71. Appeals.**

When the electrical inspection condemns all or any part of any electrical installation, the owner or his agent may within five days, after receiving written notice of such condemnation and the reasons therefore, petition the electrical commission for a review of such finding by filing a petition with the chairman of the commission. Upon receipt of the petition, the electrical commission shall at once proceed to determine whether the installation complies with the ordinances of the city with respect thereto, and within three days shall make a decision in accordance with its findings. The owner occupant and all persons interested shall have opportunity to appear before the commission in support or in opposition to the petition, and submit evidence.

(Code 1982, 153.97)

#### **Sec. 22-72. Liability.**

This article shall not be construed to relieve from or lessen the responsibility or liability of any party owning, operating or controlling any electrical material, for damages to persons or property caused by any defect therein, nor shall the be held as assuming any such liability by reason of the inspection authorized herein.

(Code 1982, 153.98)

**Sec. 22-73. Wiring by only registered electricians.**

Only electricians registered in accordance with the provisions of this article shall be allowed to install electrical wiring or equipment or to make alterations or additions to present electrical installations or equipment. Nothing contained in this article shall prohibit the issuing of a permit to a property owner making his own installations or alterations. Wiring shall only be done on single-family residence to be occupied by the owner.

Property owners making their own installations or alterations shall, when securing permits, sign a notarized statement of ownership that also states that the owner will be personally making the installations or alterations. Property owners making their own installations must live in the residence for 12 consecutive months prior to securing a permit to another new home.

(Code 1982, 153.30)

**Sec. 22-74. Penalty.**

Whoever violates any provision of this article shall be subject to punishment as provided in Sec. 1-9. A separate offense shall be deemed committed on each day that a violation occurs or continues.

(Code 1982, 153.99)

**Sec. 22-75—22-95. Reserved.**

**DIVISION 2. ADMINISTRATION\***

**Cross reference-Administration, ch.2.**

*Subdivision I. In General*

**Sec. 22-96. Inspector.**

There is created the office of electrical inspector. The person chosen to fill the office of electrical inspector shall be a competent individual of good moral character, who shall be well versed in approved methods of electrical construction for safety to life and property, the statutes of the state relating to electrical work, the rules and regulations issued by the state fire marshal under authority statutes, the National Electrical Code/1993, and other installation and safety rules and standards approved by the American Engineering Standards Committee.

(Code 1982, 153.03)



**Sec. 22-97. Appointment.**

The electrical inspector shall be appointed for one year by the mayor by and with the advice and consent of the city council. It shall be unlawful for the electrical inspector except in performance for his official duties hereunder to engage in the business of the installation, alteration, maintenance or sale of electrical wiring, electrical devices, or electrical material either directly or indirectly and he shall have no financial interest in any concern engaged in such business in this city at any time while holding the office of electrical inspector.

(Code 1982, 153.04)

**Sec. 22-98. Powers.**

The electrical inspector shall have the right during reasonable hours to enter any building in the discharge of his official duties, or for the purpose of making any inspection or test of the installation or alteration of electrical equipment contain therein, and shall have the authority to cause the turning off of all electrical currents to cut or disconnect any wire where such electrical currents are dangerous to life or property or may interfere with the work of the fire department.

(Code 1982, 153.05)

**Secs. 22-99—22.120. Reserved.**

*Subdivision II. Electrical Inspection Department*

**Sec. 22-121. Establishment of department.**

There is established an electrical inspection department for the regulation if the installation, alteration and use of all electrical equipment, as herein provided. The electrical inspection department shall consist of the chief electrical inspector of the city and such other employees as may from time to time be provided by the council. The electrical inspection department shall be charged with the duty of enforcing the provisions of the rules and regulations relating to the installation, alteration and use of electrical equipment, as provided for by ordinance, and shall function under the immediate supervision and control of the chief electrical inspector.

(Code 1982, 153.12)

**Sec. 22-122. Records.**

The electrical inspection department shall keep complete records of all permits issued and inspections made and other official work performed under the provisions of this article.

(Code 1982, 153.12)

**Sec. 22-123. Reports.**

The electrical inspection department shall make a yearly report to the city council as of April 30 at the second regular council meeting in May of each year.

(Code 1982, 153.13)

**Sec. 22-124—22-145. Reserved.**

*Subdivision III. Electrical Commission*

**Sec. 22-146. Commission established.**

There is established an electrical commission which shall consist of six members, as follows: the electrical inspector shall be a member and ex officio chairman of such commission; of the other five members, one shall be a registered professional engineer, one an electrical contractor, one a journeyman electrician, one a representative of the inspection bureau maintained by the Fire Underwriters (or, if no such representative resides in the city, the chief of the fire department), and one a representative of an electrical supply company. Such members shall be appointed by the mayor by and with the advice and consent of the city council on a rotation term basis not longer than three years. The electrical inspector shall serve on the commission without additional compensation therefore. The commission shall hold regular meetings quarterly on the second Tuesday of the month at 7:00 pm.

(Code 1982, 153.06)

**Sec. 22-147. Duties of the electrical commission.**

The electrical commission shall from time to time recommend safe and practical standards and specifications for the installation, alteration and use of electrical equipment designed to meet the necessities and conditions that prevail in the city, shall recommend reasonable rules and regulations governing the issuance of permits by the electrical department, and shall recommend reasonable fees to be paid for the inspection by such inspection department of all electrical equipment installed or altered within this city. Such standards and specifications, such rules and regulations, and such fees shall not become effective until adopted by ordinance by the city council. All such fees shall be paid to the city. The standards and specifications, rules and regulations, and fees hereinafter provided by this article shall govern until further recommendations in respect thereto shall have been made by the commission and adopted by ordinance.

(Code 1982, 153.07)

**Sec. 22-148---22-170. Reserved.**

*Subdivision IV. Inspection*

**Sec. 22-171. Certificate of Inspection.**

(a) *Required.* On the completion of the installation or alteration of electrical equipment in any building, it shall be the duty of the person installing or altering the same to notify the electrical inspector, who shall inspect or cause the work to be inspected within 48 hours after such notice is given; and if such electrical equipment is found to be fully in compliance with this article and does not constitute a hazard to life or property, he shall issue to such person for the delivery to the owner a certificate of inspection, authorizing connection to the electrical service, and the turning on of the current. All wires hidden from view shall be inspected before concealment, and the electrical contractor or electrician or property owner specified in section 22-73 shall notify the electrical inspector, giving him at least two working days in which to make the required inspection before such wires are concealed.

(b) *Exception.* Service switch and service entrance revisions only may be completed before inspection in order to facilitate coordination of the supply of electricity for persons doing the work in the interest of continuity of residents using electricity. Regulation for permits in section 22-196 are not affected by this exception.

Code 1982, 153.09; Ord. No. 977F, 2, 7-17-95)

**Sec. 22-172. Prima facie proper installation.**

No certificate of inspection shall be issued unless the electrical equipment is in strict conformity with the provisions of the ordinances of this city and the statutes of the state. Compliance with the regulations is laid down from time to time in the National Electrical Code, as approved by the American National Standards Institute, unless in conflict with such ordinances or statutes, shall be prima facie evidence of proper installation or alteration.

(Code 1982, 153.10)

**Sec. 22-173. Subsequent inspections.**

The provisions for the inspection of work authorized by the permits issued in accordance with division 3 of this article shall not be construed as prohibiting the inspection of any electrical equipment now or hereafter installed whenever the electrical inspector shall determine that the public safety requires it. No inspection fee shall be charged for such extra or additional inspection; but in case it becomes necessary to replace such electrical equipment on account of defects disclosed by such inspection, a permit therefore shall be obtained in accordance with the provisions of this chapter.

(Code 1982, 153.11)

**Secs. 22-174--22-195. Reserved.**

### DIVISION 3. PERMITS

**Sec. 22-196. Permits**

No electrical equipment shall be installed or altered except on a permit first issued by the electrical inspection department. The electrical inspection department shall first inspect all such electrical equipment installed or altered in this city, and shall require that it conform to all applicable statutes and ordinances relating to electricity.

(Code 1982, 153.08)

**Sec. 22-197. Application for permit.**

Prior to the beginning of electrical installation, application must be made to the building inspector for a permit. The building inspector may, in any case, require the application to be accompanied by drawings and specifications of the proposed installation and equipment to a reasonable detail. Every electrical contractor must show proof of registration and certificate of insurance.

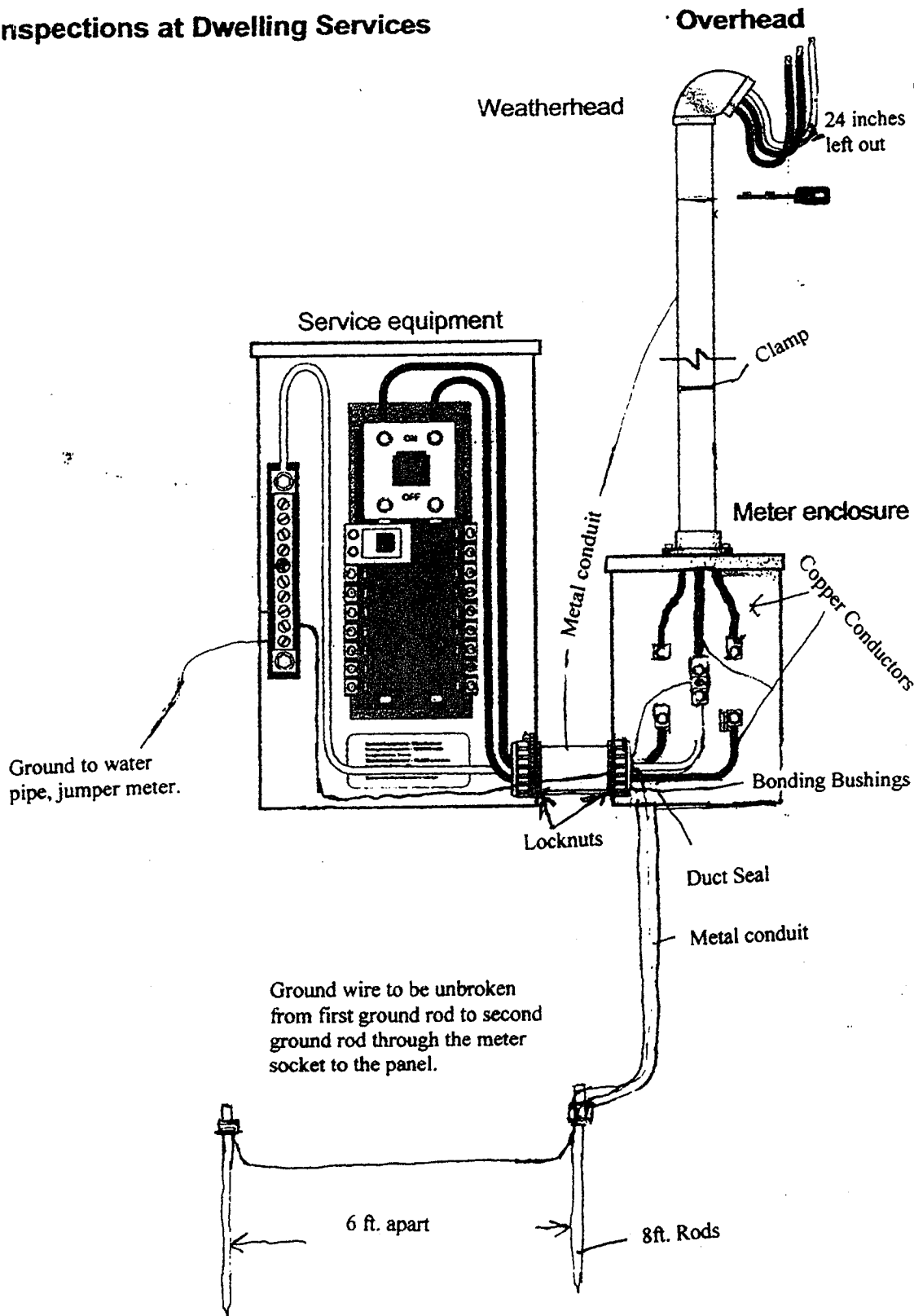
(Code 1982, 153.31)

## SERVICE INFORMATION

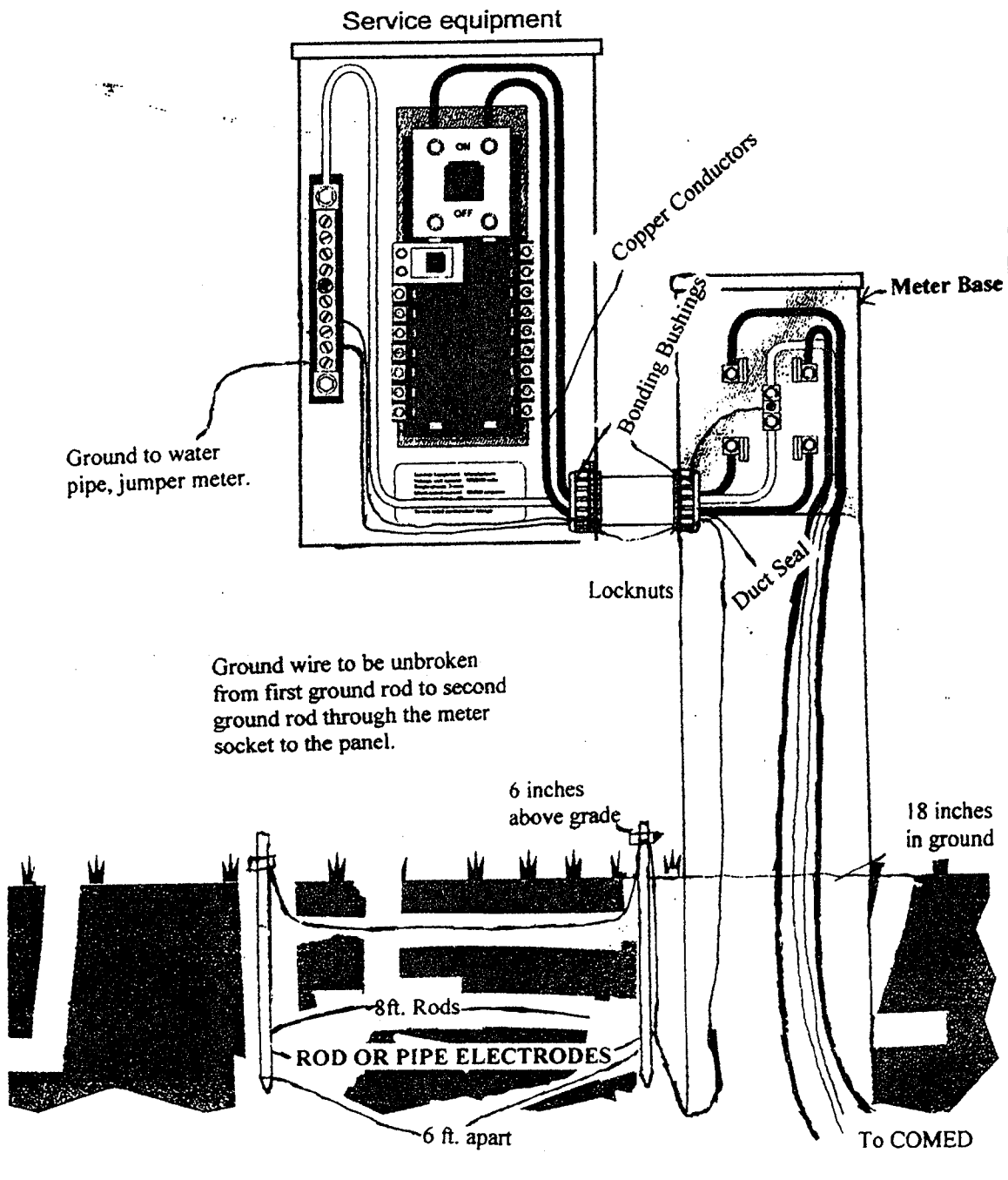
### NOTE AND REMEMBER

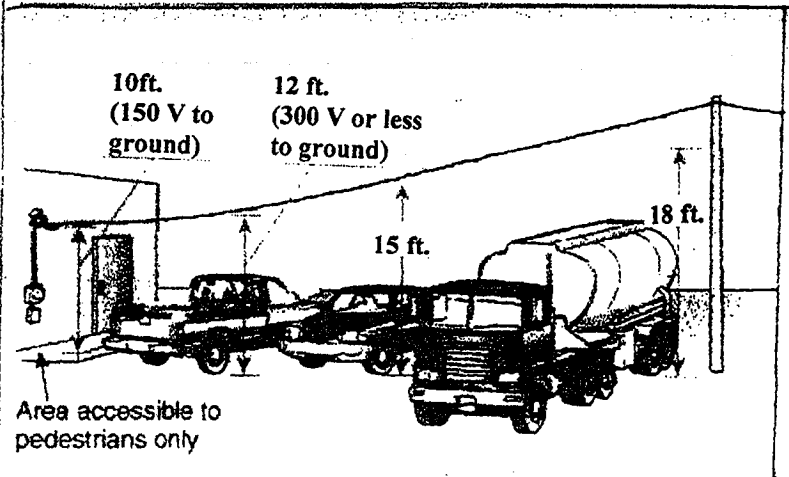
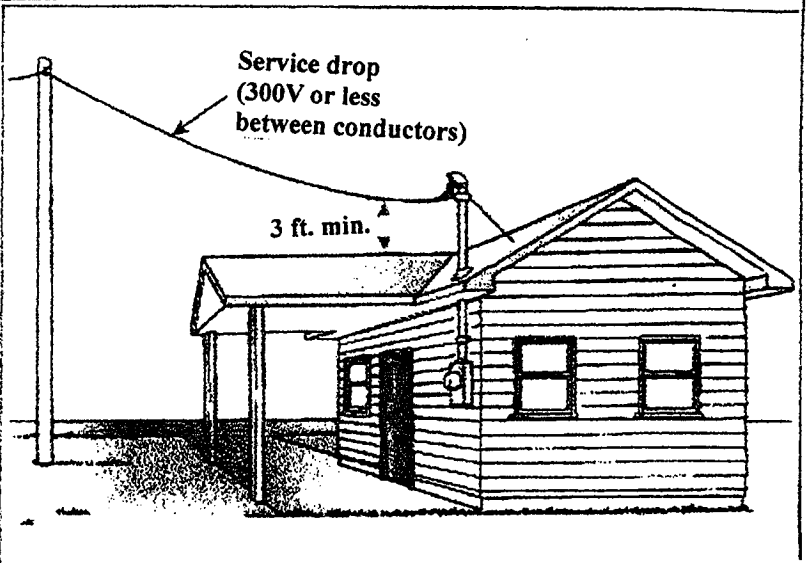
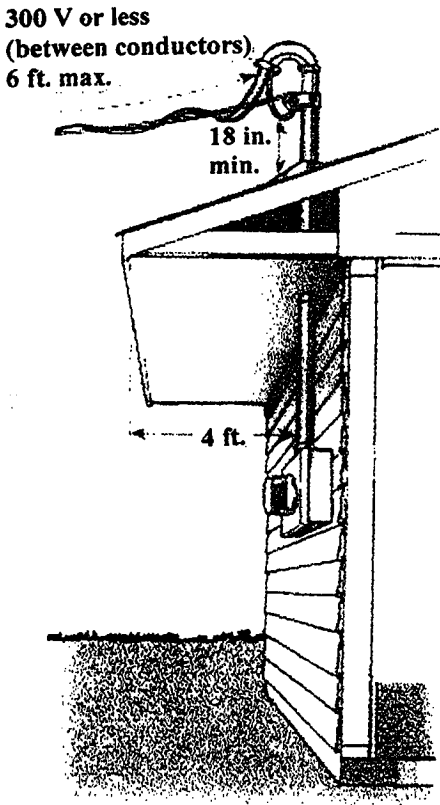
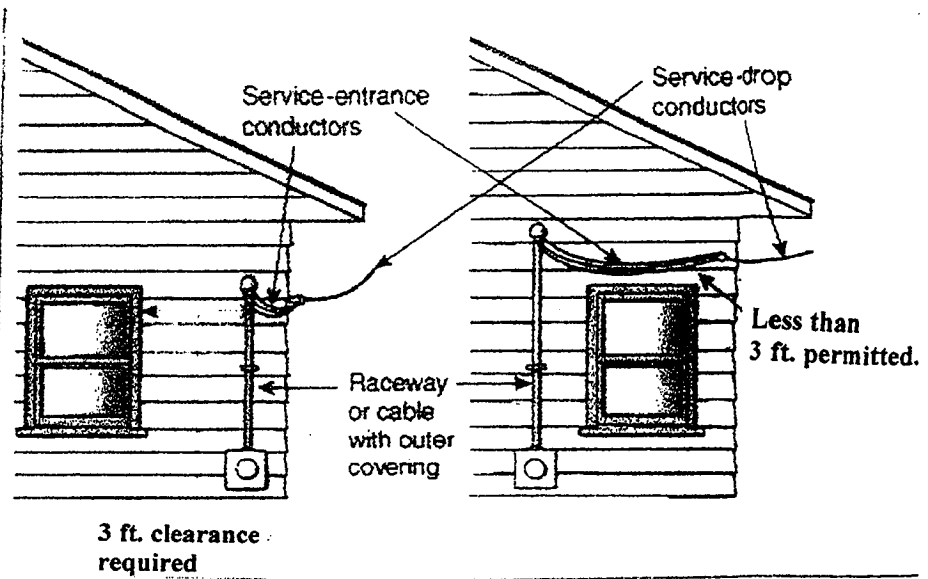
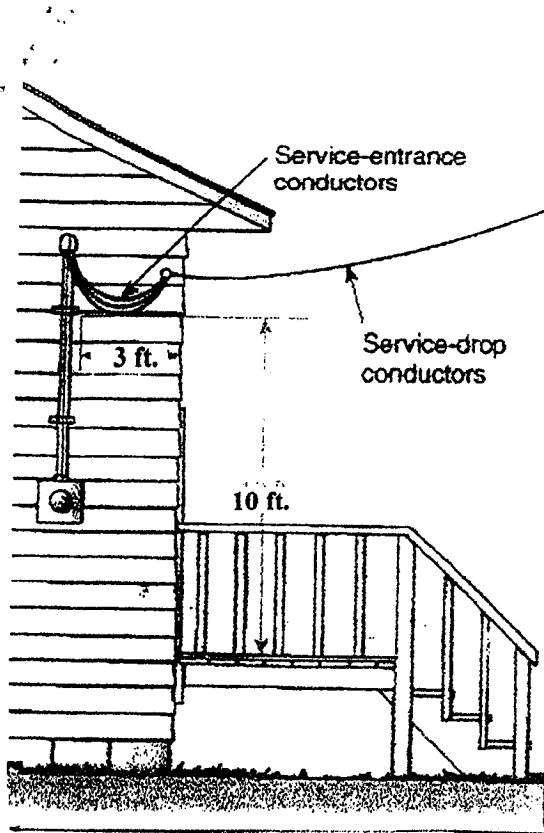
1. Service all in metal conduit 100 amp, #3 copper, 1 ¼ in. conduit
2. Service 200 amp metal conduit, 3/0 copper, 2 in. conduit, a minimum of 30 space load center. Note example up to 2500sq. ft. home, a 30 space load center, over 2500 sq. ft. home should be a 40 space load center.
3. All multi-family over 2 units to be wired in conduit.
4. Two ground rods required minimum 6 ft. apart, 1 rod 8 in. above ground.
5. Ground bushings required.
6. Duct seal the pipe to panel in meter socket required.
7. Homes over 1600 sq. ft. require 200 amps. Service.
8. Homes over 3800 sq. ft. require 400 amp. Service, with a minimum of two 30 space load centers.

# Inspections at Dwelling Services



# Inspections at Dwelling Services - Underground







## TANDEM BREAKERS

The purpose of this code is the practical safeguarding of persons and property from hazards arising from the use of electricity. Hazards often occur because of overloading of wiring systems by methods or usage not in conformity with this code. This occurs because initial wiring did not provide for increases in the use of electricity. An initial adequate installation will provide for future increases in the use of electricity. Plans must provide ample space and convenience and safety of operation.

The use of Tandem Breakers in new panels for new construction is disliked by the AHJ but the NEC doesn't prevent their use and they are a labeled and listed product. All panels are rated as to the use of tandem breakers and state as to how many can be installed and where in the panel they can be located.

Approval of equipment is the responsibility of the Authority Having Jurisdiction. It is the local AHJ ruling that panels listed to have tandem breakers installed will not have more than 50% of the number of tandems as listed by the manufacturer. As an example, The Homeline 200 amp 30/40 space load center allows 10 tandem breakers. It is the local ruling you could only have up to 5 tandem breakers installed in this load center. If tandem breakers are continually used, then larger space load centers should be part of the electrical plans to provide ample space for future increase for safety of operation. Failure to plan ahead in your designs may cause the AHJ to not allow the use of tandems in new panels for new construction.