



# ONTARIO AMENDMENTS TO THE CANADIAN ELECTRICAL CODE PART 1, C22.1

As amended  
November 2024

Sections 0 through 86 of the Canadian Electrical Code Part I C22.1-21, exclusive of any references to any of the appendices, is adopted as part of the Electrical Safety Code with the following amendments:

### Section 0 – Object, scope and definitions

(see Appendix G)

#### Object (see Appendix B)

1. Delete the CE Code Subsection entitled *Object*.
2. Delete the CE Code Subsection entitled *Scope*.
3. Delete the CE Code definition of “acceptable” and replace with the following:  
**Acceptable** — not presenting an undue hazard to persons or property under the circumstances.
4. Delete the CE Code definition of “accredited certification organization” and replace with the following:  
**Accredited certification organization** — see **Certification organization**.
5. Add the following definition:  
**Applicable standards** — standards of design, construction, testing, and marking, as adopted by the Electrical Safety Authority, that are
  - a) applied to electrical equipment by certification organizations, field evaluation agencies, professional engineers, or other competent persons who inspect, test, and report upon electrical equipment; and
  - b) intended to prevent exposure of persons and property to undue hazards.
6. Delete the CE Code definition of “approved (as applied to electrical equipment)” and replace with the following:  
**Approved** — authorized or approved in accordance with this Code.
7. Add the following definition:  
**Certification organization** — a “certification body” as defined in Ontario Regulation 438/07 and a body accredited in accordance with the Standards Council of Canada Act (Canada) to evaluate electrical equipment and recognized by the Electrical Safety Authority.
8. Add the following definition:  
**Connection authorization** —
  - a) when concerning supply of electrical energy to an electrical installation from a supply authority, signifies written permission by the Electrical Safety Authority to a supply authority, or any other person or corporation, to supply electric energy to a particular electrical installation; and
  - b) when concerning supply of electric energy from one part of an electrical installation to another, or from a source of electric energy other than that of a supply authority, signifies permission from the Electrical Safety Authority to a contractor to connect a particular electrical installation or part thereof to a source of electric energy.
9. Add the following definition:  
**Contractor** — any person who as principal, servant, or agent, by himself or herself or by associates, employees, servants or agents, performs or engages to perform, either for his or her own use and benefit or for that of another, and for or without remuneration or gain, any work with respect to any electrical installation or any other work to which this Code applies.
10. Add the following definition:  
**Critical injury** — an injury of a serious nature that
  - a) places life in jeopardy;
  - b) produces unconsciousness;

- c) results in a substantial loss of blood;
- d) involves the fracture of a leg or arm but not a finger or toe;
- e) involves the amputation of a leg, arm, hand, or foot but not a finger or toe;
- f) consists of burns to a major portion of the body; or
- g) causes the loss of sight in one eye.

11. Delete the CE Code definition of “current-permit”.

12. Delete the CE Code definition of “electrical equipment” and replace with the following:

**Electrical equipment** — an “electrical product or device” as defined in subsection 113.12.1 of Part VIII of the Electricity Act, 1998, and means anything used or to be used in the generation, transmission, distribution, retail, or use of electricity.

13. Delete the CE Code definition of “electrical installation” and replace with the following:

**Electrical installation** — the installation of any wiring in or upon any land, building, or premises from the point(s) where electric power or energy can be supplied from any source to the point(s) where such power or energy can be used therein or thereon by any electrical equipment and includes the connection of any such wiring with any of the said equipment and any part of that wiring, and also includes the maintenance, alteration, extension, and repair of such wiring.

14. Add the following definition:

**Electrical Safety Authority** — “the sole administrative authority for the purposes of administering the provisions of the Electricity Act, 1998, and the regulations made under that Act that are designated legislation under section 1. O. Reg. 187/09, s. 2.” in accordance with Ontario Regulation 187/09.

15. Add the following definition:

**Field evaluation agency** — as defined in Ontario Regulation 438/07, an inspection body that is accredited in accordance with the Standards Council of Canada Act (Canada) to evaluate electrical equipment and that is recognized by the Electrical Safety Authority.

16. Delete the CE Code definition of “inspection department” and replace with the following:

**Inspection department** — the Electrical Safety Authority (see **Electrical Safety Authority**).

17. Add the following definition:

**Licensed electrical contractor** — an electrical contractor licensed in accordance with the Ontario Regulation 570/05 (Licensing of Electrical Contractors and Master Electricians) made under the Electricity Act, 1998.

18. Add the following definition:

**National Building Code of Canada** — the Ontario Building Code.

19. Add the following definition:

**Requirements of the supply authority** — a code or standard under a rule or bylaw of a municipal corporation or commission or under a rule of a person supplying power to such works.

20. Add the following definition:

**Serious electrical incident** —

- a) any electrical contact that causes death or critical injury to a person;
- b) any fire, explosion, or condition suspected of being electrical in origin that might have caused a fire, explosion, loss of life, critical injury to a person, or damage to property;
- c) any electrical contact with electrical equipment operating at over 750 V; or
- d) any explosion or fire in electrical equipment operating at over 750 V.

21. Delete the CE Code definition of “special permission”.

22. Delete the CE Code definition of “utilization equipment” and replace with the following:

**Utilization equipment** — electrical equipment that utilizes electrical energy for mechanical, chemical, heating, lighting, or similar useful purposes.

23. Add the following definition:

**Volt-amperes** (with respect to an electric circuit) — the mathematical product of the voltage and amperage carried thereby.

24. Delete Rules 2-000 through 2-032 of the CE Code, except for Rule 2-032 3) of the CE Code, and replace with the following:

### Section 2 — General Rules Administrative

#### 2-000 Scope (see Appendix B)

This Code does not apply to

- Δ a) electrical equipment and electrical installations used exclusively in the transmission or distribution of electrical power or energy intended for sale or distribution to the public as specified in Item i) or ii):
- i) the distributor is licensed to own or operate the distribution system under Part V of the Ontario Energy Board Act, 1998; or
  - ii) the transmitter is licensed to own or operate the transmission system under Part V of the Ontario Energy Board Act, 1998.
- b) electrical equipment and electrical installations in communication systems from the transformer or other current-limiting device used at the junction of the communication system with the electric circuit supplying the communication system;
- c) electrical equipment and electrical installations in the cars, car-houses, passenger stations, or freight stations used in the operation of an electric railway or electric street railway and supplied with electric current from the railway power-circuit;
- d) electrical equipment and electrical installations in railway locomotives, railway cars, signalling systems, communication systems, wayside train monitoring systems, and track facilities, including the branch circuit supplying such electrical equipment or electrical installations when such electrical equipment or electrical installation is used in the operation of a railway;
- e) electrical equipment and electrical installations in an aircraft;
- f) electrical equipment and electrical installations in a mine as defined in the Mining Act, excluding any dwelling house or other building not connected with, or required for, mining operations or purposes or used for the treatment of ore or mineral;
- g) electrical equipment and electrical installations on a vessel of non-Canadian registry or on a vessel that is required to be certified in accordance with the Canada Shipping Act except for such equipment and installations required to connect the electrical supply from the onshore electrical supply facility to the service box on the boat and including the service box; or
- h) electrical equipment forming an integral part of a self-propelled vehicle that is required to be certified in accordance with the Motor Vehicle Safety Act except for such equipment supplying electrical power from an electrical installation to the vehicle and those portions of a vehicle capable of receiving electrical power from an electrical installation.

#### 2-002 Special requirements

Sections devoted to Rules governing particular types of installations are not intended to embody all Rules governing these particular types of installations, but cover only those special Rules that add to or amend those prescribed in other Sections covering installations under ordinary conditions.

#### 2-003 Record of electrical installation work

The owner, owner's agent, or operator shall maintain a record of all electrical installation acceptable to the Electrical Safety Authority in any public building, commercial or industrial establishment, apartment house, or other

building in which the public safety may be involved, and shall produce this record to any inspector at any time and from time to time upon request, as specified by the Electrical Safety Authority.

### **2-004 Notification of work**

- 1) A contractor shall file a notification with the Electrical Safety Authority of any work on an electrical installation
  - a) prior to commencement of the work, whether or not electrical power or energy has been previously supplied to the land, building, or premises on which the work is performed; or
  - b) within 48 h after commencement of the work where compliance with Subrule 1) a) is not practicable.
- 2) A contractor shall pay the fees prescribed by the Electrical Safety Authority and be in compliance with Ontario Regulation 570/05 made under Part VIII of the Electricity Act, 1998.
- 3) Where the Electrical Safety Authority refuses a notification in accordance with provisions of Rule 2-008, the contractor shall not proceed with any further electrical work.
- 4) Every contractor who undertakes an electrical installation is responsible for ensuring the electrical installation complies with this Code and for procuring an authorization for connection from the Electrical Safety Authority before the installation is used for any purpose.
- 5) The contractor shall give the Electrical Safety Authority at least 48 h notice that the work on the electrical installation has been completed and that the installation is ready for a connection authorization, but where the work is being performed in a remote district or is not immediately accessible for any other reason, the notice shall be of such greater length as is necessary to accommodate the inspection schedule of the Electrical Safety Authority.
- 6) Inspections as required by the Electrical Safety Authority may be made at such time and in such manner as the Electrical Safety Authority determines.
- 7) An electrical installation shall not be concealed or rendered inaccessible until it conforms to this Code and such concealment or rendering inaccessible has been authorized by an inspector.
- 8) An installation may be accepted and a connection authorized by the Electrical Safety Authority even though the installation has not been inspected provided
  - a) a contractor files with the Electrical Safety Authority a completed notification of any work on an electrical installation as per Subrules 1) and 2);
  - b) the contractor is qualified in accordance with Subrules 9) and 10);
  - c) the contractor is in compliance with the process set out by the Electrical Safety Authority; and
  - d) the contractor has provided assurance acceptable to the Electrical Safety Authority that all portions of the installation comply with this Code.
- 9) A contractor may be eligible for the process in Subrule 8) where
  - a) a contractor is in compliance with Ontario Regulation 570/05 under Part VIII of the Electricity Act, 1998;
  - b) a contractor
    - i) holds an appropriate certificate of qualification issued to the contractor that is not suspended in accordance with the provisions of the Building Opportunities in the Skilled Trades Act, 2021;
    - ii) holds appropriate liability insurance; and
    - iii) has demonstrated knowledge of this Code, as it applies to the installations, that is satisfactory to the Electrical Safety Authority; or
  - c) a contractor
    - i) has demonstrated competency through appropriate training and examination or in other ways;
    - ii) holds appropriate liability insurance; and
    - iii) has demonstrated knowledge of this Code, as it applies to the installations, that is satisfactory to the Electrical Safety Authority.
- 10) Where an installation is such that a notification covers work by more than one individual, the Electrical Safety Authority may require some or all individuals performing work on an installation to satisfy Subrule 9) as a condition for following the process in Subrule 8).

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- 11) *Where Subrule 8) is followed, the particular installations inspected shall be determined by the Electrical Safety Authority.*
- 12) *The Electrical Safety Authority may refuse to follow the process in Subrule 8) where work by the contractor has been found to be contrary to the requirements of this Code.*

### **2-005 Notification not required** (see Appendix B)

*Notwithstanding the provisions of Rule 2-004, a notification is not required*

- a) *for the installation of replacement utilization equipment, receptacles, or general-use switches by a licensed electrical contractor if the equipment being installed*
  - i) *is installed in an owner-occupied dwelling unit;*
  - ii) *is installed in a branch circuit having a rating not exceeding 30 A and 130 V;*
  - iii) *is interchangeable with the equipment being replaced in function, electrical rating, size, and weight without having to change any part of the branch circuit;*
  - iv) *is installed in the same location as the equipment being replaced;*
  - v) *is approved in accordance with Rule 2-024;*
  - vi) *is not electrical equipment forming part of an electrical installation to which Sections 24, 38, 64, 68, and 84 of this Code apply; and*
  - vii) *does not involve the repair, modification, or replacement of a service box or a panelboard or the replacement of an electro-mechanical overcurrent device in a service box or panelboard;*
- b) *for the installation of replacement luminaires, and general-use switches, by the single dwelling unit owner, if the luminaires or general-use switches being installed are*
  - i) *installed in an owner-occupied single dwelling unit;*
  - ii) *installed in a branch circuit having a rating not exceeding 15 A and 130 V;*
  - iii) *interchangeable with the equipment being replaced in function, electrical rating, size, and weight without having to change any part of the branch circuit;*
  - iv) *installed in the same location as the equipment being replaced;*
  - v) *not connected to aluminum wiring;*
  - vi) *approved in accordance with Rule 2-024;*
  - vii) *not electrical equipment forming part of an electrical installation to which Section 68 of this Code applies;*
  - viii) *not recessed luminaires to which Rules 30-900 to 30-912 apply; and*
  - ix) *not connected to ungrounded branch circuits;*
- c) *for the installation of wiring and associated equipment connected to the load side of an approved Class 2 power supply or a limited power supply (LPS) whose output does not exceed Class 2 power supply limits by an employee or agent of the original equipment manufacturer or a worker in accordance with his/her designation when the wiring is*
  - i) *installed in an owner-occupied dwelling unit;*
  - ii) *not connected to electrical equipment identified in Subrule 2-022 3); and*
  - iii) *not connected to electrical equipment forming part of an electrical installation to which Sections 30, 32, 38, and 68 of this Code apply;*
- d) *for the connection or replacement of dishwashers, cooktops, garburators, trash compactors, ovens, exhaust fans, baseboard heaters, furnaces, and hot water tanks, if the equipment installation work*
  - i) *is performed by one of the following, each according to his/her designation:*
    - A) *a licensed electrical contractor;*
    - B) *an employee or agent of the original equipment manufacturer who has been trained by the manufacturer to connect the equipment;*
    - C) *a person authorized to do such work in accordance with Ontario Regulation 215/01 (Fuel Industry Certificates) made under the Technical Standards and Safety Act, 2000; or*
    - D) *a person authorized to do such work within the scope of practice for the trade of plumbing under the Building Opportunities in the Skilled Trades Act, 2021;*
  - ii) *is in an owner-occupied dwelling;*

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- iii) *is installed in an existing branch circuit for the application having a rating not exceeding 30 A and 240 V;*
  - iv) *does not include installing, extending, altering, or repairing any electrical wiring connected to that equipment; and*
  - v) *does not include installing equipment having a rating that exceeds the rating of the branch circuit;*
- e) *when repairs are performed on existing installed utilization equipment in an owner-occupied dwelling unit and the repair work*
  - Δ i) *is performed by one of the following, each according to his/her designation:*
    - A) *a licensed electrical contractor;*
    - B) *an employee or agent of the original equipment manufacturer who has been trained by the manufacturer to perform maintenance, service, or repair on the equipment;*
    - C) *a person authorized to do such work within the scope of practice for the trade of refrigeration and air-conditioning systems mechanic or residential air-conditioning systems mechanic under the Building Opportunities in the Skilled Trades Act, 2021;*
    - D) *a person authorized to do such work in accordance with Ontario Regulation 215/01 (Fuel Industry Certificates) made under the Technical Standards and Safety Act, 2000; or*
    - E) *a person authorized to do such work within the scope of practice for the trade of plumbing under the Building Opportunities in the Skilled Trades Act, 2021;*
  - ii) *does not include installing, extending, altering, or repairing any electrical wiring connected to that equipment;*
  - iii) *does not include detaching any electrical wiring connected to that equipment;*
  - iv) *includes equipment installed on a branch circuit having a rating not exceeding 30 A and 130 V, or 50 A and 240 V;*
  - v) *does not alter the electrical rating or the characteristics of the equipment; and*
  - vi) *does not include installing replacement components of a type that may invalidate the original certification mark;*
- f) *for the installation of a meter-base plug-in transfer device*
  - i) *by a licensed electrical contractor; and*
  - ii) *in accordance with the requirements of the supply authority;*
- g) *for the bonding of interior metal gas piping or tubing when the work is performed by a person authorized to do such work in accordance with Ontario Regulation 215/01 (Fuel Industry Certificates) made under the Technical Standards and Safety Act, 2000; or*
- h) *for the installation of wiring and associated equipment connected to the load side of a disconnect switch or circuit breaker of an elevation device in other than a dwelling unit in accordance with Ontario Regulation 209/01 (Elevating Devices) made under the Technical Standards and Safety Act, 2000.*

### **2-006 Periodic inspection**

- 1) *A notification may be made by the owner, owner's agent, or occupant of any manufacturing, mercantile, or other building where electrical installation work of a routine nature in connection with the maintenance or operation of the building or the plant therein is required to be performed at frequent intervals.*
- 2) *Acceptance of the notification by the Electrical Safety Authority shall authorize the commencement and execution of such work during the period for which the acceptance is issued, and Rule 2-004 shall not apply.*
- 3) *Upon request, an inspection shall be made at such time and in such manner as the Electrical Safety Authority determines.*

### **2-007 Reporting of serious electrical incidents**

- 1) *An owner, contractor, or operator of a facility shall report to the Electrical Safety Authority any serious electrical incident of which it is aware within 48 h after the occurrence.*
- 2) *No person shall, except in the interests of public safety, saving life, relieving human suffering, continuity of service, or preservation of property, interfere with or disturb any wreckage, article, or thing at the scene of*

and connected with the occurrence, but in no case shall the wreckage, article, or thing be carried away or destroyed by any person unless permission to do so is given by an inspector.

### **2-008 Right of refusal**

The Electrical Safety Authority may refuse a notification by any person

- a) who has failed to pay any fees or dues owing to the Electrical Safety Authority for a period of more than 30 days;
- b) who has failed to remedy defects in any electrical work or in any installation after having been notified by the Electrical Safety Authority that the defects exist; or
- c) who is not in compliance with Ontario Regulation 570/05 made under Part VIII of the Electricity Act, 1998.

### **2-010 Plans and specifications (see Appendix B)**

- Δ 1) Electrical work on any electrical installation shall not commence until plans have been submitted and examined by the Electrical Safety Authority where the electrical installation involves
- a) a three-phase consumer service or standby generation, equal to or in excess of 400 A circuit capacity;
  - b) a single-phase consumer service or standby generation equal to or in excess of 600 A;
  - c) a feeder greater than 1000 A;
  - d) an emergency power supply for life safety systems as per Section 46, excluding unit equipment;
  - e) any installations within the scope of Section 64 or bi-directional electrical vehicle supply equipment, with an output rating in excess of 10 kW;
  - f) any installation of electrical vehicle supply equipment, with the exception of a single dwelling unit, where the total nameplate rating(s) of the electrical vehicle supply equipment including both existing and new is greater than 20% of the rating of the service equipment; or
  - g) any installation operating in excess of 750 V, excluding
    - i) installations of pole lines exclusively within the scope of Section 75;
    - ii) that portion of an underground installation between a supply authority-owned transformer and the related supply authority-owned switch; or
    - iii) replacement of electrical equipment as permitted by Subrule 2 c).
- 2) Plans need not be submitted for
- a) maintenance/repair work;
  - b) temporary installations, and work within the scope of Section 76, for equipment operating at not more than 750 V phase-to-phase or not more than 1000 A; or
  - c) the replacement of electrical equipment provided
    - i) equipment electrical characteristics are the same as the existing equipment characteristics; and
    - ii) the existing installation meets the requirements of this Code.
- 3) A copy of the examined plans shall be available on-site and a copy of the Electrical Safety Authority's code compliance report shall be attached to the plans, or the Electrical Safety Authority's report number shall be written on the plans.
- 4) The person responsible for the plan design shall file with the Electrical Safety Authority complete wiring plans and specifications relating to the proposed work and shall pay the plan review fees as prescribed by the Electrical Safety Authority.
- 5) For installations that proceed in phases, plans may be submitted as the project progresses, and the work of each phase shall not commence until the plans for that phase have been examined.
- 6) Plans and specifications that are submitted shall contain the following information, as applicable to the electrical installation:
- a) the name, contact information, account number (if applicable), and address of the submitter;
  - b) the type of building or electrical installation and the site name and address where the work will be carried out;
  - c) the location of the service and main distribution room layout;
  - d) the supply voltage;
  - e) the complete single-line diagram of the service and distribution;



- f) the nameplate rating of the overcurrent protection devices, and feeder sizes;
- g) the available fault current, interrupting or withstand rating, and ampere rating for continuous operation (80% or 100%) of each item of equipment;
- h) for installations that include a hazardous location, drawings indicating the classification and extent of the hazardous areas;
- i) the size and location of grounding conductors;
- j) a description of underground parts of the installation for feeders as defined in Subrule 1) a), b), or c);
- k) for an addition to an existing electrical installation, any information related to the existing installation affected by the work and a report on the maximum demand loads of the existing installation recorded for the last twelve months;
- l) for an electrical installation of more than 750 V, the vertical and horizontal clearances of live parts, and a description of the grounding and of the mechanical protection of live parts;
- m) for projects involving health care facilities, the location and level of all patient care areas;
- n) for projects involving standby generation for life safety loads, transfer scheme and life safety emergency distribution;
- o) for projects that include interconnection of electric power production sources with a supply authority system, drawings indicating the interconnection arrangement; and
- p) for solar photovoltaic projects, the maximum photovoltaic source and output circuit voltage as per Rule 64-202.

### **2-012 Connection authorization**

- 1) Where any electrical installation or part thereof to which electric power or energy has not previously been supplied is made in or upon any land, building, or premises; or where any electrical installation or part thereof has been disconnected or cut off from any service or other source of supply under this Code; or subject to Subrule 2), no supply authority, contractor, or other person shall connect or reconnect the installation or part thereof to any service or other source of supply unless
  - a) the installation and all related work are in compliance with the requirements of this Code; and
  - b) a connection authorization has been issued by the Electrical Safety Authority with respect to the installation.
- 2) Where a connection authorization as referenced in Subrule 1) has been issued to a supply authority, it shall be valid for the connection of a service for a period of up to 6 months from the date of issue.
- 3) Where any electrical installation or part thereof has been disconnected or cut off from a source of supply by a supply authority for 6 months or less for non-payment of rates or because of a change of occupancy of premises, the supply authority may reconnect the installation or part thereof without obtaining a connection authorization.

### **2-013 Connection authorization not required**

Notwithstanding the provisions of Rule 2-012, a connection authorization for an electrical installation or part thereof is not required if the installation does not require a notification in accordance with the provisions of Rule 2-005.

### **2-014 Temporary connection authorization**

- 1) Notwithstanding the provisions of Rule 2-012, the Electrical Safety Authority may issue a connection authorization authorizing a supply authority, contractor, or other person to connect a source of electric energy for a stated length of time and under specific conditions to a temporary electrical installation or to a permanent but unfinished electrical installation and may renew the connection authorization from time to time.
- 2) Issuance of a connection authorization in accordance with Subrule 1) does not obligate the Electrical Safety Authority to issue a permanent connection authorization for an installation that is not in compliance with this Code.

### **2-016 Re-inspection**

*The Electrical Safety Authority may at any time re-inspect any electrical installation notwithstanding any previous inspection and acceptance of the installation.*

### **2-018 Defects**

- 1) *Every contractor who has performed work on an electrical installation and has been notified by the Electrical Safety Authority that the installation does not conform to this Code shall remedy all defects in work and replace all electrical equipment that is not approved within such time and in such manner as the notice from the Electrical Safety Authority directs.*
- 2) *Every contractor who has submitted a notification of an installation or portion thereof that has not previously been authorized to receive power and who has been notified by the Electrical Safety Authority that the installation does not conform to this Code shall remedy all defects in work and replace all electrical equipment that is not approved within such time and in such manner as the notice from the Electrical Safety Authority directs.*
- 3) *The Electrical Safety Authority may, by notice in writing, require any owner or occupant of land, buildings, or premises upon or within which is found an electrical installation in which a condition dangerous to persons or property has developed to make such changes in the electrical installation as are necessary to remedy the condition.*
- 4) *Upon receipt of the notice referred to in Subrule 3), the owner or occupant of the lands, buildings, or premises shall cause the installation to be changed in the manner and to the extent prescribed by the notice within the time limit.*
- 5) *Where a contractor or person refuses or neglects to comply with a notice given under Subrule 1) or 2), or the owner or occupant of lands, buildings, or premises refuses or neglects to comply with a notice given under Subrule 3), the Electrical Safety Authority may disconnect the supply or require the supply authority to disconnect the supply of electrical power or energy to the lands, buildings, or premises in which is contained the electrical installation that was the subject of the notice.*
- 6) *If the supply has been disconnected pursuant to Subrule 5), it shall not be reconnected until full compliance with the notice has been made.*

### **2-022 Sale or use of electrical equipment (see Appendix B)**

- 1) *No person shall use, advertise, display, sell, or offer for sale or for other disposal any electrical equipment unless it has been approved in accordance with Rule 2-024 except as specified in Subrule 2).*
- 2) *Electrical equipment does not require approval*
  - a) *if permission is granted by the Electrical Safety Authority for it to be displayed or activated for demonstration at a trade show;*
  - b) *except as specified in Subrule 3), where the equipment is connected to the output of*
    - i) *a Class 2 power supply; or*
    - ii) *a limited power supply (LPS) whose power output does not exceed Item i);*
  - c) *except as specified in Subrule 4), if the equipment is battery-operated and portable; or*
  - d) *if the equipment, by design, is intended to be used solely outside of Ontario.*
- 3) *The following equipment shall be approved when connected to the output of Class 2 or LPS power supply:*
  - a) *luminaires;*
  - b) *decorative lighting strings, signs, or displays;*
  - c) *electrical medical equipment;*
  - d) *equipment for hazardous locations as defined under Sections 18 and 20 of this Code;*
  - e) *equipment that incorporates heating elements; or*
  - f) *lighting equipment that incorporates light-emitting diodes (LEDs).*
- 4) *Battery-operated portable equipment shall be approved if the equipment is*
  - a) *located in hazardous locations as defined under Sections 18 and 20 of this Code; or*
  - b) *used to test, measure, or indicate one or more electrical quantities, and is marked as Category III or IV.*

- 5) *If assembled electrical equipment consists of or incorporates approved component(s), the electrical equipment shall not be deemed to be approved unless the whole electrical equipment as assembled is approved in accordance to Subrule 1).*
- 6) *If a certification report or a field evaluation report relating to any approved electrical equipment requires a notice indicating the proper and safe manner of use of the electrical equipment be affixed to the electrical equipment or provided with it, no person shall use, advertise, display, sell, or offer for sale or other disposal of the electrical equipment without affixing or providing the notice in the manner required, as required by Section 5 of Ontario Regulation 438/07.*

### **2-024 Approval of electrical equipment** (see Appendix B)

- 1) *Electrical equipment shall be deemed to be approved if it has been approved according to the process set out in Section 2 of Ontario Regulation 438/07.*
- 2) *No person shall affix to any electrical equipment an approval label that was not issued for that electrical equipment.*
- 3) *If electrical equipment that is used in or connected to an electrical installation is inspected in accordance with Rule 2-004 by the Electrical Safety Authority, it shall be deemed to be approved if the installation and electrical equipment pass the inspection.*

### **2-026 Cancellation of approval**

- 1) *The Electrical Safety Authority may suspend, revoke, or reinstate the approval of electrical equipment according to the process set out in Subsection 6 of Ontario Regulation 438/07 and according to the rules developed by the Electrical Safety Authority.*
- 2) *If an approval is suspended or revoked, the electrical equipment shall be deemed not to be approved.*
- 3) *The Electrical Safety Authority may require that notice be given to the public or any person or class of persons by the persons identified in Section 9 of Ontario Regulation 438/07.*

### **2-028 Deleted**

### **2-030 Deviation or postponement**

*A deviation from or postponement of the requirements of this Code is lawful in respect of an electrical installation where adequate proof that the deviation or postponement does not create an undue hazard to persons or property under the circumstances has been provided to the Electrical Safety Authority.*

### **2-032 Damage and interference** (see Appendix B)

- 1) *No person shall damage or cause any damage to any electrical installation or electrical equipment.*
- 2) *No person shall interfere with any electrical installation or electrical equipment in the course of alterations or repairs to non-electrical equipment or structures except where it is necessary to disconnect or move components of an electrical installation, in which event it shall be the responsibility of the person carrying out the alterations or repairs to ensure the electrical installation is restored to a safe operating condition as soon as the progress of the alterations or repairs permits.*

25. *Keep Rule 2-032 3) and the corresponding Appendix B Note of the CE Code:*

- 3) *Electrical equipment that has been exposed to ingress of water shall be subjected to evaluation to ascertain whether or not the equipment may be placed back into service.*
- 4) *No person shall remove any tag, seal, or warning applied to an electrical installation or applied to electrical equipment by the Electrical Safety Authority from that electrical installation or electrical equipment without permission from the Electrical Safety Authority.*

### **2-034 Use of approved equipment**

*No person shall use electrical equipment for any purpose or in any manner other than the purpose or manner for which it is intended.*

### 2-036 General

No contractor shall perform any work on an electrical installation in any manner contrary to the requirements of this Code.

26. Keep Rule 2-034 and the corresponding Appendix B Note of the CE Code and renumber as Rule 2-038:

**Δ 2-038 Application of Code requirements** (see Appendix B)

Electrical equipment forming part of an electrical installation that is not covered by the scope of this Code shall not be used to meet the requirements of this Code.

27. Delete CE Code Rule 2-106 and replace with the following:

#### **2-106 Rebuilt equipment**

- 1) Where any electrical equipment is rebuilt or rewound with any change in its rating or characteristics, it shall be provided with a nameplate giving the name of the person or firm by whom such change was made together with the new marking.
- 2) Where the original nameplate is removed, the original manufacturer's name and any original identifying data (e.g., serial numbers) shall be added to the new nameplate.
- 3) The appropriate requirements of the appropriate standard applying to new electrical equipment shall also apply to rebuilt and rewound equipment unless it is impracticable to comply with such requirements.
- 4) Rebuilt or refurbished moulded case circuit breakers or moulded case switches shall not be considered to be approved for the purpose of Rule 2-024.
- 5) When installed electrical equipment is retrofitted with a retrofit kit and the installation conforms to the requirements of the Electrical Safety Authority, the equipment is deemed to be approved.

28. Section 3 — Deleted

### **Section 3**

**Note:** This Section has been deleted.

### **Section 4 — Conductors**

29. Add Rule 4-004 26) as follows:

- 26) Notwithstanding Rules 4-006 and 8-200 1) b), 3-wire 120/240 V and 120/208 V service conductors or cables for single dwellings and feeder conductors or cables supplying single dwelling units of row housing, apartment, or similar buildings shall be permitted to be sized in accordance with Table 39 if they have a 90 °C insulation rating and the maximum calculated load or demonstrated load does not exceed the 75 °C ampacity of the conductor in accordance with Rules 8-104 and 8-106.

### **Section 6 — Services and service equipment**

30. Delete CE Code Rule 6-112 and replace with the following:

#### **6-112 Support for the attachment of overhead supply or consumer's service conductors or cables** (see Appendix B)

- 1) A means of attachment shall be provided for all supply or consumer's service conductors.
- 2) The point of attachment shall be
  - a) on the same side of the building as the consumer's service head or equivalent;
  - b) solidly anchored to the structure or service mast;
  - c) in a position that allows the overhead service conductors or cables to have an angle away from the structure; and
  - d) in compliance with the requirements of the supply authority.
- 3) The point of attachment of supply or consumer service conductors shall be not less than 4.5 m nor more than 9 m above sidewalk or grade.
- 4) Exposed service conductors or cables that are not higher than windows, doors, and porches shall have a clearance of not less than 1 m from the windows, doors, or porches.
- 5) Where service masts are used, they shall

- a) be of metal and assembled from components suitable for service mast use;
- b) be attached to the building as shown in Specification 28; and
- c) be guyed, if required in accordance with Rule 6-118.
- 6) Rigid steel conduit of a minimum nominal size of 63 trade size shall be permitted to be used for the purpose of Subrule 5) provided all other requirements for a service mast are complied with.
- 7) Bolts shall be used for securing the means of attachment at the point of attachment, and if attached to wooden structural members, the latter shall be not less than 38 mm in any dimension.
- 8) The supply or consumer's service conductor support shall not be attached to the roof of a structure except as permitted in Subrule 9).
- 9) Notwithstanding Subrule 8), it shall be permitted to fasten the upper service mast support and the eye bolt to which a guy wire is attached to a main structural member of the roof, such as a roof rafter, a roof truss, or the equivalent.

31. Delete CE Code Rule 6-116 and replace with the following:

### **6-116 Consumer's service head location**

- 1) The consumer's service head or equivalent shall be installed
  - a) in compliance with the requirements of the supply authority; and
  - b) in such a position that the point of emergence of the conductors from the consumer's service head or equivalent is
    - i) a minimum of 150 mm and a maximum of 300 mm above; and
    - ii) a maximum of 600 mm horizontally from the support for attachment of the overhead service conductors or cables.
- 2) Notwithstanding Subrule 1) b), for central metering installations on a pole, the emergence of the secondary service conductors from the weatherhead shall be permitted to be installed as per the appropriate dimensions as identified in Specification 41.

32. Add Rule 6-118 as follows:

### **6-118 Guys on service masts**

- 1) Where the distance from the upper support clamp on the service mast to the point of attachment exceeds 1.5 m, or where the span exceeds 30 m, or the weather loaded tension is known to exceed 270 kg (600 lbs), the mast shall be guyed in accordance with Specification 28.
- 2) Guy wires shall
  - a) be of 7-strand steel;
  - b) have a diameter of at least 6 mm (1/4 in), Grade 1300 (Grade 180);
  - c) be Class B coating weight galvanized; and
  - d) have corrosion-resistant preformed grips or clamps for attachment.

## **Section 8 — Circuit loading and demand factors**

33. Delete CE Code definition of "electric vehicle energy management system" and replace with the following:

- Δ **Energy management system** — a means used to control electrical loads through the process of connecting, disconnecting, increasing, or reducing electric power to the loads and consisting of any of the following: a monitor(s), communications equipment, a controller(s), a timer(s), and other applicable device(s).

34. Delete CE Code Rule 8-106 10) and 11) and replace with the following:

### Δ **8-106 Use of demand factors** (see Appendix B)

- 10) Where loads are controlled by an energy management system, the demand load for the electrical equipment shall be equal to the maximum load allowed by the energy management system.
- Δ 11) For the purposes of Rules 8-200 1) a) vi), 8-202 1) a) vii), 8-202 3) d), 8-204 1) d), 8-206 1) d), 8-208 1) d), and 8-210 c), the demand load for the electrical equipment shall not be required to be considered in the determination of the calculated load where an energy management system as described in Subrule 10) performs the functions of

- a) monitoring the consumer's service, feeders, and branch circuits; and
- b) controlling the electrical equipment loads in accordance with Rule 8-500.

35. Delete CE Code Rule 8-202 3) and replace with the following:

**8-202 Apartment and similar buildings** (see Appendix B)

- Δ 3) The calculated load for the consumer's service or feeder supplying two or more dwelling units shall be based on the calculated load obtained from Subrule 1) a) and the following:
- a) excluding any electric vehicle supply equipment loads, electric space-heating loads and any air-conditioning loads, the load shall be considered to be
    - i) 100% of the calculated load in the unit having the heaviest load; plus
    - ii) 65% of the sum of the calculated loads in the next 2 units having the same or next smaller loads to those specified in Item i); plus
    - iii) 40% of the sum of the calculated loads in the next 2 units having the same or next smaller loads to those specified in Item ii); plus
    - iv) 25% of the sum of the calculated loads in the next 15 units having the same or next smaller loads to those specified in Item iii); plus
    - v) 10% of the sum of the calculated loads in the remaining units;
  - b) if electric space heating is used, the sum of all the space-heating loads as determined in accordance with the requirements of Section 62 shall be added to the load determined in accordance with Item a), subject to Rule 8-106 3);
  - c) if air conditioning is used, the sum of all the air-conditioning loads shall be added, with a demand factor of 100%, to the load determined in accordance with Items a) and b), subject to Rule 8-106 3);
  - d) except as permitted by Rule 8-106 10) or Rule 8-106 11), any electric vehicle supply equipment loads shall be added with a demand of 100%; and
  - e) in addition, any lighting, heating, and power loads not located in dwelling units shall be added with a demand factor of 75%.

36. Delete CE Code Subsection entitled "Electric vehicle energy management systems" and replace with the following:

Δ

### **Energy management systems**

Δ **8-500 Energy management systems**

- 1) Energy management systems shall be permitted to monitor and control electrical loads.
- 2) An energy management system shall not cause the load of a branch circuit, feeder, or service to exceed the requirements of Rule 8-104 5) or 6).
- 3) An energy management system shall be permitted to control electrical power by remote means.

### **Section 12 — Wiring methods**

37. Delete CE Code Rules 12-000 1) b) and d).

### **Section 14 — Protection and control**

38. Add Rule 14-418 as follows:

**14-418 Disconnecting means** (see Appendix B)

- 1) A single disconnecting means shall be provided either integral with or adjacent to the distribution equipment
  - a) within each unit of a multi-unit building, other than a dwelling unit;
  - b) within each area common to more than one building (e.g., an underground parking area); or
  - c) within each building when fed from another building.
- 2) Subrule 1) does not apply to circuits from part of fire alarm, fire protection, and emergency systems.
- 3) Where more than one feeder supplies a unit or building, a single disconnecting means as required by Subrule 1) shall be permitted for each feeder.



- 4) When two or more single disconnecting means are installed in a unit or building in accordance with Subrule 3), all disconnecting means shall
- a) be grouped together, where practical; or
  - b) have a permanent diagram posted on or near each disconnect, indicating the location of all the other single disconnects supplying power to the building or unit.

### Section 16 — Class 1 and Class 2 circuits

39. Delete CE Code Rule 16-222 and replace with the following:

**16-222 Equipment located on the load side of overcurrent protection, transformers, or current-limiting devices for Class 2 circuits** (see Appendix B)

Class 2 circuits shall be arranged so that no live parts are accessible when the operating voltage exceeds

- a) for dry or damp locations
  - i) 30 V rms for sinusoidal ac;
  - ii) 42.4 V peak for other waveforms (nonsinusoidal ac);
  - iii) 60 V continuous dc; and
  - iv) 24.8 V peak for interrupted dc (square wave dc at a rate of 10 to 200 Hz); and
- b) for wet locations (not including immersion)
  - i) 15 V rms for sinusoidal ac;
  - ii) 21.2 V peak for nonsinusoidal ac;
  - iii) 30 V for continuous dc; and
  - iv) 12.4 V peak for interrupted dc (square wave dc at a rate of 10 to 200 Hz).

### Section 20 — Flammable liquid and gasoline dispensing, service stations, garages, bulk storage plants, finishing processes, and aircraft hangars

40. Delete CE Code Rule 20-060 and replace with the following:

**20-060 Scope** (see Appendix B)

- 1) Rules 20-062 to 20-070 apply to locations in which compressed natural gas is dispensed to the fuel tanks of self-propelled vehicles and to associated compressors and storage facilities.
- 2) The Rules in this Section do not apply to vehicle refuelling appliances specifically approved for the purpose to the applicable standard and installed in accordance with CSA B149.1 that do not have storage facilities.

### Section 24 — Patient care areas

41. Delete CE Code Rule 24-000 2).

42. Delete CE Code Rule 24-104 8) and replace with the following:

- Δ 8) A circuit consisting of conductors connected to communication or nurse call equipment that is installed within a patient care area shall be deemed a Class 1 circuit but shall have its voltage and power limited in accordance with Rule 16-222.

### Section 26 — Installation of electrical equipment

43. Delete CE Code Rule 26-744 4) and replace with the following:

- 4) A receptacle of CSA configuration 14-50R, as shown in Diagram 1, shall be installed at a suitable location in every single dwelling and in every dwelling unit of an apartment or similar multi-dwelling building for supplying electric energy to an electric range.

44. Add Rules 26-744 11), 12), 13), and 14) as follows:

- 11) Where a wiring system intended to supply an electric clothes dryer is installed, it shall be connected to a receptacle as outlined in Subrule 3) at the load end and connected to the panelboard at the supply end.

- 12) Where a receptacle as required by Subrule 3) is installed, it shall be connected to the panelboard by a wiring system as specified in Section 12.
- 13) The range receptacle referred to in Subrule 4) shall be connected to the panelboard by a wiring system as specified in Section 12 and shall have overcurrent protection as required by Section 14.
- 14) Notwithstanding Subrule 4), the range receptacle need not be installed in
  - a) dwelling units where a built-in gas-fired or electric cooktop or a built-in gas-fired or electric oven is installed;
  - b) other than single dwellings where provision has been made for a gas range; or
  - c) dwelling units where power from a supply authority is not available and the capacity of local generation is less than 6 kW.

### Section 28 — Motors and generators

45. Add Rule 28-500 4) as follows:

**28-500 Control required** (see Appendix B)

- 4) A manually operated across-the-line type of motor starter that is not marked “Suitable for Motor Disconnect” shall not be used as disconnecting means, and shall be field marked
  - a) “WARNING — Do not use to disconnect motor”; and
  - b) to indicate the disconnecting means and its location.See Appendix B.

### Section 30 — Installation of lighting equipment

#### 30-002 Special terminology

46. Add the following definition:

**Roadway lighting system** — a system of luminaires, poles, sign luminaires, underpass illumination, cables, power supply equipment, control systems, and associated materials required to provide illumination on a roadway or associated appurtenances on a municipal or provincial right-of-way.

47. Add Appendix B Note reference to Rule 30-200 as follows:

**30-200 Near or over combustible material** (see Appendix B)

48. Add Rule 30-1007 as follows:

#### **30-1007 Clearances for pole-mounted luminaires**

- 1) Where pole-mounted luminaires are installed on poles carrying the conductors of a primary line, the luminaire shall be at least 3 m below the primary conductors.
- 2) Notwithstanding Subrule 1), where the supply authority owns the distribution pole, the clearance requirements are permitted to meet the third party attachment requirements of the supply authority.

49. Add Rule 30-1009 as follows:

#### **30-1009 Clearances of poles supporting luminaires** (see Appendix B)

- 1) Where poles are installed to support luminaires, they shall have sufficient clearance from overhead primary and secondary lines, including neutral lines, so as to permit the pole to fall in an arc without touching the conductors at rest.
- 2) Where poles are installed to support luminaires near distribution lines owned by the supply authority, the clearances maintained shall be in accordance with the requirements of CSA C22.3 No. 1 or the supply authority, whichever specifies the greater clearances.

50. Delete CE Code Rule 30-1012 c) and replace with the following:

- c) in accordance with Section 75.

51. Delete CE Code Rule 30-1020 and replace with the following:

#### **30-1020 Switching of floodlights**

- 1) *Switches controlling floodlights shall comply with the following:*
  - a) *a switch on the primary side of a transformer shall be capable of making and interrupting the full load on the transformer;*
  - b) *switches controlling floodlights from the secondary side of a transformer shall have a current rating not less than 125% of the current requirements of the floodlights controlled;*
  - c) *switches shall be capable of being operated without exposing the operator to danger of contact with live parts, either by remote operation or by proper guarding; and*
  - d) *switches shall be capable of being locked in the OFF position.*
- 2) *Where pole-mounted luminaires are controlled from more than one point by switches, each switch shall be wired and connected so that the identified (neutral) conductor runs directly to the luminaire(s) controlled by it.*

52. Add Rule 30-1300 as follows:

### **Roadway lighting systems**

#### **30-1300 Roadway lighting systems** (see Appendix B)

- 1) *Roadway lighting systems shall be installed in accordance with Rule 2-024 3) and Rules 30-1000 to 30-1030 except Rule 30-1006 1) need not apply.*
- 2) *In-line fuseholders shall be acceptable to satisfy the requirements of Rules 30-1002 and 30-1008 for single luminaires fed from overhead distribution systems where a dedicated roadway lighting bus is not available.*
- 3) *Grounding and bonding of roadway lighting luminaires shall be as required by the authority having jurisdiction over the infrastructure installed on the public right-of-way.*
- 4) *Notwithstanding Subrule 1), the installation of roadway lighting systems or traffic control systems shall be permitted to meet the requirements of CSA C22.3 No. 1 or Ontario provincial standards.*
- 5) *Where poles are installed to support roadway lighting near distribution lines owned by the supply authority, the clearances shall be in accordance with the requirements of CSA C22.3 No. 1 or the supply authority, whichever specifies greater clearances.*

53. Add Rules 30-1400 to 30-1410 as follows:

### **LED luminaires in buildings of residential occupancies supplied by Class 2 circuits**

#### **30-1400 Scope** (see Appendix B)

*Rules 30-1402 to 30-1410 apply to the wiring and associated controls of LED luminaires required by the Ontario Building Code in buildings of residential occupancy that are supplied by Class 2 circuits in which the current is limited in accordance with Rule 16-200.*

#### **30-1402 Special terminology**

**LED lighting system** — *a complete assembly consisting of a power source that operates within Class 2 circuit limits, LED luminaires, wiring harness, connectors, and associated equipment.*

#### **30-1404 Sources of supply** (see Appendix B)

- 1) *A power supply for use with LED luminaires shall be*
  - a) *a Class 2 power supply;*
  - b) *a limited power supply (LPS) whose voltage and power output does not exceed Class 2 power supply; or*
  - c) *a power source that operates within Class 2 circuit limits, if part of a complete LED lighting system.*
- 2) *A power supply is permitted to be connected by an attachment plug, or be permanently connected, to a maximum 15 A, 120 V branch circuit.*
- 3) *Where a power supply as required by Subrule 1) is connected by an attachment plug, the receptacle shall be*

- a) dedicated for this purpose; and
- b) located in a suitable location to prevent the attachment plug from being inadvertently disconnected.

### **30-1406 Conductors**

Conductors for Class 2 circuit wiring shall be in accordance with Rule 16-210.

### **30-1408 Method of installation**

Class 2 circuit wiring shall be installed in accordance with at least the minimum wiring requirements for non-metallic-sheathed cable as specified by Rules 12-506 to 12-524.

### **30-1410 Bonding to ground**

Bonding shall not be required for non-current-carrying metal parts of luminaires and associated equipment connected to the secondary side of a Class 2 power supply or LPS unless specified by a manufacturer.

## **Section 36 — High-voltage installations**

54. Delete CE Code Rule 36-200 and replace with the following:

### **Δ 36-200 Service equipment and metering location (see Appendix B)**

- 1) Service equipment shall be installed in a location that complies with the requirements of the supply authority and, in the case of a building, shall be at the point of service entrance.
- 2) Metering equipment shall be connected on the load side of the service equipment except it shall be permitted on the supply side when the equipment contains the supply authority's revenue metering.

55. Delete CE Code Section 54 and associated Appendix B notes.

### **Δ 56. Delete CE Code Section 56 and associated Appendix B notes.**

57. Delete CE Code Section 60 and associated Appendix B notes.

58. Add Section 75 as follows:

## **Section 75 — Installation of power lines**

### **75-000 Scope**

- 1) This Section applies to
  - a) installations of primary and secondary lines except for lines owned by a supply authority;
  - b) poles and pole-mounted electrical equipment; and
  - c) central metering systems.
- 2) This Section supplements or amends the general requirements of this Code.

### **75-002 Special terminology (see Appendix B)**

In this Section, the following definitions and abbreviations apply:

**ACSR** — aluminum conductor, steel-reinforced.

**Classified** — poles graded according to strength whereby the minimum circumferential dimensions are determined so that all poles of the same class, regardless of length, will withstand the same horizontal force applied in accordance with CAN/CSA-O15 for wood poles, CSA G40.21 for steel poles, CSA A14 series for concrete poles, and ASCE Manual No. 104 for fibre-reinforced polymer.

**CMS** — central metering system; a metering system that is centrally located on the consumer side of the demarcation point to an embedded supply-authority-owned transformer, without a secondary breaker or switch, that supplies one or more consumer services on the same premises.

**Demarcation point** — the physical location where consumer-owned electrical infrastructure interconnects with the supply authority's distribution system.

**Distribution system** — the system by which electrical power or energy is distributed to the receiving equipment; it includes components such as a primary line, a secondary line, services, distribution transformers, distribution equipment, and other equipment of a similar nature.

**Embedded infrastructure** — any supply-authority-owned electrical equipment installed on the consumer's side of the demarcation point.

**Free-standing pole** — a pole structure and base assembly that is installed with engineering direction without the use of guys.

**Grades of construction** — a classification of strength of structures, guys, crossarms, conductors, messengers, insulators, pins, and fastenings, based on relative hazards ranging from 1 through 3, with Grade 1 being the strongest.

**Lines** —

**Primary line** — a distribution system operating at more than 750 V but not more than 50 000 V phase-to-phase.

**Secondary line** — a distribution system operating at 750 V or less.

**Neutral-supported cable** — two or three insulated conductors and a bare neutral.

**Open wire bus** — a secondary line conductor that has a weatherproof covering on the phase conductors and that includes a bare neutral.

**Pipelines** — those items through which gases, liquids, or solids are conveyed, including pipe, components, and any appurtenances attached thereto, up to and including the isolating valves used at stations and other facilities.

**Power conductor** — a conductor that conveys electrical power or energy and is not part of a communication circuit.

**Structure** — any object that can be placed, built, or erected, and is composed of parts.

### 75-004 General requirements (see Appendix B)

- 1) Where the work consists of the installation of a service, the supply authority shall be consulted as to the layout of the service and the location of the transformer and meter to ensure compliance with applicable codes or standards under a rule or bylaw of the supply authority.
- 2) Where the work consists of the installation of conductors over or under a railway, permission shall be obtained from the authorities having jurisdiction of the railway.
- 3) Where approval is required from the supply authority by this Rule, such approval shall be obtained prior to commencement of any work with respect to the installation.
- 4) Where the conductors of a primary or secondary line cross over or under a public road, permission shall be obtained from the supply authority and the authorities having jurisdiction of the road.
- 5) Where the work consists of the installation of overhead or underground circuits traversing navigable waterways, including commercial, recreational, and secondary waterways, permission shall be obtained from the authorities having jurisdiction of the waterway.
- 6) Where the work consists of the installation of overhead or underground circuits traversing above ground or underground pipeline systems, permission shall be obtained from the authorities having jurisdiction of the pipelines.

### 75-006 Hardware

All hardware shall be galvanized or corrosion-resistant.

### *Poles*

#### *A) General*

#### **75-100 Poles**

*All secondary line, primary line, and transformer poles shall be new, classified, and made of*

- a) *wood;*
- b) *steel;*
- c) *concrete;*
- d) *fibre-reinforced polymer; or*
- e) *other acceptable material as authorized by the Electrical Safety Authority.*

#### **75-102 Length of poles**

*Subject to Rule 75-706,*

- a) *every pole in a primary line shall be at least 12.2 m (40 ft) in length;*
- b) *every pole in a secondary line shall be at least 9.2 m (30 ft) in length;*
- c) *notwithstanding Items a) and b), in case of rock pole mounts approved in accordance with Rule 75-104 5), the above pole lengths shall be permitted to be reduced by 1.5 m; and*
- d) *notwithstanding Item a), lesser pole lengths shall be acceptable for stand-alone transformer pole installations provided the vertical height of any live part is at least 7 m (23 ft) above grade level.*

#### **75-104 Setting of poles**

- 1) *Where a pole having a length shown in Column 1 of Table 104 is set in earth, the butt end of the pole shall be buried to a depth of at least that prescribed in Column 2 of Table 104.*
- 2) *Where a pole having a length shown in Column 1 of Table 104 is set in solid rock using a rock auger, the butt end of the pole shall be buried to a depth of at least that shown in Column 2 of Table 104, less*
  - a) *30 cm for fair rock and limestone; or*
  - b) *60 cm for solid rock, granite, or massive limestone.*
- 3) *Where poles are installed on slopes or hillsides, the depth of the hole shall be measured from the lower side of the opening.*
- 4) *Corner and dead-end poles shall be offset away from the anchor or raked towards the anchor in accordance with Specifications 3 and 4.*
- 5) *Pole mounts shall be acceptable for wood poles on rock.*
- 6) *Where it is not practicable to employ the above methods,*
  - a) *poles shall be cribbed in accordance with*
    - i) *Specification 6; or*
    - ii) *Specification 7; or*
  - b) *when bedrock is encountered, pole setting reduction using filled steel culverts as a partial substitute shall be permitted for normal soil setting depth provided*
    - i) *the use of steel culverts is limited to situations where there is a lack of readily available equipment for rock removal (by blasting or drilling);*
    - ii) *the number of steel culverts, when used, is limited to two adjacent pole locations; and*
    - iii) *the installation is conducted in accordance with Specification 8.*
- 7) *Swamp cribbing for steel poles shall be permitted to be used only where permitted by and in accordance with the manufacturer's instructions.*

#### **75-106 Equipment attached to poles**

- 1) *No electrical equipment shall be attached to the poles of a supply authority without permission of the supply authority.*
- 2) *Equipment mounted on a wood pole shall be mounted on the same one-third of the pole's continuous circumference, leaving the remaining two-thirds of the pole's continuous circumference clear for climbing purposes when not accessible by an aerial device.*
- 3) *Stainless steel bands shall not be used as the sole support for electrical equipment installed on wooden poles.*



- 4) *Electrical equipment installed on metal or concrete poles shall be permitted to be supported by stainless steel strapping and buckles that shall have a minimum support strength of 4.5 kN.*
- 5) *Except for wood poles, field drilling of poles listed in Rule 75-100 for supporting electrical equipment shall not be permitted.*
- 6) *Notwithstanding Subrule 5), field drilling shall be permitted provided it conforms to the pole manufacturer's engineered drawings and adheres to an approved drilling procedure supplied by the manufacturer.*

### **75-108 Warning signs**

*All poles carrying primary or secondary lines shall have the following warning sign: "DANGER — Keep off. If work on this pole or near wires is necessary, call a qualified person."*

#### **B) Wood poles**

### **75-120 Wood poles**

- 1) *The pole "Species — Treatment" combinations listed in Table 102 are acceptable for new installations.*
- 2) *Notwithstanding Rule 75-100, used poles shall be permitted to be installed provided they*
  - a) *are classified;*
  - b) *have no visible signs of damage;*
  - c) *are listed in Table 102; and*
  - d) *have been authorized by the Electrical Safety Authority before the pole is set in the ground.*
- 3) *Wood poles shall adhere to the following requirements:*
  - a) *A transformer pole shall be a minimum of Class 5 and in accordance with the requirements of Table 103.*
  - b) *A single-phase primary line pole or a secondary line pole shall be a minimum of Class 7.*
  - c) *A three-phase primary line pole shall be a minimum of Class 5.*
  - d) *Poles shall meet the requirements of the supply authority when the supply authority's equipment and lines are installed on the poles.*

### **75-122 Marking of wood poles**

*All wood poles shall have the following markings:*

- a) *butt marking showing*
  - i) *type of wood;*
  - ii) *supplier's code or trademark; and*
  - iii) *class and length;*
- b) *side markings located above the ground line in accordance with Table 104; and*
- c) *side markings that include*
  - i) *treatment plant;*
  - ii) *class and length;*
  - iii) *type of wood;*
  - iv) *last two numerals of year of treatment; and*
  - v) *preservation code letter.*

#### **C) Steel poles**

### **75-140 Steel pole requirements**

- 1) *The poles shall be manufactured in compliance with the designs used to assign classes and other applicable requirements in CSA C22.3 No. 1.*
- 2) *The poles shall be galvanized.*
- 3) *Evidence of compliance with Subrules 1) and 2) shall be included in a report from a certification organization or from a professional engineer.*
- 4) *Notwithstanding Rule 75-100, used poles shall be permitted to be installed provided that they*
  - a) *are classified;*
  - b) *have no visible signs of damage; and*
  - c) *have been authorized by the Electrical Safety Authority before the poles are set in the ground.*
- 5) *The baseplate and top cap shall be installed.*

**75-142 Steel pole installations in known corrosive soils** (see Appendix B)

Additional below-grade corrosion protection shall be required for steel poles set directly in soil where there is knowledge or a history of aggressive corrosion of steel or iron in the soil.

**75-144 Marking of steel poles**

- 1) The poles shall be side-marked above the ground line, in accordance with Table 104, with manufacturers' code or trademark and with the pole class, length, and last two digits of the year of manufacture.
- 2) The pole class shall be marked with the wood pole equivalency of Grade 2 construction as defined in CSA C22.3 No. 1 for Classes 1, 2, 3, 4, and 5 as set out in CAN/CSA-O15.

**75-146 Depth of setting of steel poles**

Depth of setting for steel poles shall be as shown in Table 104.

### **D) Concrete poles**

**75-160 Concrete poles**

Concrete poles shall be manufactured in accordance with CSA A14.

**75-162 Concrete pole selection** (see Appendix B)

- 1) Accepted pole classes shall be in accordance with the equivalencies in Table 101.
- 2) Notwithstanding Rule 75-100, used poles shall be permitted to be installed provided they
  - a) are classified;
  - b) have no visible signs of damage; and
  - c) have been authorized for use by the Electrical Safety Authority before the poles are set in the ground.

**75-164 Marking of concrete poles**

The poles shall be side-marked above the ground line in accordance with Table 104, with the manufacturer's code or trademark, and with the pole class, length, and last two digits of the year of manufacture.

**75-166 Depth of setting of concrete poles**

Depth of setting for concrete poles shall be as shown in Table 104.

### **E) Fibre-reinforced polymer poles**

**75-180 Fibre-reinforced polymer poles** (see Appendix B)

Fibre-reinforced polymer poles shall be manufactured in accordance with ASCE Manual 104, Recommended Practice for Fiber-Reinforced Polymer Products for Overhead Utility Line Structures.

**75-182 Marking of fibre-reinforced polymer poles**

- 1) Fibre-reinforced polymer poles shall be side-marked above the ground line in accordance with Table 104, with manufacturers' code or trademark, and with the pole class, length, and last two digits of the year of manufacture.
- 2) The pole class shall be marked with the wood pole equivalency of Grade 2 construction as defined in CSA C22.3 No. 1 for Classes 1, 2, 3, 4, and 5 as set out in CAN/CSA-O15.

**75-184 Depth of setting of fibre-reinforced polymer poles**

Depth of setting for fibre-reinforced polymer poles shall be as per manufacturer's installation instructions but in no case less than that specified in Table 104.

### **Framing**

**75-200 Pole framing**

- 1) Poles used in primary lines shall be framed according to the following specifications:

- a) Specification 9 — primary, 1-phase, 2.4 to 8 kV, maximum span 90 m;
  - b) Specification 10 — primary, 1-phase, 2.4 to 16 kV, maximum span 90 m;
  - c) Specification 11 — primary, 3-phase, 2.4/4.16 to 8.0/13.8 kV;
  - d) Specification 12 — primary, 3-phase, 2.4/4.16 to 16/27.6 kV;
  - e) Specification 13 — primary, 3-phase, line angles 4° to 90°, 2.4/4.16 to 16/27.6 kV;
  - f) Specification 14 — primary, 3-phase, crossarm, 2.4/4.16 to 16/27.6 kV;
  - g) Specification 15 — primary, 3-phase, underbuilt, 2.4/4.16 to 16/27.6 kV;
  - h) Specification 16 — primary, 3-phase, 44 kV;
  - i) Specification 17 — primary, 3-phase, line angles 4° to 90°, 44 kV; and
  - j) Specification 18 — primary, 3-phase, crossarm, 44 kV.
- 2) Notwithstanding Subrule 1), the distance from the top of a steel pole down to the top bolt for pole line hardware shall be permitted to be 10 cm.

### **75-202 Crossarms (see Appendix B)**

- 1) Crossarms, if made of wood, shall
  - a) be Douglas fir, Western larch, Western hemlock, Yellow cypress, Jack pine, or Lodgepole pine; and
  - b) have dimensions in accordance with Specification 29, and be at least 120 mm wide and 95 mm thick.
- 2) Steel crossarms shall have dimensions in accordance with Specification 30.
- 3) Fibre-reinforced polymer crossarms shall be manufactured in accordance with ASCE Manual 104.

### **75-204 Braces for crossarms on primary lines**

- 1) All crossarms shall have two braces, each 864 mm in length.
- 2) One-piece V-shaped crossarm braces shall be permitted.
- 3) Notwithstanding Subrule 1), braces shall not be required if the crossarm is equipped with a mounting bracket designed to provide the equivalent support of braces.

## **Anchors and guys**

### **75-300 Anchoring and guy requirements**

- 1) Arrangement of guys and anchoring shall be in accordance with Specification 26.
- 2) Notwithstanding Subrule 1), a guy is not required for a dead-ended temporary secondary service tap where the span does not exceed 10 m.
- 3) Transformer or terminal poles fed from underground circuits with no overhead distribution shall have three down guys placed approximately 120° apart and attached below the equipment.
- 4) Guys shall not be required for support of a free-standing pole where the specific pole installation includes a design drawing for the pole and supporting base, and the design drawing is from the pole manufacturer or signed by a professional engineer.
- 5) Storm guys shall be installed for tangent lines between guyed angled structures, and shall not exceed five spans.
- 6) In addition to meeting the requirements of this Code, the number and placing of guys on steel poles shall be in accordance with the manufacturer's recommendations.

### **75-302 Anchors**

- 1) Poles at dead ends or angles shall be anchored as follows:
  - a) where a steel plate anchor is used, it shall be installed in the manner prescribed by Specification 19;
  - b) where a log anchor is used, it shall be installed in the manner prescribed by Specification 20;
  - c) where an expansion anchor is used, it shall be installed in the manner prescribed by Specification 21; or
  - d) where a screw anchor is used, it shall be installed in the manner prescribed by Specification 22.
- 2) Where anchors are installed in

- a) solid rock, the anchors shall be installed in accordance with either Figure 1 or 2 of Specification 23; or
- b) shale or limestone, the anchors shall be installed in accordance with Figure 1 or 2 of Specification 24.
- 3) Power-driven screw anchors shall be installed in accordance with the manufacturer's specifications.
- 4) All backfill associated with the installation of anchors shall be well tamped.

### **75-304 Anchor and guy attachment ratio**

- 1) The distance of an anchor from its pole shall be at least one-third the height of the pole above ground.
- 2) Guying ratios (height versus lead distance) shall be between 3:1 and 2:3.

### **75-306 Guy wires and guards (see Appendix B)**

- 1) Guy wires shall
  - a) be of 7-strand steel;
  - b) have a diameter of at least 9 mm, Grade 1300, minimum breaking load of 61 kN (3/8 in, Grade 180, minimum breaking load of 13 500 lbs); and
  - c) be Class B coating weight galvanized.
- 2) Guy guards shall be installed at all locations.
- 3) The guy guard shall be made of plastic, and shall be coloured bright yellow to provide good visual identification for public safety.
- 4) Two guy guards shall be installed one above the other on the same guy at locations used for winter recreation activities in heavy snow areas.
- 5) Where two or more guys are attached to one anchor, a guy guard shall be installed on both the innermost and outermost down guys.

### **75-308 Guys on poles and anchors**

- 1) A guy wire shall be attached to the pole
  - a) with a fitting shown in Specification 27;
  - b) in the manner prescribed in Specification 3;
  - c) in such a way that there is no contact between the guy wire fitting or its mounting bolt and any ground wire on the pole; and
  - d) as identified in the framing requirements of Rule 75-200.
- 2) Pre-formed guy grips shall be permitted to be used in place of the fitting mentioned in Subrule 1) a).
- 3) The back of an insulator through bolt shall not be used as an attachment point for guys.
- 4) A guy wire shall be attached to the anchor with a minimum of three 3-bolt clamps.
- 5) Notwithstanding Subrule 4), where other than Grade 1 construction is employed the minimum number of 3-bolt clamps shall be two.
- 6) Notwithstanding Subrules 4) and 5), pre-formed guy grips or automatic guy wire strain dead ends shall be permitted.

### **75-310 Strain insulators on pole guys**

- 1) Strain insulators shall be installed in all guy assemblies. The strain insulator shall be located as prescribed in Specifications 25 and 25.1 such that under broken guy conditions the insulator will fall
  - a) below all power attachments;
  - b) above the communication attachment if present; and
  - c) no less than 250 cm above grade.
- 2) Where the span between the guyed pole and stub pole crosses over or under conductors operating at a potential of more than 150 V to ground, a second strain insulator shall be installed to isolate the section of the span guy between the crossing conductors and the stub pole and not less than 250 cm from the stub pole, in accordance with Specification 25.1.
- 3) Notwithstanding Subrule 1), guys directly attached to steel poles need not have a strain insulator provided the attachment hardware is suitable for the pole.

### **75-312 Span guy construction**

Where a span guy is installed, it shall be constructed in the manner prescribed in Specification 4.

### **Insulators**

#### **75-400 Insulators**

Insulators shall be selected in accordance with Specification 31, 32, or 33, or Table 100.

#### **75-402 Insulators on steel poles**

- 1) Insulators that are permitted to be mounted directly on grounded steel structures shall be as specified in Table 100.
- 2) Clamps for the neutral conductor shall be a type designed for the pole.
- 3) Spool-type insulating supports shall not be permitted.

#### **75-404 Insulators on concrete poles**

Insulators that are permitted to be mounted directly on grounded concrete poles shall be as specified in Table 100.

#### **75-406 Attachment of secondary service and neutral conductors**

- 1) Secondary service conductors shall
  - a) terminate on a dead-end rack of a type shown in Specification 35; or
  - b) be attached to a pole in accordance with Specification 36, 37, 38, or 39.
- 2) Neutral conductors shall be attached to a pole in accordance with Specification 35.1.

### **Conductors**

#### **75-500 Overhead primary line conductors**

Primary line conductors shall be bare and not less than No. 2 AWG ACSR.

#### **75-502 Overhead secondary line conductors**

- 1) Overhead cables shall be
  - a) neutral-supported cables of Type NS75 or Type NS90; or
  - b) open wire bus.
- 2) Individual conductors of the moisture-resistant, rubber-insulated type suitable for exposed wiring where exposed to the weather as specified in Table 19 and lashed together with a messenger cable shall be
  - a) stranded; and
  - b) not less than No. 12 AWG copper or No. 10 AWG aluminum.
- 3) RWU type cables are acceptable for aerial installation and can be lashed together with a messenger cable provided they are sunlight-resistant rated and so marked.

#### **75-504 Connections**

Connectors for all primary overhead current-carrying connections shall be compression, wedge, or shear bolt type.

#### **75-506 Submarine power cables**

Submarine power cables shall be manufactured to one of the following Standards:

- a) ICEA S-95-658/NEMA WC70;
- b) ICEA S-96-659/NEMA WC71;
- c) ICEA S-93-639/NEMA WC74;
- d) CSA C68.10; or
- e) CSA C68.5.

### **Spans and sags**

#### **75-600 Pole spans**

- 1) Poles used in secondary lines shall be placed not more than 40 m apart.
- 2) Subject to Rule 75-200, poles used in primary lines shall be placed not more than 90 m apart.

### **75-602 Span with secondary service line attached to buildings or mobile homes**

- 1) The span of neutral-supported cables, Types NS75 and NS90, shall be not more than 38 m from the point where the secondary service line is attached to a building to the nearest pole.
- 2) Notwithstanding Subrule 1), the span shall be not more than 10 m from the point where the secondary overhead service line is attached to a mobile home or similar structure to the nearest pole or other point of attachment.

### **75-604 Sag between poles or between poles and buildings**

Open wire bus, neutral-supported cable, and ACSR shall be installed so that the sag of the conductors between poles or between poles and a building is determined by using Tables 105 to 112, whichever is applicable to the size and type of conductor being installed and with respect to the applicable span and temperature.

## **Clearances**

### **75-700 Clearances between power conductors and communication circuits**

- 1) Electrical equipment, power conductors, communication circuits, and equipment shall be constructed and maintained so as to create no undue hazard to previously installed facilities.
- 2) Where power conductors and communication circuits are carried on separate parallel pole lines, such lines shall be spaced apart at a sufficient distance such that one line cannot fall upon the other line in the event of a pole breaking.
- 3) Where lines cross such that the conductors of one circuit may fall upon the conductors of another circuit, the power conductors shall be installed such that the clearance between the upper conductors at maximum sag and the lower conductors assumed to form a straight line between conductors' points of support is at least in accordance with Specification 1, Item 4.
- 4) Where power conductors and communications circuits are carried on the same pole, the power conductors shall be installed such that the clearance between the upper conductors at maximum sag and the lower conductor complies with Specification 2.
- 5) Subrules 3) and 4) shall not apply to a service span from a pole to a building.

### **75-702 Clearances in service span**

Where the voltage of power conductors is not more than 750 V, the separation between the power conductors at maximum sag and a communication drop-wire at line of sight in the service span from a pole to a building shall be not less than 300 mm.

### **75-704 Location of conductors on primary lines**

- 1) Where primary line conductors cross other conductors of lower voltage, the conductors of the circuit having the highest voltage shall
  - a) be installed above such other conductors of lower voltage; and
  - b) have minimum clearances in accordance with Specification 1, Items 1 and 2.
- 2) The neutral conductor associated with primary line shall
  - a) be located below the phase conductors;
  - b) have minimum clearances in accordance with Specification 1, Item 2; and
  - c) be a minimum of 200 mm below the transformer.

### **75-706 Primary and secondary line clearances**

- 1) For high-voltage line installations, the vertical separation between conductors under maximum sag conditions and the ground shall meet the requirements of Table 34.
- 2) The primary line neutral shall be not less than 6.1 m above finished grade.
- 3) Conductors of a secondary line shall be located such that the clearance at any above finished grade measured vertically between the conductors under maximum sag conditions and the ground shall be not less than the following:
  - a) 4.5 m on properties accessible to pedestrians and passenger vehicles only; or
  - b) 6.1 m on properties accessible to commercial and farm vehicles.



- 4) Where conductors are installed over a public road, the vertical separation between conductors under maximum sag conditions and finished grade shall meet the requirements of Table 34.

### **75-708 Clearances of conductors from buildings** (see Appendix B)

- 1) An overhead primary line conductor shall meet the requirements of Table 33 measured from a vertical drop at maximum conductor swing from a building.
- 2) Primary line conductors shall not be installed over buildings unless the installation is lawful under Rule 2-030, and work shall not begin until the plans and specifications for the work are approved in accordance with Rule 2-010.
- 3) Where the maximum conductor swing is not known, a distance of 1.8 m shall be used.
- 4) An overhead secondary line conductor shall be kept at least 1 m, measured from a vertical drop at maximum conductor swing, from any building except where necessary to connect to the electrical wiring of a building.

### **75-710 Clearances between conductors and structures** (see Appendix B)

Notwithstanding Rule 36-110, clearances between conductors of an overhead primary line or secondary line and temporary or permanent structures shall be installed and maintained so as to meet the minimum clearances specified in Rule 75-708, and

- a) not be located closer than 12 m measured horizontally from silos to the closest conductors, with the conductor at rest;
- b) not be located closer than 12 m measured horizontally over wells from which pump rods may be lifted and come in contact with the conductors at rest;
- c) except for free-standing engineered structures, have sufficient clearance from free-standing poles that support flood or area lighting, signs, flagpoles, antennae, or other similar structures so as to permit the structure to fall in an arc without touching the conductors at rest;
- d) not be located within 6 m, measured horizontally from windmills or similar structures, to the closest conductor, with the conductor at rest; and
- e) have a minimum vertical clearance of 3.1 m above fencing at maximum sag.

### **75-712 Tree trimming**

All trees and woody growth adjacent to a line shall be trimmed and maintained so that a minimum clearance to the nearest conductor, measured radially from the conductor at rest, is

- a) 1 m for secondary lines; and
- b) 4 m for primary lines.

## **Grounding and bonding**

### **75-800 Grounding of equipment mounted on steel poles**

- 1) A steel pole shall be permitted to be used as the grounding electrode for equipment mounted on the pole where the steel pole is directly embedded in soil, the portion of the pole in contact with the soil is not coated with any non-metallic coating or covering, and the installation is in accordance with the manufacturer's recommendations.
- 2) Where a pole is used as the ground electrode for the transformer, the transformer shall be bonded to the pole and the neutral in accordance with Specification 44 or 45.

### **75-802 Grounding of concrete poles**

- 1) The grounding stud of each pole shall be connected to the system neutral or ground electrode to provide grounding for the reinforcing bars.
- 2) The reinforcing bars shall not be considered a ground electrode.

### **75-804 Grounding of steel crossarms**

Where porcelain dead-end insulators are used, steel crossarms shall be connected to a ground electrode with a conductor of not less than

- a) No. 4 AWG stranded bare copper conductor for 27.6 kV and below; and
- b) No. 1/0 AWG stranded bare copper conductor for voltages greater than 27.6 kV.

### **75-806 Grounding of overhead installations**

Grounding for pole-mounted equipment and the system neutral shall be installed in accordance with Specifications 34, 38, 40, 41, 42, 43, 44, and 45.

### **75-808 Grounding conductors**

- 1) Metal guards or metal conduit shall not be used as protection for a grounding conductor in locations accessible to livestock.
- 2) A grounding conductor run underground to a ground electrode shall
  - a) be buried in the earth to a depth not less than 250 mm below the ground level;
  - b) not be located within 3 m of a doorway; and
  - c) not be located in an area normally frequented by livestock.

### **75-810 Grounding a service box on a transformer pole**

Where a service box is installed on a transformer pole, it shall be grounded as required by Section 10.

### **75-812 Neutral voltage mitigation devices**

- 1) All grounding conductors shall be insulated (minimum 600 V) and shall be not less than No. 4 AWG copper.
- 2) Each grounding conductor shall have mechanical protection up to the neutral voltage mitigation device and be installed in accordance with Specification 34.
- 3) Primary and secondary ground electrodes shall be spaced not less than 5 m apart.
- 4) A permanent warning sign shall be installed directly below the device and shall read, "WARNING — Primary and secondary grounding conductors shall be interconnected prior to disconnecting this device for service or removal" or the equivalent.

### **Δ 75-814 Multiple grounding of system neutral on primary lines (see Appendix B)**

- 1) The system neutral on primary distribution lines shall be multi-grounded.
- 2) The standard number of grounds per km of circuit shall be four.
- 3) The neutral voltage to a remote ground at any point under steady-state conditions shall be limited to reduce the risk of shock hazard.

## **Services**

### **75-900 Service box installation**

Where a service box is installed on a transformer pole, no equipment other than that shown in Specification 41 shall be placed on the pole except one temporary service shall be permitted to be attached in addition to the permanent service.

### **75-902 Central metering system (CMS) (see Appendix B)**

The following requirements shall apply to the central metering system (CMS):

- a) The CMS shall be permitted to be used to supply multi-service installations when
  - i) there is no customer-owned equipment between the supply authority's embedded transformer(s) and the demarcation point (excluding surge arresters and conductors); and
  - ii) written assurance has been received from a supply authority stating it owns and controls the embedded transformer(s).
- b) Each building shall have a disconnecting means, and where the disconnecting means is a service box, it shall be installed as per Section 6.
- c) Voltage drop of the service conductors from the transformer to the service box shall meet the requirements of Section 8.
- d) Overhead wiring shall
  - i) be neutral-supported cable with a minimum of No. 2 AWG aluminum;
  - ii) comply with Rule 12-108 when parallel conductors are installed; and

- iii) *be permitted as open wiring for over 200 A.*
- e) *The minimum ampacity of overhead or underground conductors feeding more than one service or building shall be based on 80% of the sum of the ratings of all service boxes supplied.*
- f) *Transformer pole hardware and metering equipment shall be in accordance with Specifications 41, 42, and 43.*
- g) *Pad-mounted installations shall meet the requirements of the supply authority.*
- h) *CMS-type systems shall not have more than four services extending from a transformer pole.*

### **75-904 Transfer devices for CMS**

- 1) *Installation of ground-mounted transfer devices shall meet the requirements of Section 6.*
- 2) *Pole-top mounted transfer devices for CMS shall*
  - a) *have a minimum rating equal to or greater than 80% of the sum of all service boxes supplied;*
  - b) *meet the minimum clearances shown on Specification 41;*
  - c) *be permitted to be installed ahead of the service box without integral overcurrent protection provided they have a withstand rating equal to or greater than the available fault current levels; and*
  - d) *be in compliance with the requirements of the supply authority.*

### **Section 78 — Marina wharves, docking facilities, fixed and floating piers, and boathouses**

- 59. *Delete CE Code Rule 78-052 2) and replace with the following:*
  - 2) *Ground fault protection shall be provided to de-energize all normally ungrounded conductors of each feeder for distribution equipment and branch circuits in or on fixed or floating piers, docking facilities, and boathouses, with the ground fault setting sufficient to allow normal operation of the distribution equipment, but in no case greater than 30 mA.*
- 60. *Delete CE Code Rule 78-052 3) and replace with the following:*
  - 3) *Branch circuits installed in or on fixed or floating piers, docking facilities, and boathouses, and that originate from distribution equipment that has ground fault protection on its feeder, shall not be required to have additional ground fault protection.*

### Tables

61. Amend cross-references in CE Code Table 19 as follows:

**Table 19**  
**Conditions of use for insulated conductors and cables other than flexible cords,  
portable power cables, and equipment wires**  
(See Rules 12-102, 12-302, 12-406, 12-602, 12-606, 12-902, 12-904, 12-1606,  
12-2104, 22-202, and 75-502, and Tables 1, 2, 3, 4, D1, and D3.)

62. Amend cross-references in CE Code Table 33 as follows:

**Table 33**  
**Horizontal clearances from adjacent structures  
(including protuberances)\***  
(See Rules 26-302, 36-110, and 75-708, and Appendix B.)

63. Amend cross-references in CE Code Table 34 as follows:

**Table 34**  
**Vertical ground clearances for open line conductors\***  
(See Rules 36-110 and 75-706, and Appendix B.)

64. Add Table 39 as follows:

<b>Table 39</b> <b>Minimum permitted size for 3-wire 120/240 V and 120/208 V service conductors or cables for single dwellings and feeder conductors or cables supplying single dwelling units of row housing, apartment, or similar buildings</b> [See Rule 4-004 26).]				
Overcurrent device rating, A	Conductor size, AWG or kcmil, Copper, 90 °C	Maximum load, A*	Conductor size, AWG or kcmil, Aluminum, 90 °C	Maximum load, A*
100	3	100	2	90
125	2	115	1/0	120
200	2/0	175	4/0	180
225	3/0	200	250	205
400	500	380	700	375
400	2 × 2/0	350	2 × 4/0	360

\*Loads calculated in accordance with the applicable Rules in Section 8 are permitted to exceed these values by 5%.

65. Add Tables 100 to 114 as follows:

**Table 100**  
**Minimum insulation on steel or concrete poles**  
(See Rules 75-400 to 75-404.)

System voltage	Insulator type	
	Porcelain	Polymer
	Insulator class	
2.4/4.16–8/13.8 kV	(ANSI) Pin Insulator 55-5 *3 (ANSI) LP 57-1L and 57-1S *5	(CEA) DS15 *1 (CEA) LP15 *2
14.4/24.9 and 16/27.6 kV	(ANSI) Pin Insulator 56-3 *4 (ANSI) LP 57-2L and 57-2S *5	(CEA) DS28 *1 (CEA) LP28M *2
44 kV	(ANSI) Pin Insulator 56-5 *4 (ANSI) LP 57-5L and 57-5S *5	(CEA) DS46 *1 (CEA) LP46M *2

ANSI — American National Standard Institute

\*3 — C29.5

\*4 — C29.6

\*5 — C29.7

CEA — Canadian Electricity Association

\*1 — LWIWG — 01

\*2 — LWIWG — 02

**Table 101**  
**Concrete pole class equivalency**  
(See Rule 75-162.)

Class	Equivalent class of wood poles
E	5
F	4
G	3
H	2
J	1

**Table 102**  
**Wood pole species and treatment combinations**  
(See Rule 75-120.)

Treatment preservative	Acceptable wood pole species
Pentachlorophenol (PCP) CCA-PEG CCA-ET (oil) CCA ACQ	Coast Douglas fir Interior Douglas fir White spruce Red spruce Western larch Jack pine White pine Red pine Lodgepole pine Southern yellow pine* Ponderosa pine Western hemlock Alaska yellow cedar Western red cedar
CCA† — WR	Red pine
Copper naphthenate	Coast Douglas fir Jack pine Red pine Lodgepole pine Southern yellow pine Western red cedar

\* Southern Yellow Pine — Penta, which shall have a minimum of 6.09 kg/m<sup>3</sup> [0.38 pcf (pounds per cubic foot)] of treatment preservative level, be kiln dried, and be marked “SPP.38” and “KD”.

† CCA — Chromated Copper Arsenate.

**Table 103**  
**Pole limitations maximum transformer weight in kilograms**  
(See Rule 75-120.)

Pole lengths, m (ft)*	Transformer mounting	Pole class			
		2	3	4	5
12.2 (40)	Direct	—	1022	613	386
	Cluster	1771	1339	840	604
13.7 (45)	Direct	1249	749	498	318
	Cluster	1566	1067	766	545

\* Lesser pole lengths are acceptable for stand alone transformer pole installations with no overhead lines attached, provided that the vertical height to any live part is at least 7 m (23 ft) above grade level.



Δ

**Table 104**  
**Depth of setting of poles in soil**  
(See Rules 75-104, 75-122, 75-144, 75-146, 75-164, 75-166, 75-182, and 75-184.)

Pole length, m (ft)	Minimum depth of pole (m)	Max. height of marking (m) above grade
9.2 (30)	1.7	1.3
10.7 (35)	1.7	1.3
12.2 (40)	1.8	1.2
13.7 (45)	2	1.1
15.2 (50)	2.1	1
16.8 (55)	2.3	2
18.3 (60)	2.4	1.8
19.8 (65)	2.6	1.7
Col. 1	Col. 2	Col. 3

**Table 105**  
**Sag of neutral-supported triplex cable**  
(ruling span\* — 30.0 m)  
(See Rule 75-604.)

Temp. °C	Triplex: 2-No. 4 Polyethylene AL. 1-No. 4 Bare ACSR				Triplex: 2-No. 2 Polyethylene AL. 1-No. 2 Bare ACSR				Triplex: 2-No. 1/0 Polyethylene AL. 1-No. 1/0 Bare ACSR			
	Span, m				Span, m				Span, m			
	15	23	30	38	15	23	30	38	15	23	30	38
	Sag, mm				Sag, mm				Sag, mm			
-29	127	279	508	787	203	432	762	1194	254	584	1016	1575
-18	152	330	559	838	203	457	813	1270	279	584	1041	1626
0	152	356	635	914	229	483	864	1346	279	610	1092	1702
16	178	406	711	1118	229	533	940	1473	279	635	1143	1778
32	203	432	762	1194	254	559	991	1549	305	660	1168	1829
Temp. °C	Triplex: 2-No. 3/0 Polyethylene AL. 1-No. 1/0 Bare ACSR				Triplex: 2-No. 4/0 Polyethylene AL. 1-No. 3/0 Bare ACSR							
	Span, m				Span, m							
	15	23	30	38	15	23	30	38				
	Sag, mm				Sag, mm							
-29	305	686	1194	1880	406	889	1600	2489				
-18	305	686	1219	1905	406	914	1626	2540				
0	305	711	1245	1956	406	940	1651	2591				
16	330	711	1270	1981	432	940	1676	2616				
32	330	737	1321	2057	432	965	1727	2692				

\* Ruling span formula:  
Ruling span = average span + 2/3 (maximum span — average span)

# Ontario Amendments to the Canadian Electrical Code

## Part I, C22.1

Sags and tensions for pre-assembled quadruplex cable  
(ruling span\* — 30.0 m)  
(See Rule 75-604.)

Temperature, °C	No. 1/0 AL. 600 V Neutral No. 1/0 Bare ACSR				No. 3/0 AL. 600 V Neutral No. 3/0 Bare ACSR			
	Span, m				Span, m			
	15	23	30	38	15	23	30	38
	Sag, mm				Sag, mm			
-29	220	520	880	1410	210	610	1110	1840
-20	230	540	920	1470	240	640	1140	1870
0	250	580	990	1590	290	690	1190	1930
16	260	610	1040	1670	330	730	1230	1970
32	270	640	1090	1740	360	770	1270	2010

\*Ruling span formula:

Ruling span = average span + 2/3 (maximum span – average span)

**Table 107**  
**Sags and tensions for #2 ACSR (6/1) with 60 m (200 ft) ruling span**  
(See Rule 75-604.)

Initial sags and tensions for stringing													
Ambient temperature			Span								Tension		
			40 m	45 m	50 m	55 m	60 m	65 m	70 m	75 m			
			Sag, cm								lb	kN	% RTS
−20 °C			21	27	33	40	48	56	65	75	274	1.2	9.8
−10 °C			27	34	42	51	61	72	83	95	221	1.0	7.9
0 °C			33	42	51	62	74	87	101	116	184	0.8	6.6
10 °C			37	47	58	71	84	99	114	131	158	0.7	5.7
20 °C			43	55	67	82	97	114	132	152	140	0.6	5.0
30 °C			48	60	74	90	107	126	146	167	126	0.6	4.5

Final sags and tensions for design													
Loading condition			Span								Tension		
Cond. temp.	Wind, N/m <sup>2</sup>	Ice, mm	40 m	45 m	50 m	55 m	60 m	65 m	70 m	75 m			
			Sag, cm								lb	kN	% RTS
−20 °C	400	12.5	64	82	101	122	145	170	197	227	1090	4.8	39.1
30 °C	0	0	55	70	86	104	124	146	169	194	109	0.5	3.9
50 °C	0	0	63	80	99	119	142	167	193	222	95	0.4	3.4
100 °C	0	0	80	101	125	151	180	211	245	281	75	0.3	2.7

**Table 108**  
**Sags and tensions for #2 ACSR (6/1) with 75 m (250 ft) ruling span**  
(See Rule 75-604.)

Initial sags and tensions for stringing											
Ambient temperature	Span								Tension		
	55 m	60 m	65 m	70 m	75 m	80 m	85 m	90 m			
	Sag, cm								lb	kN	% RTS
-20 °C	34	41	48	56	64	73	82	92	326	1.4	11.7
-10 °C	42	50	59	68	78	89	100	112	271	1.2	9.7
0 °C	49	58	68	79	91	104	117	131	229	1	8.2
10 °C	58	68	80	93	107	122	137	154	199	0.9	7.1
20 °C	64	76	89	104	119	135	153	171	176	0.8	6.3
30 °C	71	84	99	115	132	150	170	190	159	0.7	5.7

Final sags and tensions for design												
Loading condition			Span								Tension	
Cond. temp.	Wind, N/m <sup>2</sup>	Ice, mm	55 m	60 m	65 m	70 m	75 m	80 m	85 m	90 m		
			Sag, cm								lb	kN
-20 °C	400	12.5	105	125	147	171	196	223	252	282	1270	5.6
30 °C	0	0	84	100	118	137	157	179	202	226	134	0.6
50 °C	0	0	97	115	135	157	180	205	231	259	118	0.5
100 °C	0	0	122	145	170	197	226	257	290	325	93	0.4

**Table 109**  
**Sags and tensions for #1/0 ACSR (6/1)**  
**with 60 m (200 ft) ruling span**  
 (See Rule 75-604.)

Initial sags and tensions for stringing											
Ambient temperature	Span								Tension		
	40 m	45 m	50 m	55 m	60 m	65 m	70 m	75 m			
	Sag, cm								lb	kN	% RTS
-20 °C	23	29	35	43	51	60	69	80	426	1.9	10
-10 °C	27	34	42	51	61	72	83	95	345	1.5	8.1
0 °C	33	42	51	62	74	87	101	116	288	1.3	6.7
10 °C	38	48	60	72	86	101	117	134	249	1.1	5.8
20 °C	43	55	67	82	97	114	132	152	220	1	5.1
30 °C	48	61	76	92	109	128	147	170	198	0.9	4.6

Final sags and tensions for design													
Loading condition			Span								Tension		
Cond. temp.	Wind, N/m <sup>2</sup>	Ice, mm	40 m	45 m	50 m	55 m	60 m	65 m	70 m	75 m			
			Sag, cm								lb	kN	% RTS
-20 °C	400	12.5	56	71	88	107	127	149	173	198	1366	6	31.9
30 °C	0	0	54	69	85	103	122	143	166	191	176	0.8	6.3
50 °C	0	0	63	80	99	119	142	167	193	222	142	0.6	5.8
100 °C	0	0	80	101	125	151	180	211	245	281	120	0.5	4.3

**Table 110**  
**Sags and tensions for #1/0 ACSR (6/1) with 75 m (250 ft) ruling span**  
(See Rule 75-604.)

Initial sags and tensions for stringing												
Ambient temperature	Span									Tension		
	55 m	60 m	65 m	70 m	75 m	80 m	85 m	90 m				
	Sag, cm									lb	kN	% RTS
-20 °C	35	42	50	57	66	75	85	95		513	2.3	12
-10 °C	42	50	59	68	78	89	100	112		426	1.9	10
0 °C	51	60	71	82	94	107	121	135		360	1.9	8.4
10 °C	58	68	80	93	107	122	137	154		313	1.4	7.3
20 °C	64	76	89	104	119	135	153	171		278	1.2	6.5
30 °C	73	86	101	118	135	154	173	194		251	1.1	5.9

Final sags and tensions for design												
Loading condition			Span								Tension	
Cond. temp.	Wind, N/m <sup>2</sup>	Ice, mm	55 m	60 m	65 m	70 m	75 m	80 m	85 m	90 m		
			Sag, cm								lb	kN
-20 °C	400	12.5	91	109	128	148	170	193	218	245	1596	7
30 °C	0	0	82	97	114	132	152	173	195	219	219	1
50 °C	0	0	94	112	131	152	175	199	225	252	191	0.8
100 °C	0	0	120	143	168	194	223	254	286	321	150	0.7

**Table 111**  
**Sags and tensions for #3/0 ACSR (6/1) with 60 m (200 ft) ruling span**  
(See Rule 75-604.)

Initial sags and tensions for stringing												
Ambient temperature	Span								Tension			
	40 m	45 m	50 m	55 m	60 m	65 m	70 m	75 m				
	Sag, cm								lb	kN	% RTS	
−20 °C	21	27	33	40	51	56	65	75	686	1.2	10.3	
−10 °C	27	34	42	51	61	72	83	95	554	1	8.3	
0 °C	33	42	51	62	74	87	101	116	462	0.8	6.9	
10 °C	37	47	58	71	86	99	114	131	398	0.7	5.9	
20 °C	43	55	67	82	96	114	132	152	351	0.6	5.3	
30 °C	48	60	74	90	107	126	146	167	317	0.6	4.8	

Final sags and tensions for design													
Loading condition			Span								Tension		
Cond. temp.	Wind, N/m <sup>2</sup>	Ice, mm	40 m	45 m	50 m	55 m	60 m	65 m	70 m	75 m			
			Sag, cm								lb	kN	% RTS
−20 °C	400	12.5	50	63	78	94	112	131	152	175	1756	7.7	26.3
30 °C	0	0	54	69	85	103	122	143	166	191	282	1.3	4.2
50 °C	0	0	61	77	95	115	137	161	186	214	247	1.1	3.7
100 °C	0	0	79	100	124	150	178	209	242	278	192	0.8	2.9



**Table 112**  
**Sags and tensions for #3/0 ACSR (6/1)**  
**with 75 m (250 ft) ruling span**  
 (See Rule 75-604.)

Initial sags and tensions for stringing											
Ambient temperature	Span								Tension		
	55 m	60 m	65 m	70 m	75 m	80 m	85 m	90 m			
	Sag, cm								lb	kN	% RTS
-20 °C	35	42	50	57	66	75	85	95	810	3.6	12.1
-10 °C	42	51	59	69	79	90	101	114	672	3	10.1
0 °C	51	60	71	82	94	107	121	135	570	2.5	8.5
10 °C	58	68	80	93	107	122	137	154	495	2.2	7.4
20 °C	67	79	93	108	124	141	159	179	440	1.9	6.6
30 °C	73	86	101	118	135	154	173	194	398	1.7	6

Final sags and tensions for design													
Loading condition			Span								Tension		
Cond. temp.	Wind, N/m <sup>2</sup>	Ice, mm	55 m	60 m	65 m	70 m	75 m	80 m	85 m	90 m			
Sag, cm											lb	kN	% RTS
−20 °C	400	12.5	81	96	113	131	150	177	193	216	2046	9	30.6
30 °C	0	0	82	97	114	132	152	173	195	219	352	1.6	5.3
50 °C	0	0	93	111	130	151	173	197	222	249	307	1.4	4.6
100 °C	0	0	119	141	166	193	221	251	284	318	240	1.1	3.6

**Table 113**  
 (Note: Table 113 is left intentionally blank.)

**Table 114**  
**Table of crib heights for wood pole in swamp**  
*(See Specifications 6 and 7.)*

Crib heights							
Pole height in m (ft)	Setting "A" butt of pole resting on or penetrating at normal setting depth						Setting "B" butt of pole not reaching solid earth at normal setting earth
	Depth of penetration						
	30 cm (1 ft)	60 cm (2 ft)	90 cm (3 ft)	120 cm (4 ft)	150 cm (5 ft)	180 cm (6 ft)	
	Height of crib in cm (ft)						
12.2 (40)	120 (4)	90 (3)	60 (2)	60 (2)	*	*	120 (4)
13.7 (45)	120 (4)	90 (3)	60 (2)	60 (2)	*	*	120 (4)
15.2 (50)	137 (4.5)	106 (3.5)	76 (2.5)	60 (2)	60 (2)	*	137 (4.5)
16.7 (55)	150 (5)	120 (4)	90 (3)	60 (2)	60 (2)	*	150 (5)
18.2 (60)	167 (5.5)	137 (4.5)	106 (3.5)	76 (2.5)	60 (2)	*	167 (5.5)
19.8 (65)	167 (5.5)	137 (4.5)	106 (3.5)	76 (2.5)	60 (2)	*	167 (5.5)
21.3 (70)	180 (6)	150 (5)	120 (4)	90 (3)	60 (2)	*	180 (6)
22.8 (75)	180 (6)	150 (5)	120 (4)	90 (3)	60 (2)	*	180 (6)
24.3 (80)	198 (6.5)	167 (5.5)	137 (4.5)	106 (3.5)	76 (2.5)	60 (2)	198 (6.5)

**Note:** Minimum height of crib for any condition shall be 60 cm (2 ft).

66. Add Specifications as follows:

### ***Specifications***

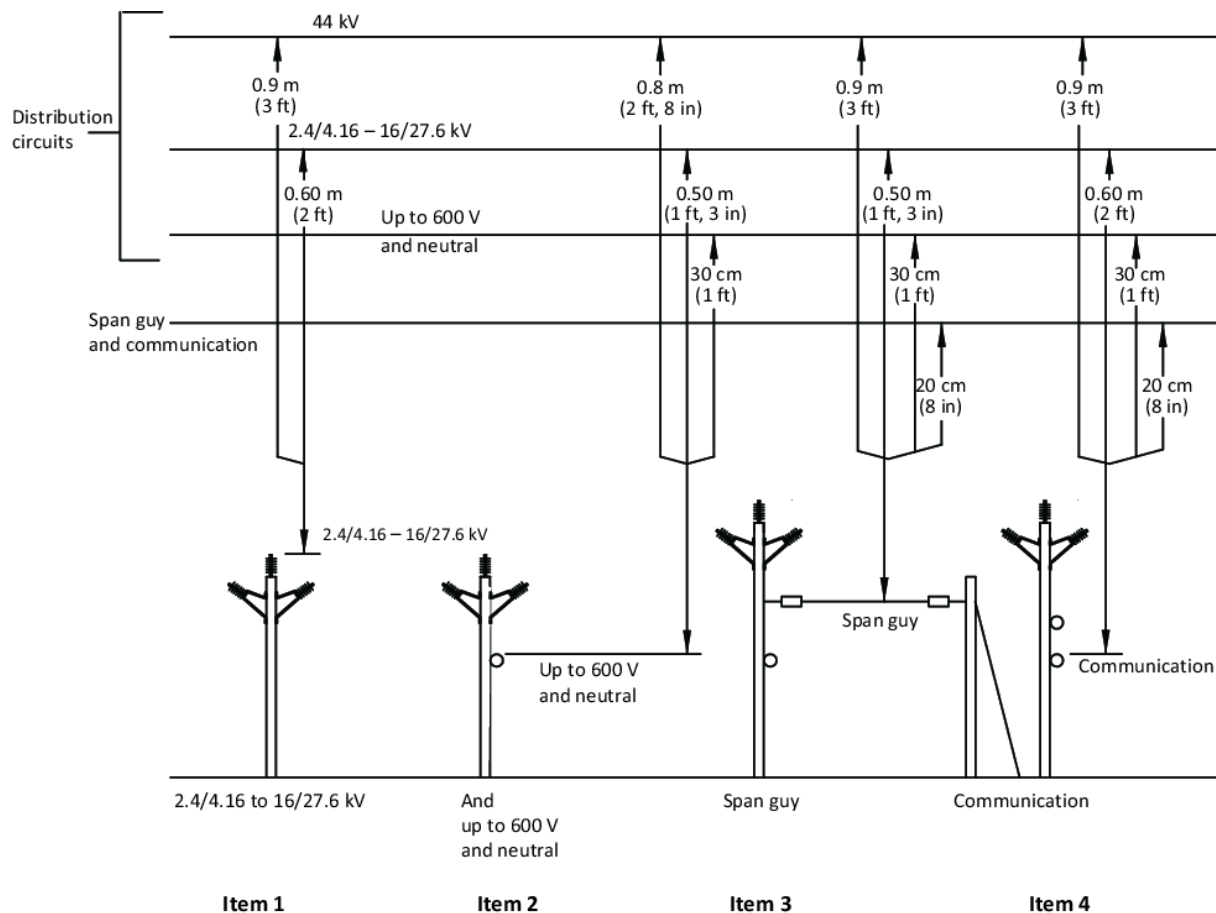
- 1** Minimum vertical clearances between wires or conductors crossing in-span
- 2** Minimum vertical clearances in-span and separation at pole between supply and communication conductors
- 3** Down guy(s) and offset
- 4** Span and anchor guy
- 5** Deleted
- 6** Swamp cribbing with steel culvert section for wood poles
- 7** Swamp cribbing with steel culvert section for wood poles with butt of pole not reaching solid earth at normal setting depth
- 8** Depth of pole setting reduction using steel culvert supports
- 9.1** Primary 1-phase tangent (pin insulator), 2.4 to 8.0 kV, maximum span 90 m (300 ft)
- 9.2** Primary 1-phase line angle 4° to 15° (pin insulator), 2.4 to 8.0 kV, maximum span 90 m (300 ft)
- 10.1** Primary 1-phase tangent (LP insulator), 2.4 to 16 kV, maximum span 90 m (300 ft)
- 10.2** Primary 1-phase line angle 4° to 15° (LP insulator), 2.4 to 16 kV, maximum span 90 m (300 ft)
- 10.3** Primary 1-phase line angle 16° to 60°, 2.4 to 16 kV, maximum span 90 m (300 ft)
- 10.4** Primary 1-phase line angle 61° to 90°, 2.4 to 16 kV, maximum span 90 m (300 ft)
- 10.5** Primary 1-phase dead-end, 2.4 to 16 kV, maximum span 90 m (300 ft)
- 11.1** Primary 3-phase, underbuilt, line angle 4° to 15° crossarm (pin insulator), 2.4/4.16 to 8.0/13.8 kV, maximum span 60 m (200 ft)
- 11.2** Primary 3-phase, line angle 4° to 15° crossarm (pin insulator), 2.4/4.16 to 8.0/13.8 kV
- 11.3** Primary 3-phase, underbuilt tangent crossarm (pin insulator), 2.4/4.16 to 8.0/13.8 kV, maximum span 60 m (200 ft)
- 11.4** Primary 3-phase, tangent, crossarm (pin insulator), 2.4/4.16 to 8.0/13.8 kV
- 12.1** Primary 3-phase, tangent, 2.4/4.16 to 16/27.6 kV
- 12.2** Primary 3-phase dead-end vertical, 2.4/4.16 to 16/27.6 kV
- 12.3** Primary 3-phase tree framing, 2.4/4.16 to 16/27.6 kV
- 13.1** Primary 3-phase line angle 4° to 15°, 2.4/4.16 to 16/27.6 kV
- 13.2** Primary 3-phase line angle 16° to 45°, 2.4/4.16 to 16/27.6 kV
- 13.3** Primary 3-phase line angle 16° to 60°, 2.4/4.16 to 16/27.6 kV
- 13.4** Primary 3-phase line angle 61° to 90°, 2.4/4.16 to 16/27.6 kV
- 14.1** Primary 3-phase, tangent, crossarm (LP insulator), 2.4/4.16 to 16/27.6 kV
- 14.2** Primary 3-phase, line angle 4° to 15° crossarm (LP insulator), 2.4/4.16 to 16/27.6 kV
- 14.3** Primary 3-phase dead-end, crossarm (triangular), 2.4/4.16 to 16/27.6 kV
- 14.4** Primary 3-phase dead-end, crossarm (flat), 2.4/4.16 to 16/27.6 kV
- 15.1** Primary 3-phase, underbuilt, tangent or line angle 0° to 15°, 2.4/4.16 to 16/27.6 kV
- 15.2** Primary 3-phase, underbuilt, tangent crossarm (LP insulator), 2.4/4.16 to 16/27.6 kV, maximum span 60 m (200 ft)
- 15.3** Primary 3-phase, underbuilt, line angle 4° to 15° crossarm (LP insulator), 2.4/4.16 to 16/27.6 kV, maximum span 60 m (200 ft)
- 16.1** Subtransmission 3-phase tangent, 44 kV
- 16.2** Subtransmission 3-phase dead-end, vertical, 44 kV

- 17.1** *Subtransmission 3-phase, line angle 4° to 15°, 44 kV*
- 17.2** *Subtransmission 3-phase, line angle 16° to 45°, 44 kV*
- 17.3** *Subtransmission 3-phase, line angle 16° to 60°, 44 kV*
- 17.4** *Subtransmission 3-phase, line angle 61° to 90°, 44 kV*
- 18.1** *Primary 3-phase tangent, crossarm, 44 kV, maximum span 90 m (300 ft)*
- 18.2** *Primary 3-phase, line angle 4° to 15°, crossarm, 44 kV, maximum span 90 m (300 ft)*
- 18.3** *Primary 3-phase dead-end, crossarm (triangular), 44 kV*
- 18.4** *Primary 3-phase dead-end, crossarm (flat), 44 kV*
- 19** *Steel plate anchor in soil*
- 20** *Log (slug) anchor in soil*
- 21** *Expansion anchor in soil*
- 22** *Earth screw anchor*
- 23** *Rock (solid hard) anchor*
- 24** *Shale and limestone anchor*
- 25** *Location of guy strain insulator joint use and non-joint use, armless or crossarm for down guys*
- 25.1** *Location of guy strain insulator joint use and non-joint use, armless or crossarm for span guys*
- 26** *Typical guy arrangements*
- 27** *Attachment of guys*
- 28** *Service mast installation*
- 29** *Wood crossarm*
- 30** *Steel crossarm*
- 31** *Pin-type insulators for crossarm framing*
- 32** *Post-type insulators for armless framing*
- 33** *Suspension-type insulators*
- 34** *Grounding for overhead installations on pole*
- 35** *Details of secondary service rack or neutral spool*
- 35.1** *Details of neutral pole attachment*
- 36** *Secondary — Attaching service tap to an intermediate pole for support*
- 37** *Secondary — Attaching service tap to an intermediate pole for splitting into 2 or more services*
- 38** *Secondary — Connecting pre-assembled single-phase service below transformer*
- 39** *Secondary dead end*
- 40** *Metering — 2.4 to 16 kV single-phase grounded primary*
- 41** *Metering — Central metering for secondary drop-leads 4/0 and smaller*
- 42** *Metering — Central metering for secondary drop-leads larger than 4/0*
- 43** *Metering for 3-phase, 120/208 V, 4-wire system*
- 44** *Grounding connection to steel pole, single-phase transformer*
- 45** *Grounding connection to steel pole, three-phase transformer*

### **Specification 1**

#### **Minimum vertical clearances between wires or conductors crossing in-span**

[See Rules [75-700](#) 3) and [75-704](#).]



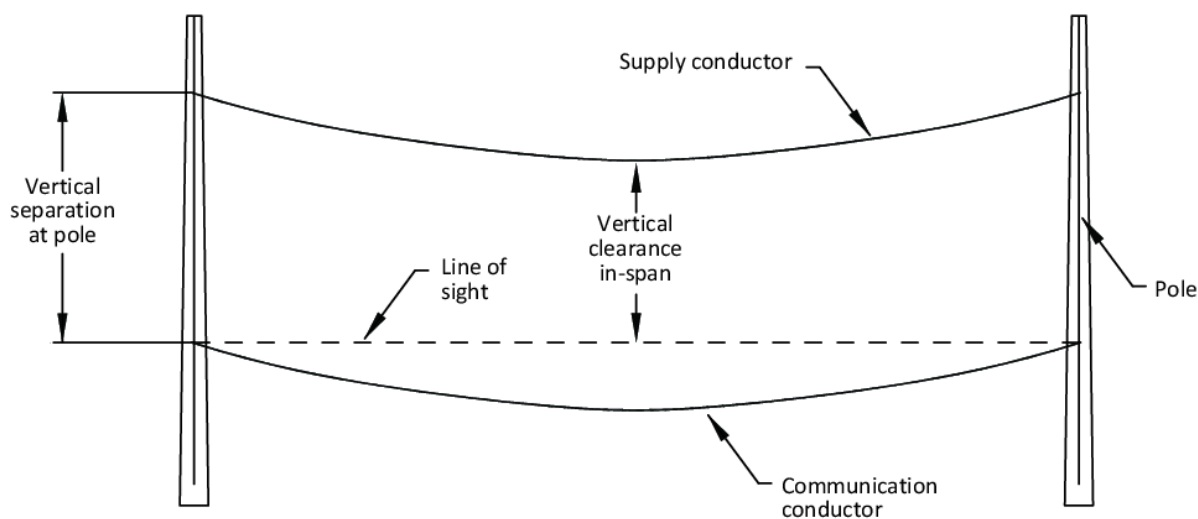
**Note:** All vertical clearances apply with the upper conductor at maximum sag and the lower conductor assumed to form a straight line between its point of support.

### Specification 2

#### Minimum vertical clearances in-span and separation at pole between supply and communication conductors

[See Rule [75-700](#) 4).]

System voltage of supply conductor	Minimum vertical clearance in-span	Minimum vertical separation at pole
Up to 600 V — insulated or bare neutral	0.2 cm (1/13 in)	100 cm (3 ft, 2 in)
Up to 600 V — bare or covered	10 cm (4 in)	100 cm (3 ft, 2 in)
2.4/4.16 – 16/27.6 kV	40 cm (1 ft, 4 in)	120 cm (4 ft)
44 kV	50 cm (1 ft, 8 in)	150 cm (5 ft)



$$\begin{aligned} \text{Minimum required vertical separation at pole} &= \text{the greater of maximum supply conductor sag (from Tables 107 to 112)} + \text{Minimum vertical clearance in-span (from Table)} \\ &\text{or} \\ &\text{Minimum vertical separation at pole (from Table)} \end{aligned}$$

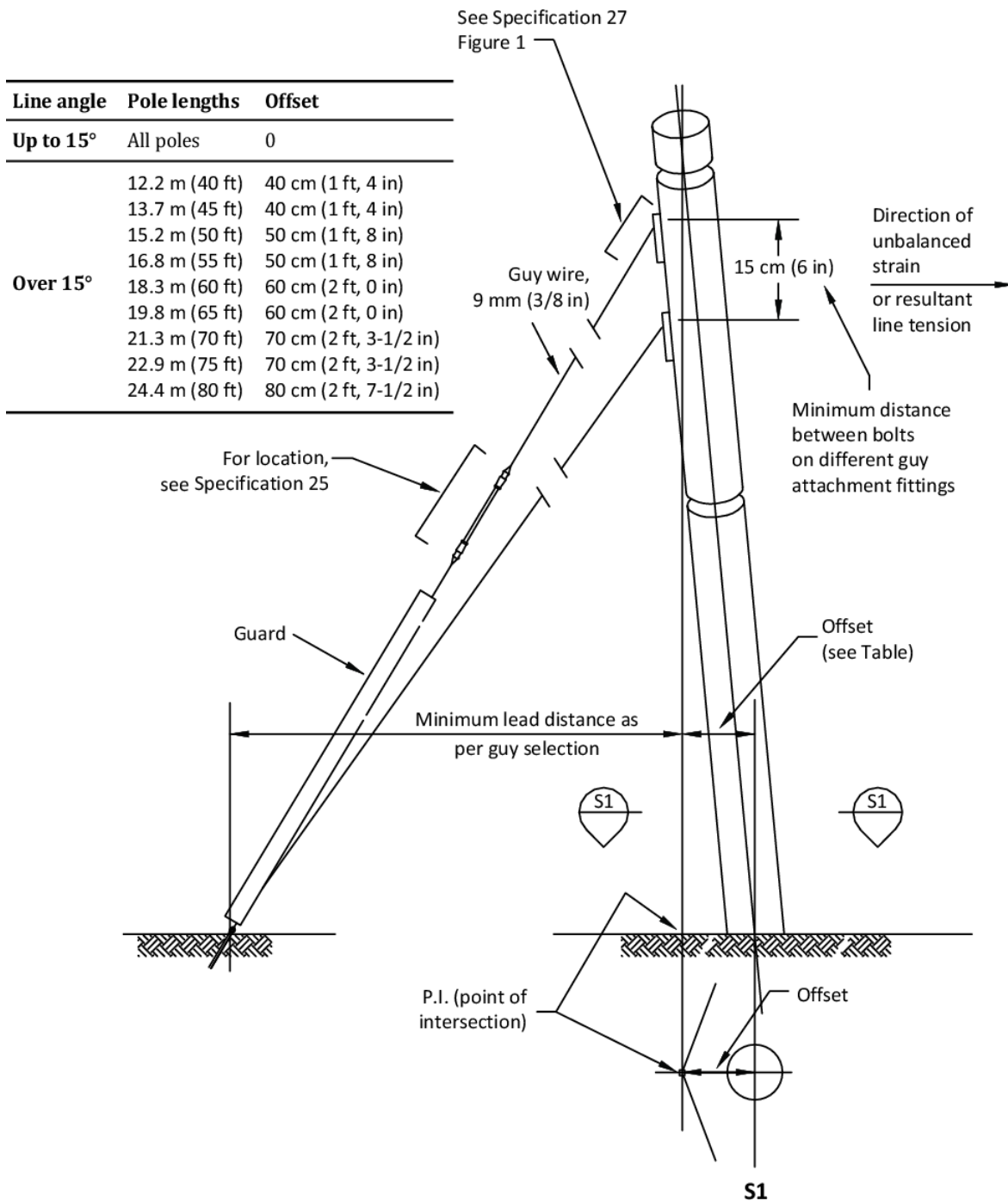
**Note:** The clearances in-span in the above table are under maximum sag conditions.

### Specification 3

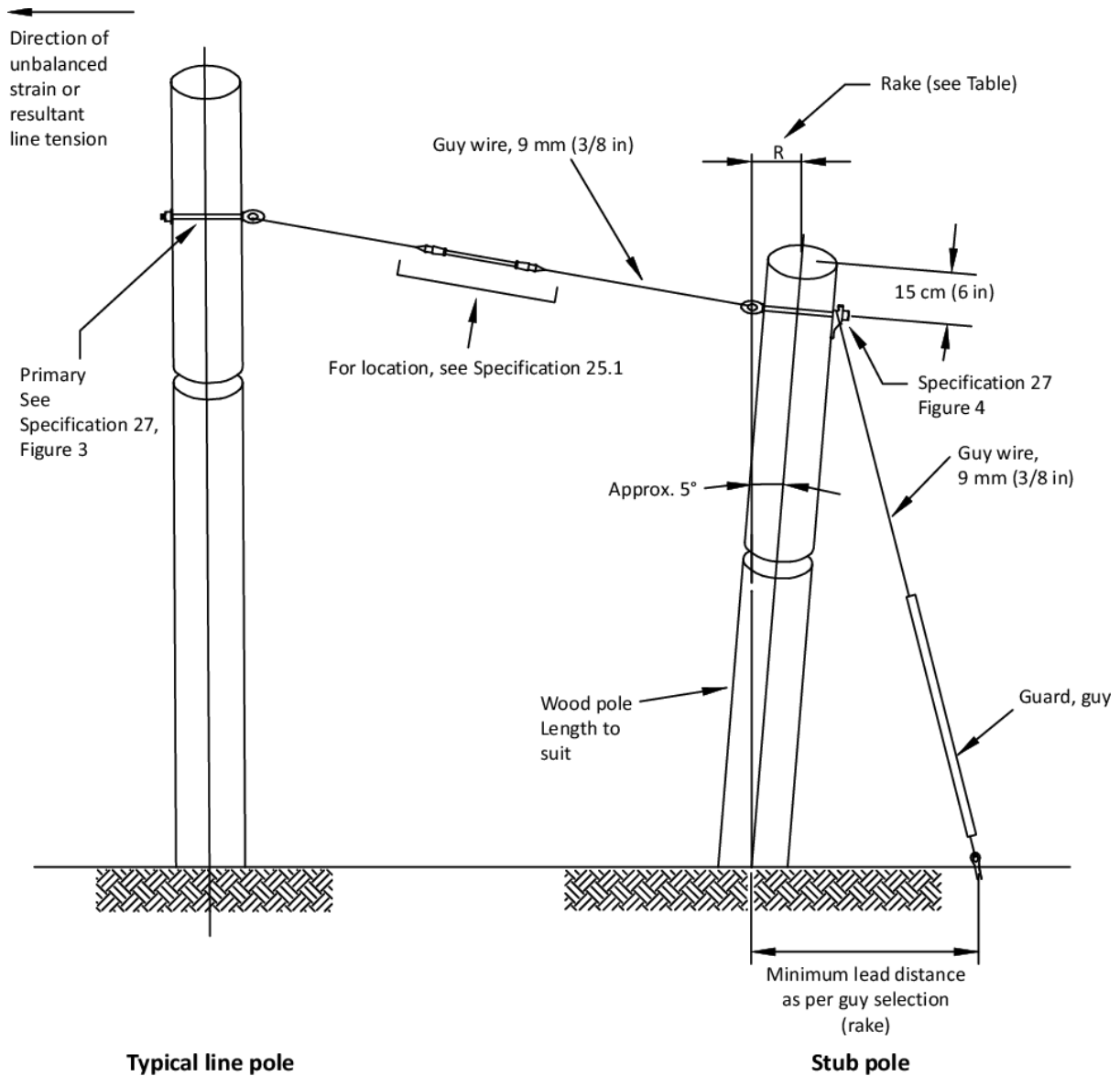
#### Down guy (s) and offset

[See Rules [75-104](#) 4) and [75-308](#) 1) b), and Specification [4](#).]





**Specification 4**  
**Span and anchor guy**  
[See Rules [75-104](#) 4) and [75-312](#).]



Stub lengths	Rake (approx.)
9.1 m (30 ft)	60 cm (2 ft, 0 in)
10.7 m (35 ft)	70 cm (2 ft, 3-1/2 in)
12.2 m (40 ft)	80 cm (2 ft, 7-1/2 in)

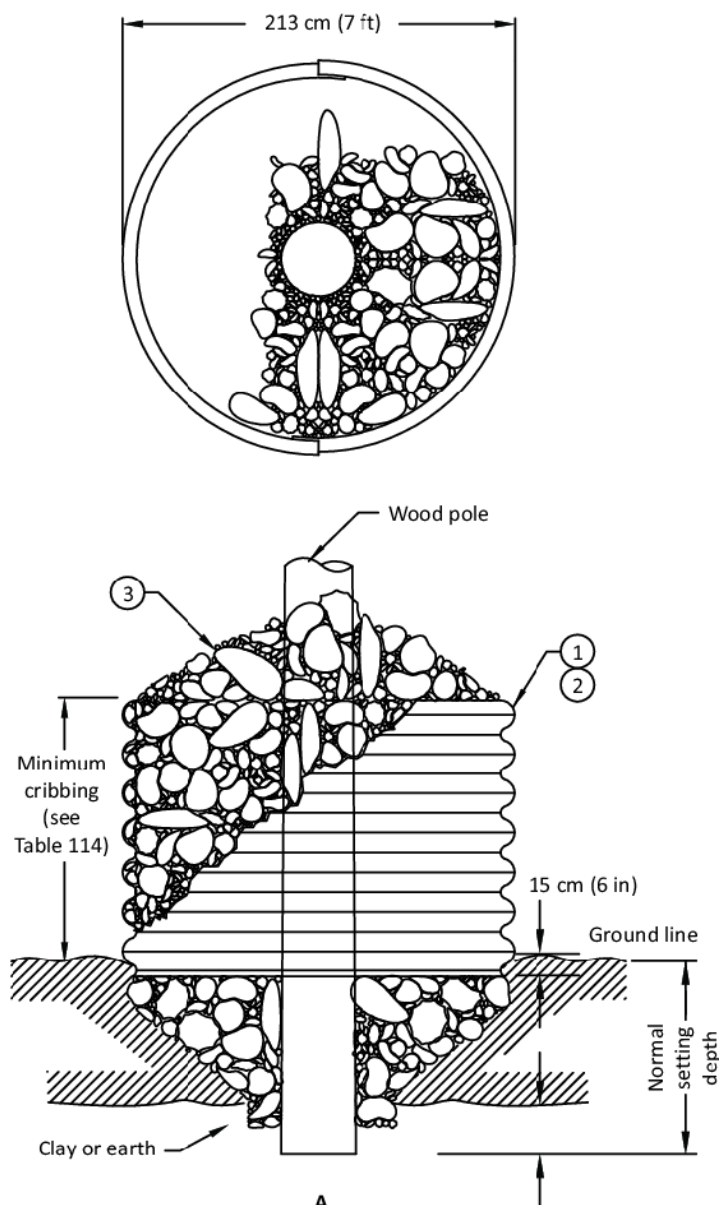
**Note:** If stub pole carries power circuit, refer to Specification 3, excluding pole offset requirements.

**Specification 5**  
**Deleted**

### ***Specification 6***

***Swamp cribbing with steel culvert section for wood poles***

*[See Rule [75-104](#) 6).]*



### Legend:

- 1 = Cribbing, 213 cm × 60 cm (7 ft × 2 ft) diameter
- 2 = Bolt assembly, 1/2 in
- 3 = Field stone or gravel

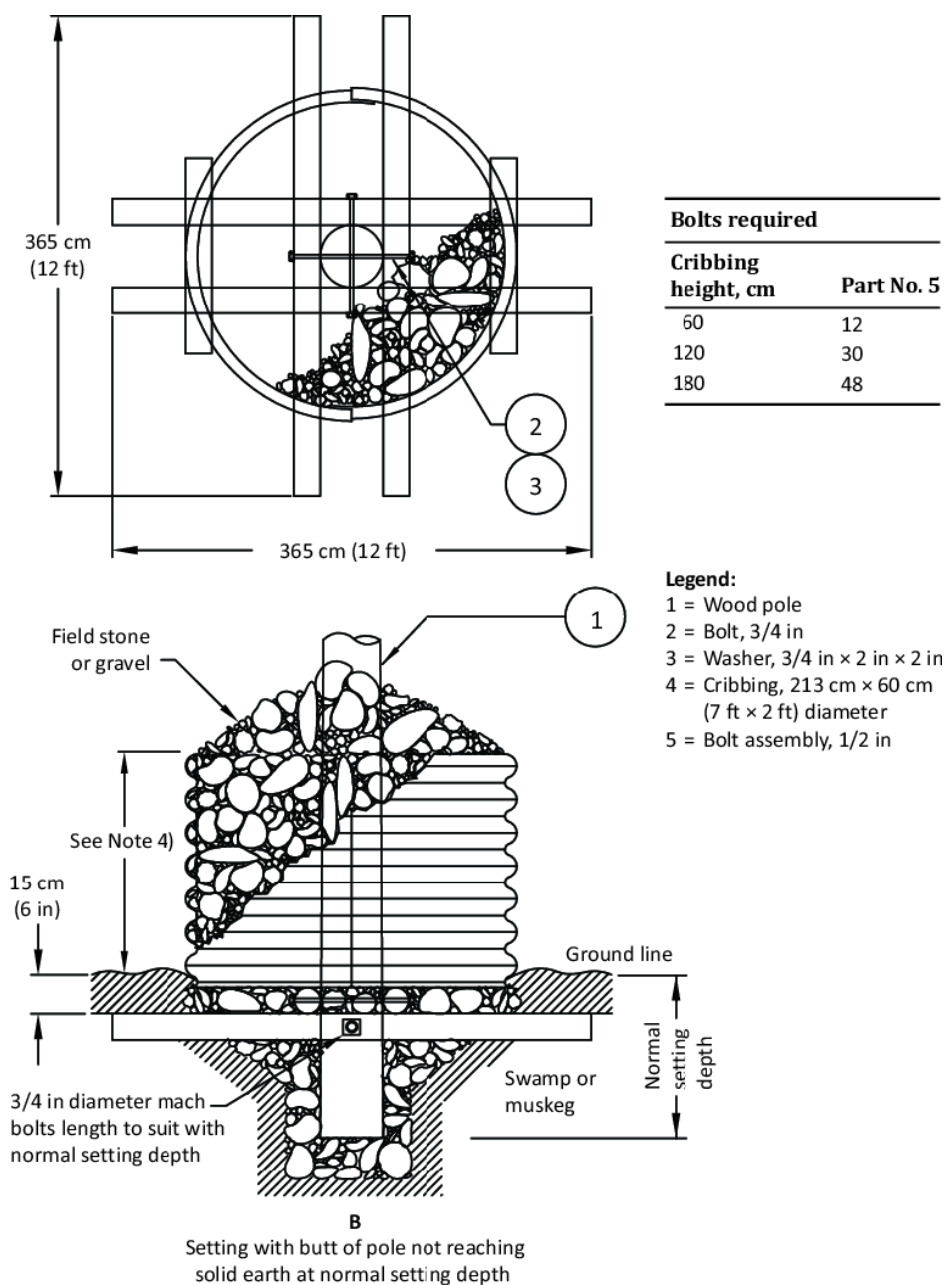
### Notes:

- 1) Material of steel culvert to be No. 14 gauge corrugated steel, hot-dipped galvanized.
- 2) Timbers to be cedar or treated hardwood (round or square) not less than 10 to 15 cm (4 to 6 in) square.
- 3) Height of crib will vary with pole.
- 4) Height and depth of penetration of butt into solid earth. Minimum height of crib is 60 cm (2 ft). See Table 114.
- 5) Where ground condition is very soft, spread 25 cm (10 in) of brush under timbers.

### Specification 7

**Swamp cribbing with steel culvert section for wood poles with butt of pole not reaching solid earth at normal setting depth**

[See Rule [75-104](#) 6.)]



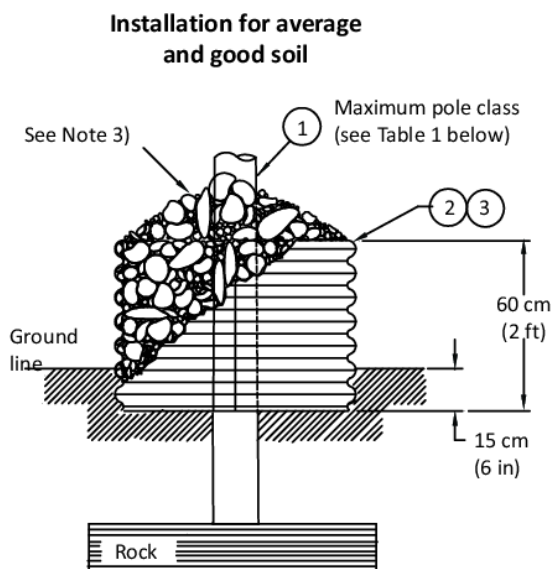
### Notes:

- 1) Material of steel culvert to be No. 14 gauge corrugated steel, hot-dipped galvanized.
- 2) Timbers to be cedar or treated hardwood (round or square) not less than 10 to 15 cm (4 to 6 in) square.
- 3) Height of crib will vary with pole.
- 4) Height and depth of penetration of butt into solid earth. Minimum height of crib is 60 cm (2 ft). See Table 114.
- 5) Where ground condition is very soft, spread 25 cm (10 in) of brush under timbers.

### Specification 8

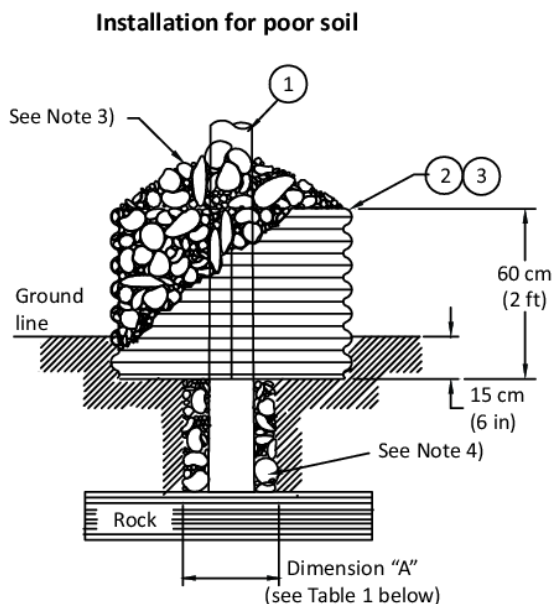
#### Depth of pole setting reduction using steel culvert supports

[See Rule 75-104 6).]



**Figure 1**

Overburden up to 46 cm (18 in) short of normal soil setting depth (shown)



**Figure 2**

Overburden up to 46 cm (18 in) short of normal soil setting depth (shown)

#### Legend:

- 1 = Pole
- 2 = Cribbing, 213 cm (7 ft) diameter x 60 cm (2 ft) high
- 3 = Bolt, 1/2 in x 1-1/4 in long

#### Notes:

- 1) The use of culvert for partial substitution of normal setting depth in soil shall be limited to two (2) adjacent pole locations.
- 2) Poles shall bear on bedrock.
- 3) Culvert fill material shall be either
  - a) field stone;
  - b) well-tamped gravel; or
  - c) inorganic soil, mechanically compacted in 15 cm (6 in) layers.
- 4) Pole backfill material for installation for poor soil shall be either field stones or well-tamped gravel.
- 5) The foundation moment capacity was used to determine the maximum pole class limits. The calculated ground line moment produced by maximum pole class shall not be exceeded.

#### Installation

#### Required steel culverts

Overburden/short of normal soil setting	Average and good soil (see Figure 1)	Poor soil (see Figure 2)
Up to 46 cm (18 in)	60 cm (2 ft, 0 in)	60 cm (2 ft, 0 in)
From 46 cm (18 in) to 76 cm (2 ft, 6 in)	122 cm (4 ft, 0 in)	122 cm (4 ft, 0 in)

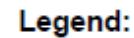
**Table 1**

#### Maximum pole class [see Note 5)]

Pole height, ft	Poor soil    Average soil    Good soil			
	Dim A = 60 cm (2 ft)	Dim A = 90 cm (3 ft)		
Up to 12.2 m (40 ft)	5	4	4	2
13.7 to 16.8 m (45 to 55 ft)	4	3	3	1
18.3 & 19.8 m (60 & 65 ft)	3	2	2	1



(See Rule 75-200)



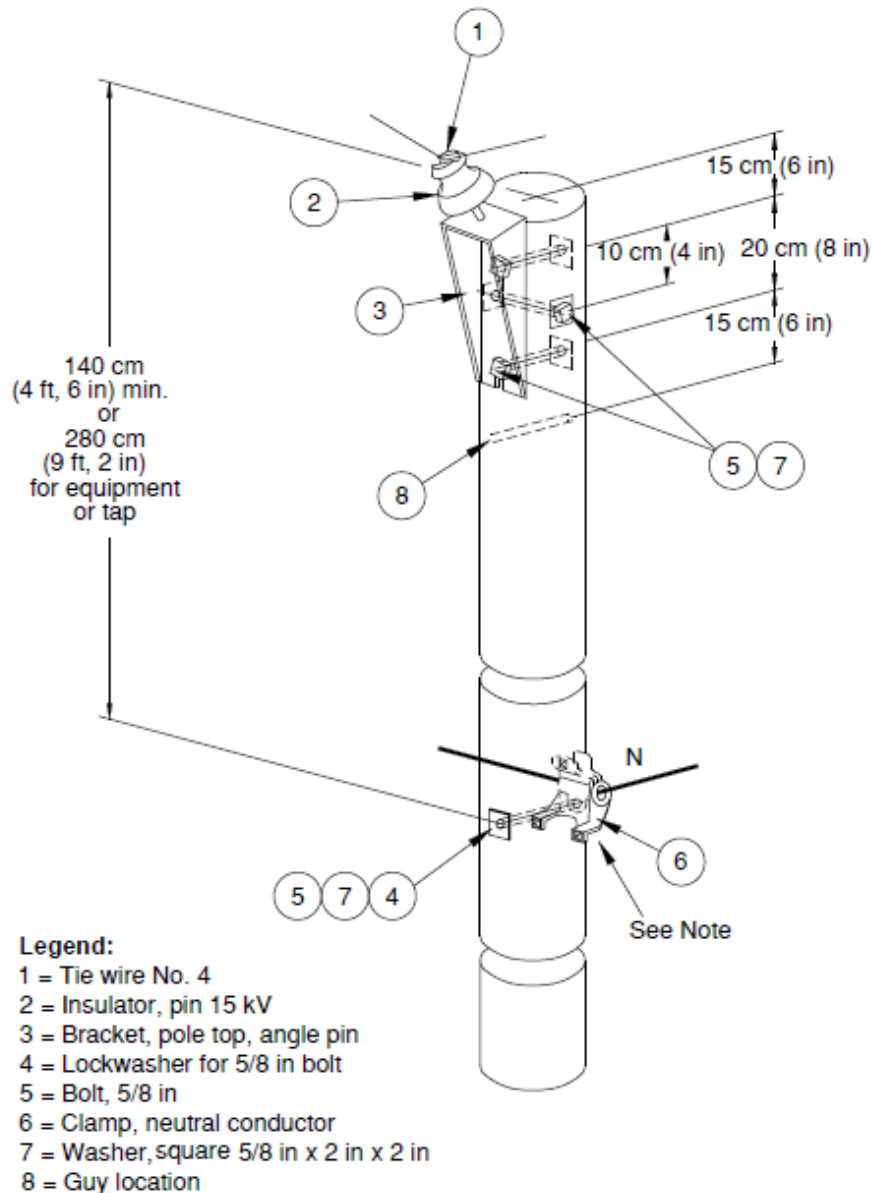
- 1 = Washer, square 5/8 in x 2 in x 2 in  
2 = Insulator, pin 15 kV  
3 = Bracket, pole top pin  
4 = Lockwasher for 5/8 in bolt  
5 = Bolt, 5/8 in  
6 = Clamp, neutral conductor  
7 = Tie wire No. 4

**Note:** See alternate Specification 35.1

### Specification 9.2

#### Primary 1-phase line angle $4^{\circ}$ to $15^{\circ}$ (pin insulator) 2.4 to 8.0 kV, maximum span 90 m (300 ft)

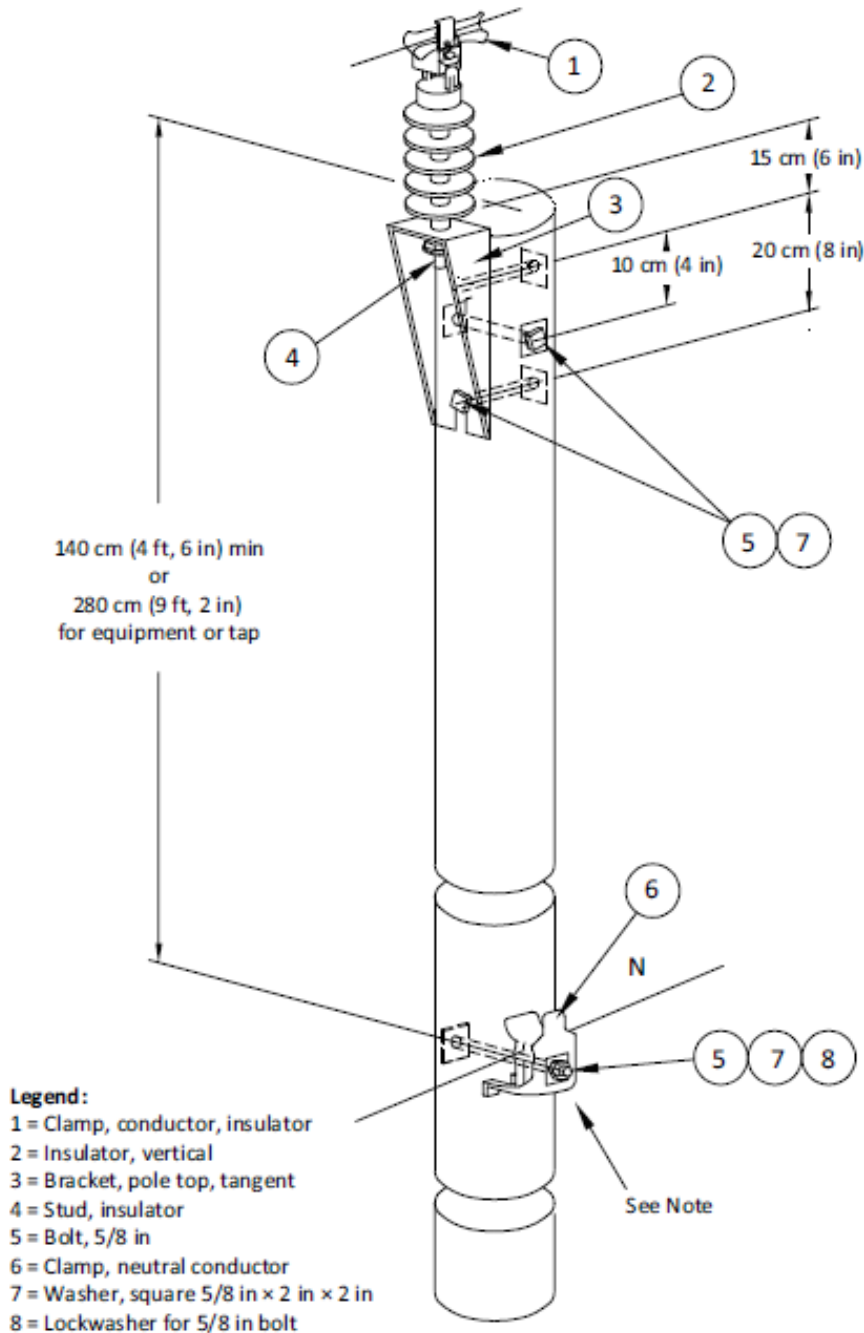
(See Rule 75-200)



**Note:** See alternate Specification 35.1

### Specification 10.1

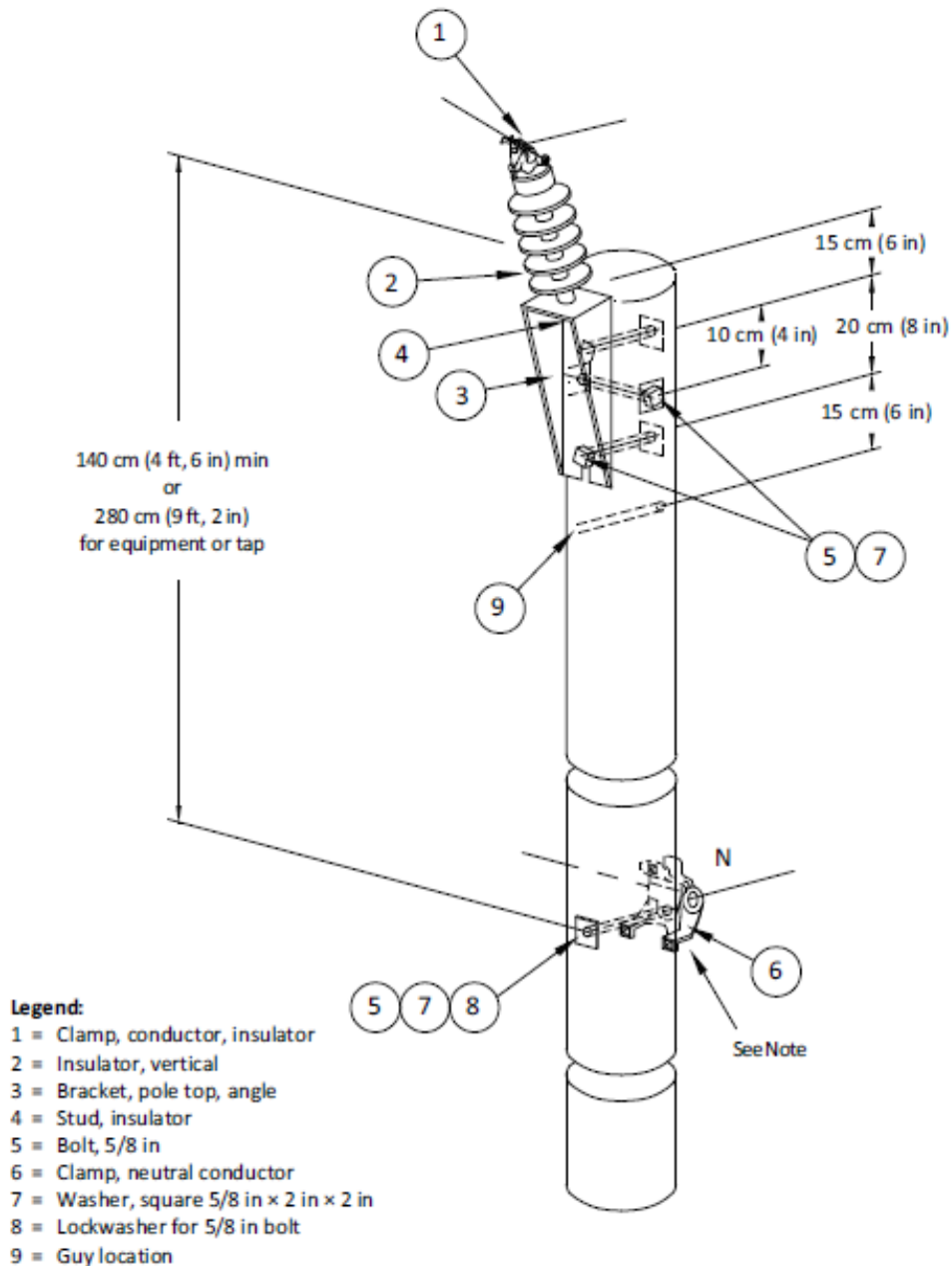
*Primary 1-phase tangent (LP insulator), 2.4 to 16 kV, maximum span 90 m (300 ft)*  
(See Rule 75-200.)



**Note:** See alternate Specification 35.1.

### Specification 10.2

Primary 1-phase line angle  $4^{\circ}$  to  $15^{\circ}$  (LP insulator), 2.4 to 16 kV, maximum span 90 m  
(300 ft)  
(See Rule 75-200.)

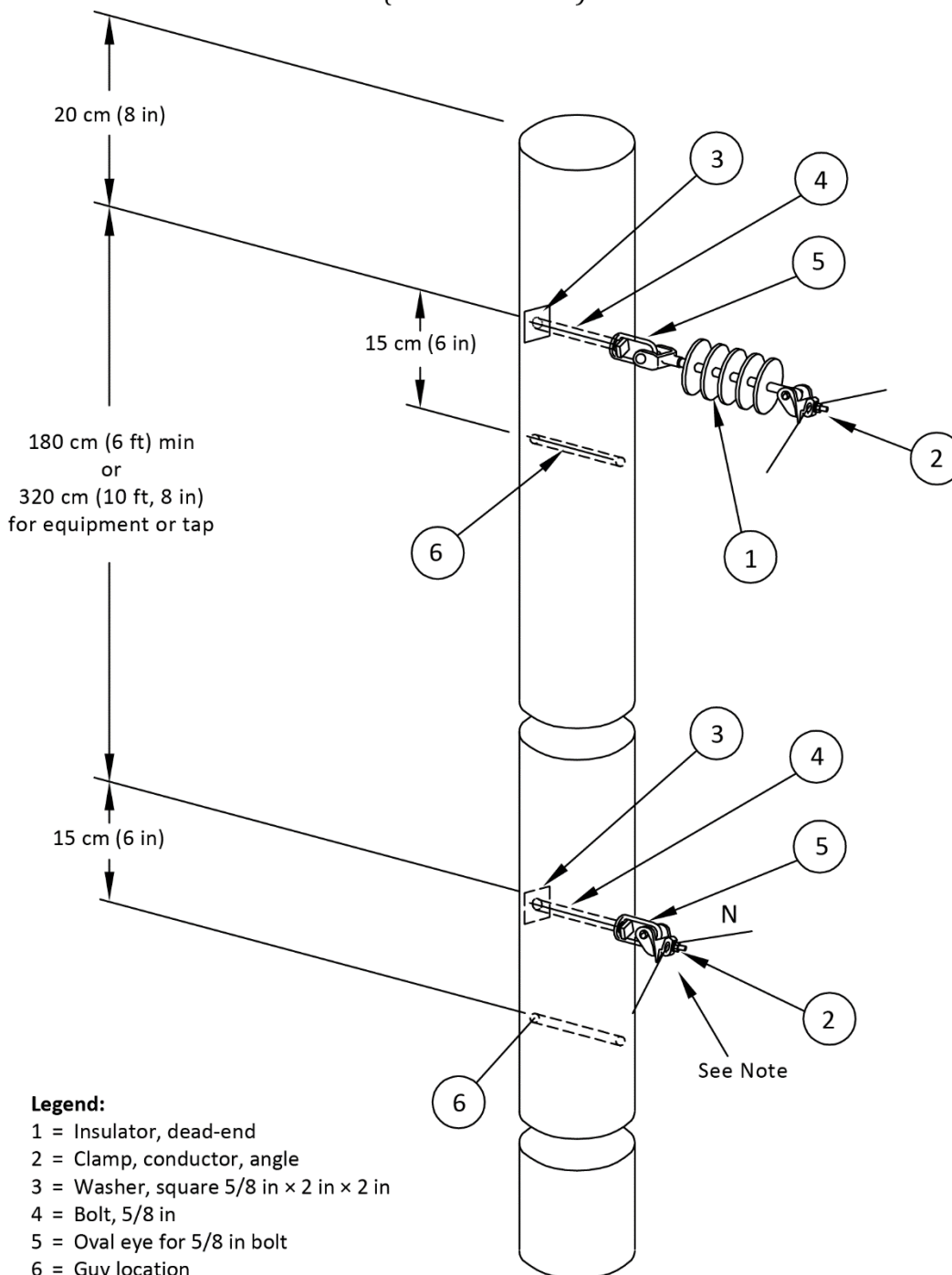


**Note:** See alternate Specification 35.1.

### Specification 10.3

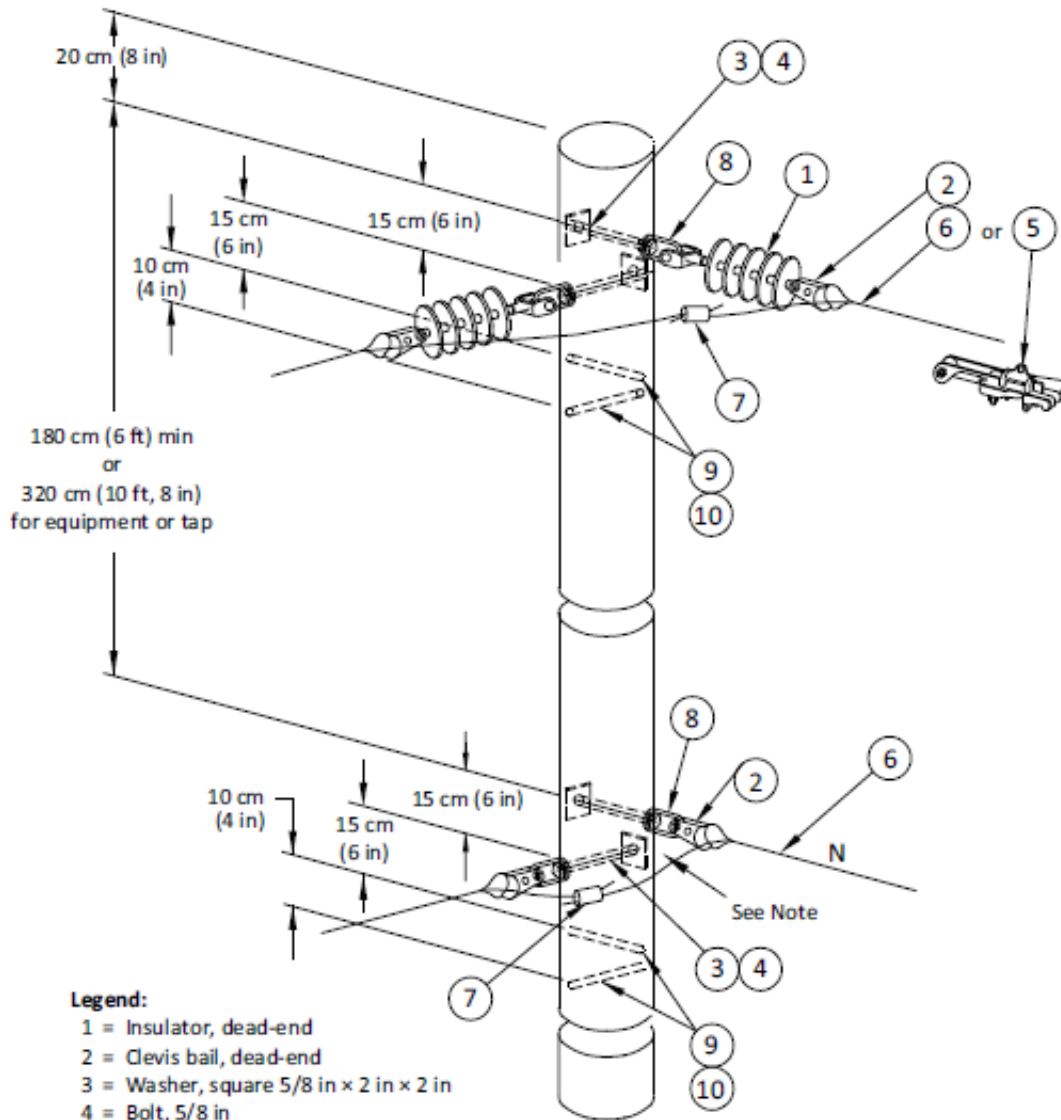
**Primary 1-phase line angle 16° to 60°, 2.4 to 16 kV, maximum span 90 m (300 ft)**

(See Rule 75-200.)



### Specification 10.4

**Primary 1-phase line angle  $61^\circ$  to  $90^\circ$ , 2.4 to 16 kV, maximum span 90 m (300 ft)**  
(See Rule 75-200.)

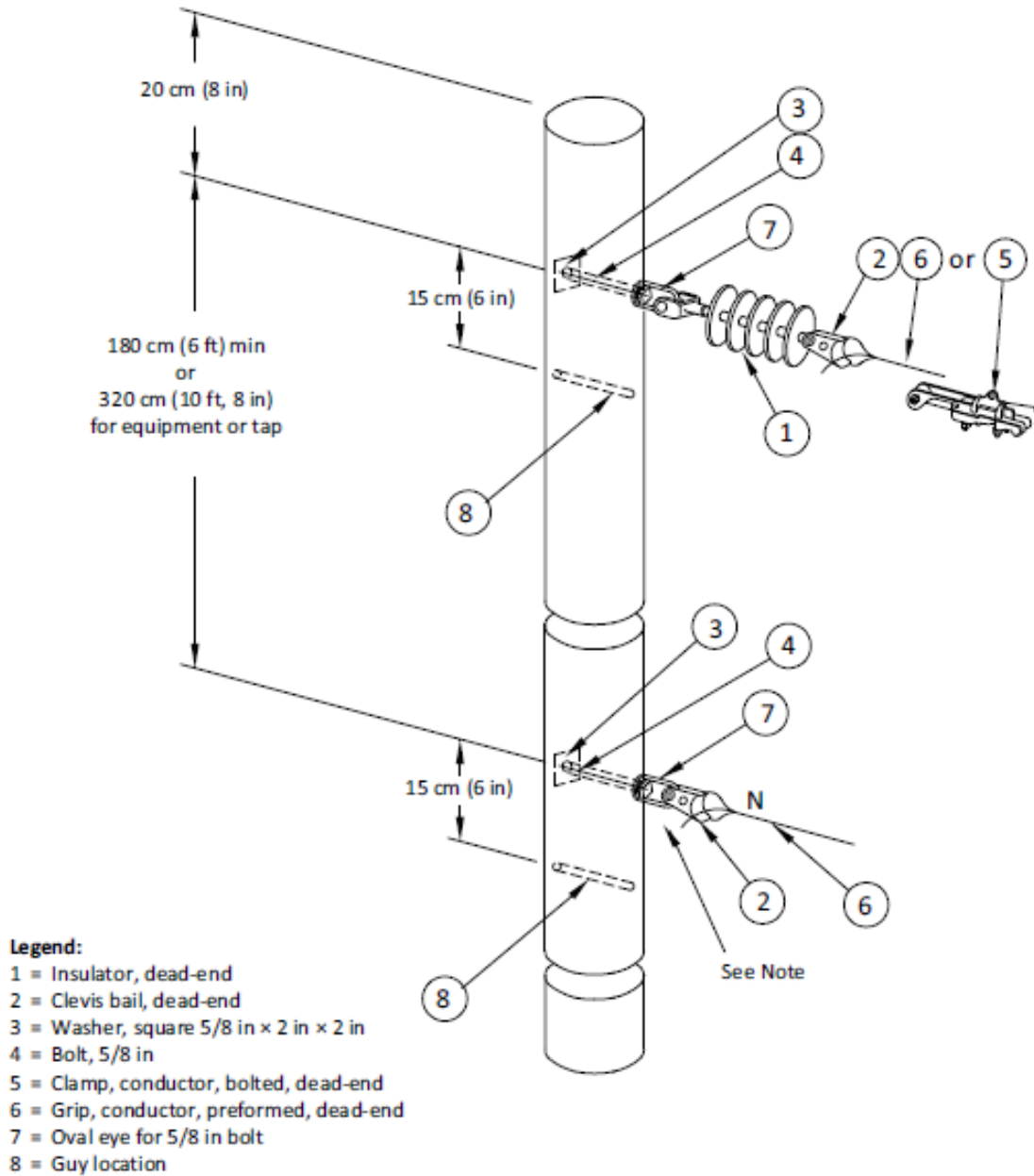


#### Legend:

- 1 = Insulator, dead-end
- 2 = Clevis bail, dead-end
- 3 = Washer, square 5/8 in  $\times$  2 in  $\times$  2 in
- 4 = Bolt, 5/8 in
- 5 = Clamp, conductor, bolted, dead-end
- 6 = Grip, conductor, preformed, dead-end
- 7 = Connector, wedge or compression
- 8 = Oval eye for 5/8 in bolt
- 9 = Guy location
- 10 = See Specification 27, Figure 5

**Note:** See alternate Specification 35.1.

**Specification 10.5**  
**Primary 1-phase dead-end, 2.4 to 16 kV, maximum span 90 m (300 ft)**  
(See Rule 75-200.)



**Legend:**

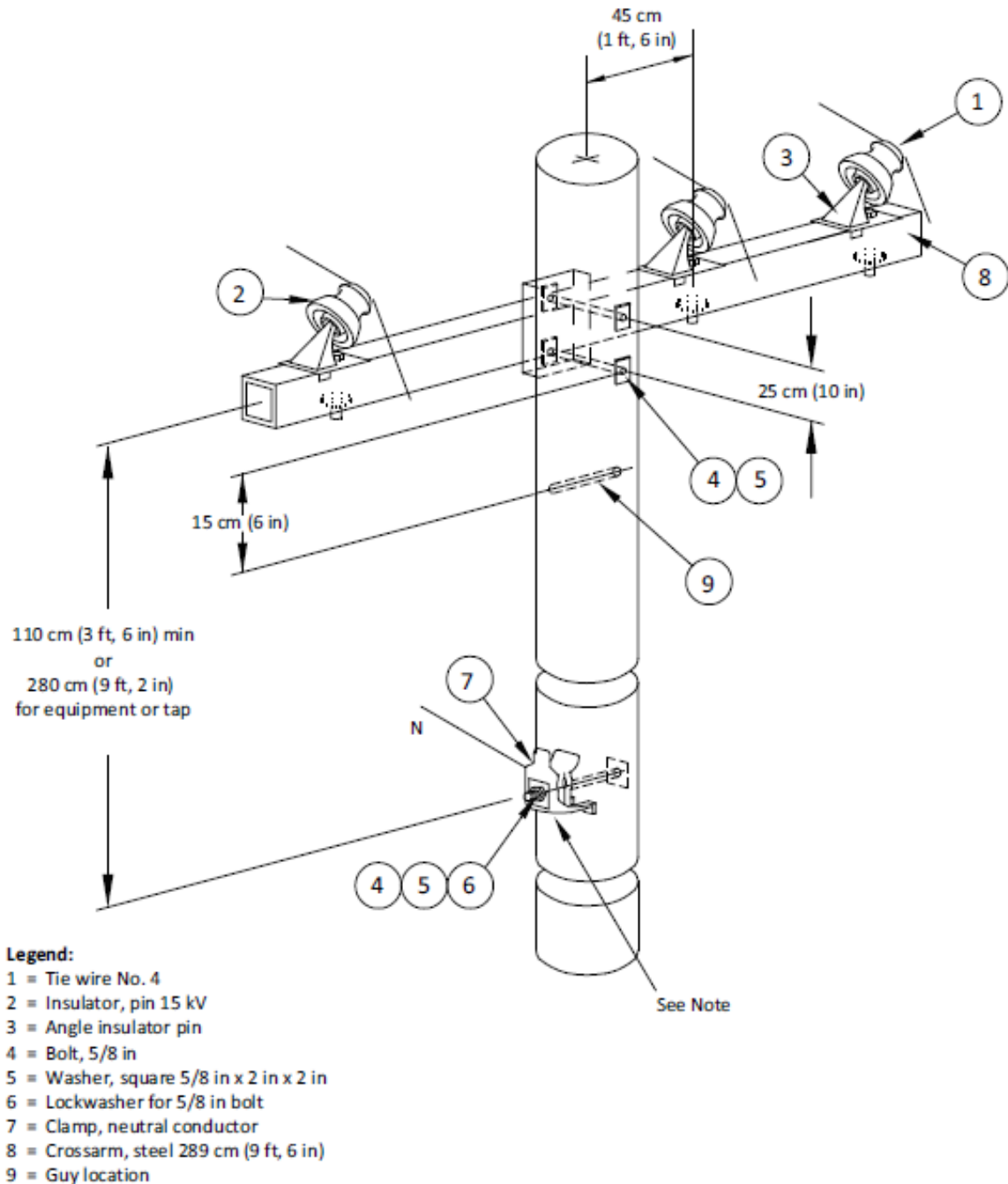
- 1 = Insulator, dead-end
- 2 = Clevis bail, dead-end
- 3 = Washer, square 5/8 in x 2 in x 2 in
- 4 = Bolt, 5/8 in
- 5 = Clamp, conductor, bolted, dead-end
- 6 = Grip, conductor, preformed, dead-end
- 7 = Oval eye for 5/8 in bolt
- 8 = Guy location

**Note:** See alternate Specification 35.1.



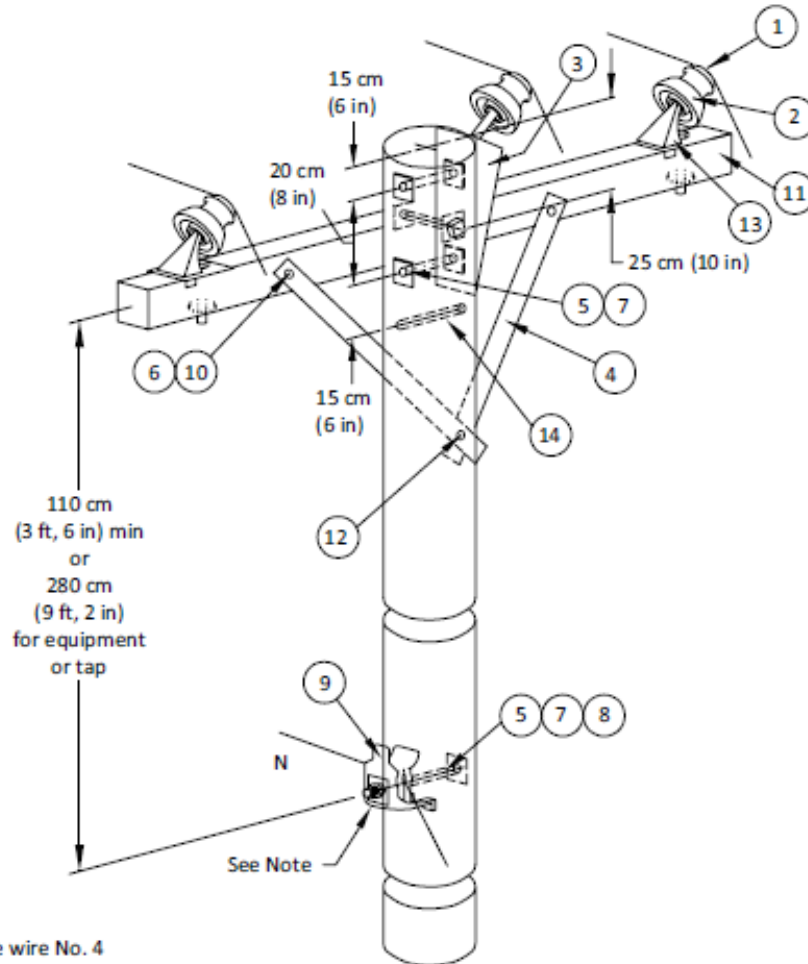
### Specification 11.1

*Primary 3-phase, underbuilt, line angle 4° to 15° crossarm (pin insulator), 2.4/4.16 to 8.0/13.8 kV, maximum span 60 m (200 ft)  
(See Rule 75-200.)*



### Specification 11.2

Primary 3-phase, line angle 4° to 15° crossarm (pin insulator), 2.4/4.16 to 8.0/13.8 kV  
(See Rule 75-200.)



#### Legend:

- 1 = Tie wire No. 4
- 2 = Insulator, pin 15 kV
- 3 = Pole top angle pin
- 4 = Brace
- 5 = Bolt, 5/8 in
- 6 = Bolt, 3/8 in
- 7 = Washer, square 5/8 in × 2 in × 2 in
- 8 = Lockwasher for 5/8 in bolt
- 9 = Clamp, neutral conductor
- 10 = Washer, rd. 3/8 in
- 11 = Crossarm, wood (see span)
- 12 = Screw, lag 1/2 in × 4 1/2 in
- 13 = Angle insulator pin
- 14 = Guy location

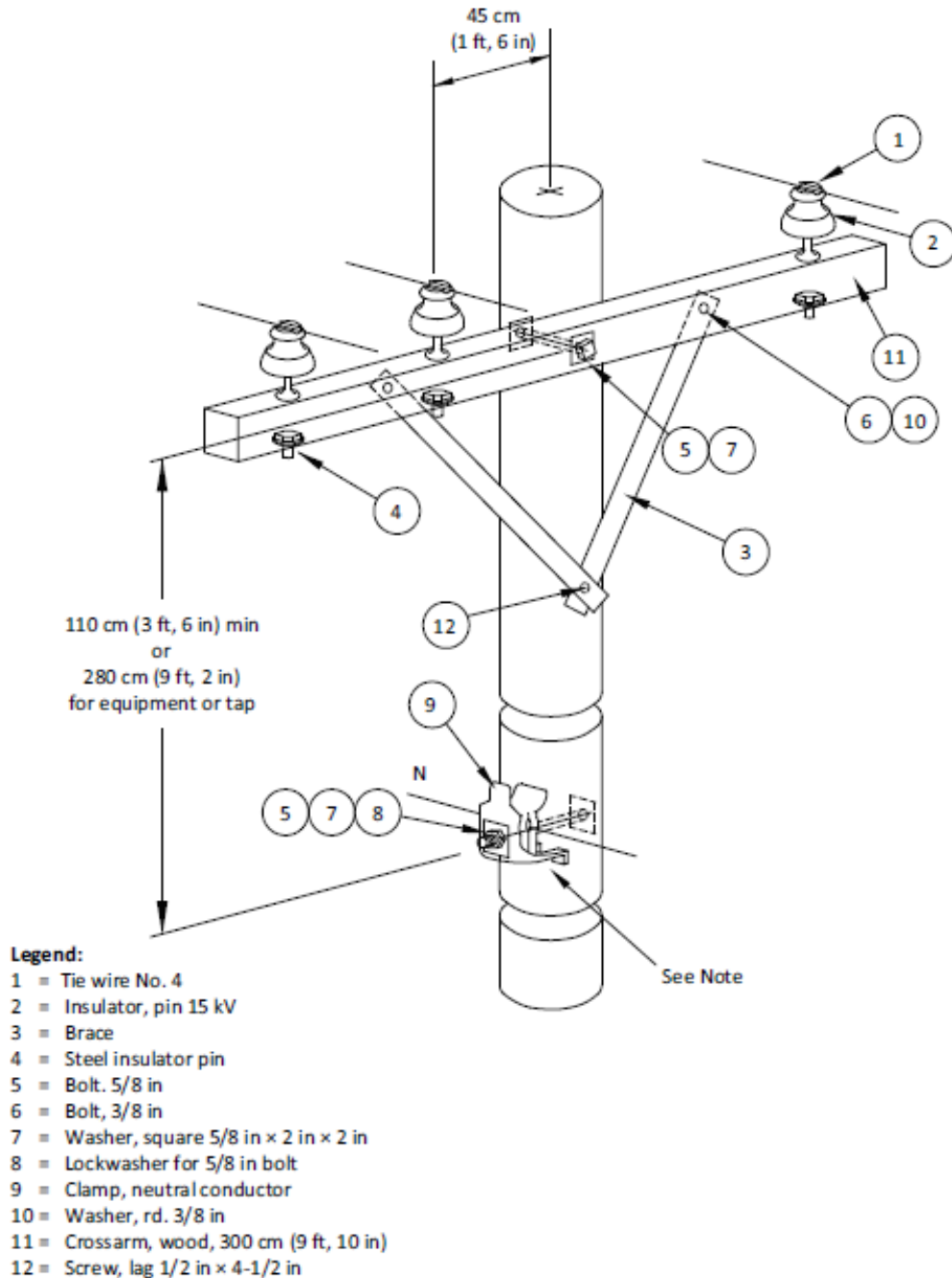
For max. span	Crossarm
75 m (250 ft)	250 cm (8 ft, 4 in)
90 m (300 ft)	300 cm (9 ft, 10 in)

**Note:** See alternate Specification 35.1.

### Specification 11.3

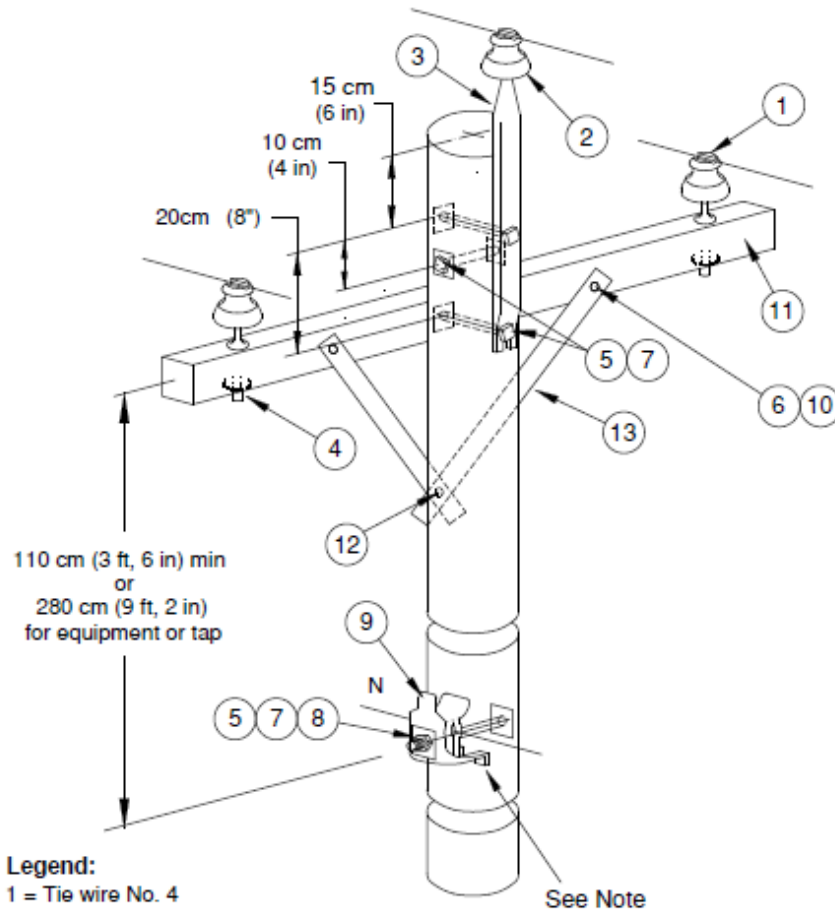
*Primary 3-phase, underbuilt tangent crossarm (pin insulator), 2.4/4.16 to 8.0/13.8 kV, maximum span 60 m (200 ft)*

*(See Rule 75-200.)*



### Specification 11.4 Primary 3-phase, tangent, crossarm (pin insulator) 2.4/4.16 to 8.0/13.8 kV

(See Rule 75-200)



#### Legend:

- 1 = Tie wire No. 4
- 2 = Insulator, pin 15 kV
- 3 = Pole top pin
- 4 = Steel insulator pin
- 5 = Bolt, 5/8 in
- 6 = Bolt, 3/8 in
- 7 = Washer, square 5/8 in x 2 in x 2 in
- 8 = Lockwasher for 5/8 in bolt
- 9 = Clamp, neutral conductor
- 10 = Washer, rd, 3/8 in
- 11 = Crossarm, wood (see span)
- 12 = Screw, lag 1/2 in x 4 1/2 in
- 13 = Brace

Note: See alternate Specification 35.1

For max. span	Crossarm
75 m (250 ft)	250 cm (8 ft, 4 in) wood
90 m (300 ft)	300 cm (9 ft, 10 in) wood

**Primary 3-phase, tangent, 2.4/4.16 to 16.0/27.6 kV**

75 cm  
(2 ft, 6 in)

25 cm  
(10 in)

15 cm (6 in)

10 cm (4 in)

20 cm (8 in)

150 cm (5 ft) min  
or  
320 cm (10 ft, 8 in)  
for equipment or tap

1 - Bracket, pole top, tangent

2 - Transformer

3 - Transformer

4 - Transformer

5 - Transformer

6 - Transformer

7 - Transformer

8 - Transformer

9 - Transformer

10 - Transformer

See Note

- 1 = Bracket, pole top, tangent
- 2 = Insulator, vertical
- 3 = Clamp, conductor insulator
- 4 = Insulator horizontal
- 5 = Bracket, stand-off (see span)
- 6 = Clamp, neutral conductor
- 7 = Stud, insulator
- 8 = Bolt, 5/8 in
- 9 = Lockwasher for 5/8 in bolt
- 10 = Washer, square 5/8 in x 2 in x 2 in

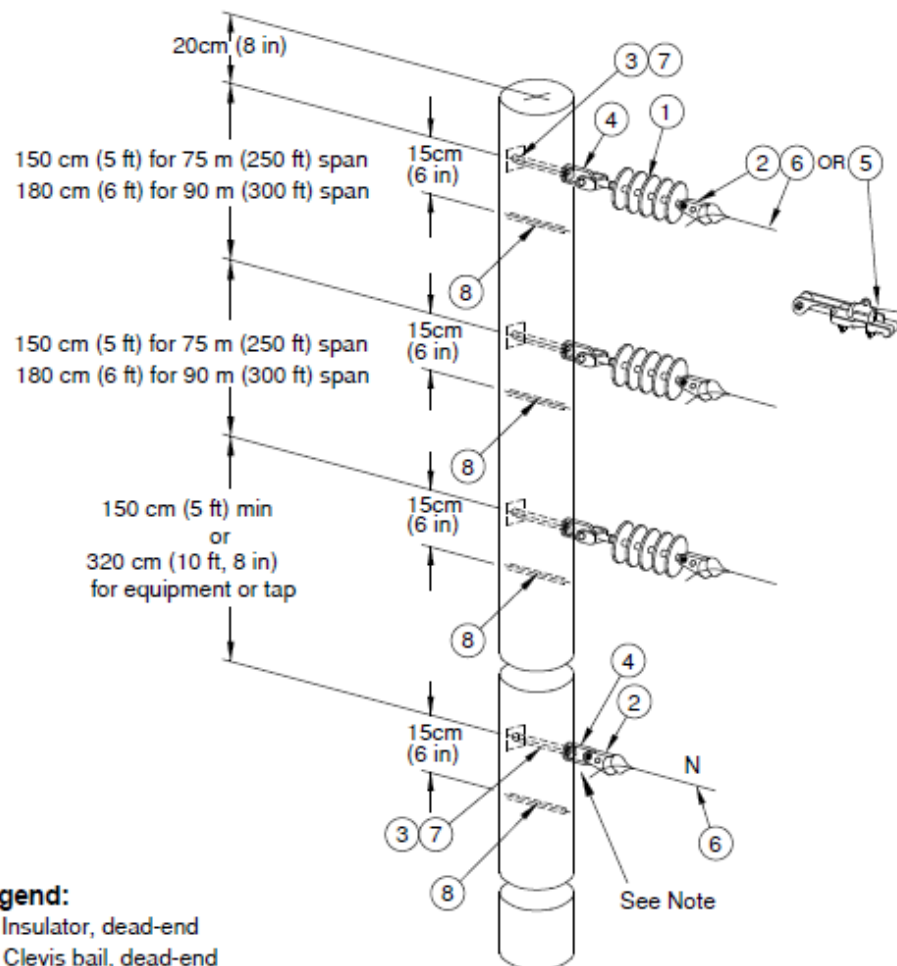
For maximum span	Stand-off bracket
75 m (250 ft)	23 cm (9 in)
90 m (300 ft)	45 cm (18 in)

### Specification 12.2

#### Primary 3-phase dead-end vertical

#### 2.4/4.16 to 16/27.6 kV

(See Rule 75-200)



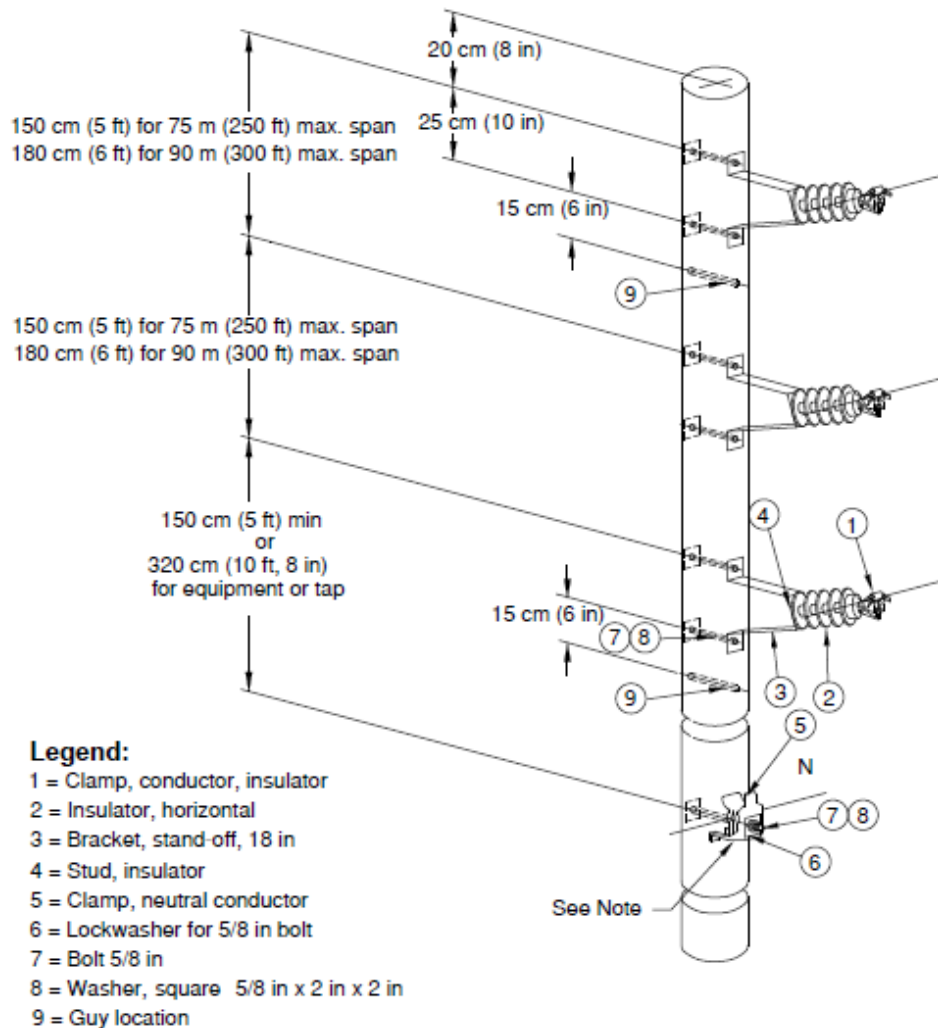
#### Legend:

- 1 = Insulator, dead-end
- 2 = Clevis bail, dead-end
- 3 = Washer, square 5/8 in x 2 in x 2 in
- 4 = Oval eye 5/8 in
- 5 = Clamp, conductor, bolted, dead-end
- 6 = Grip, conductor, preformed, dead-end
- 7 = Bolt 5/8 in
- 8 = Guy location

Note: See alternate Specification 35.1

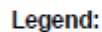
### Specification 12.3 Primary 3-phase tree framing, 2.4/4.16 to 16/27.6 kV

(See Rule 75-200)





(See Rule 75-200)



- 1 = Bracket, pole top, tangent
- 2 = Insulator, vertical
- 3 = Clamp, conductor insulator
- 4 = Insulator horizontal
- 5 = Bracket, stand off (see span)
- 6 = Clamp, neutral conductor
- 7 = Stud, insulator
- 8 = Bolt, 5/8 in
- 9 = Washer, square 5/8 in x 2 in x 2 in
- 10 = Lockwasher for 5/8 in bolt
- 11 = Guy location

**Note:** See alternate Specification 35.1

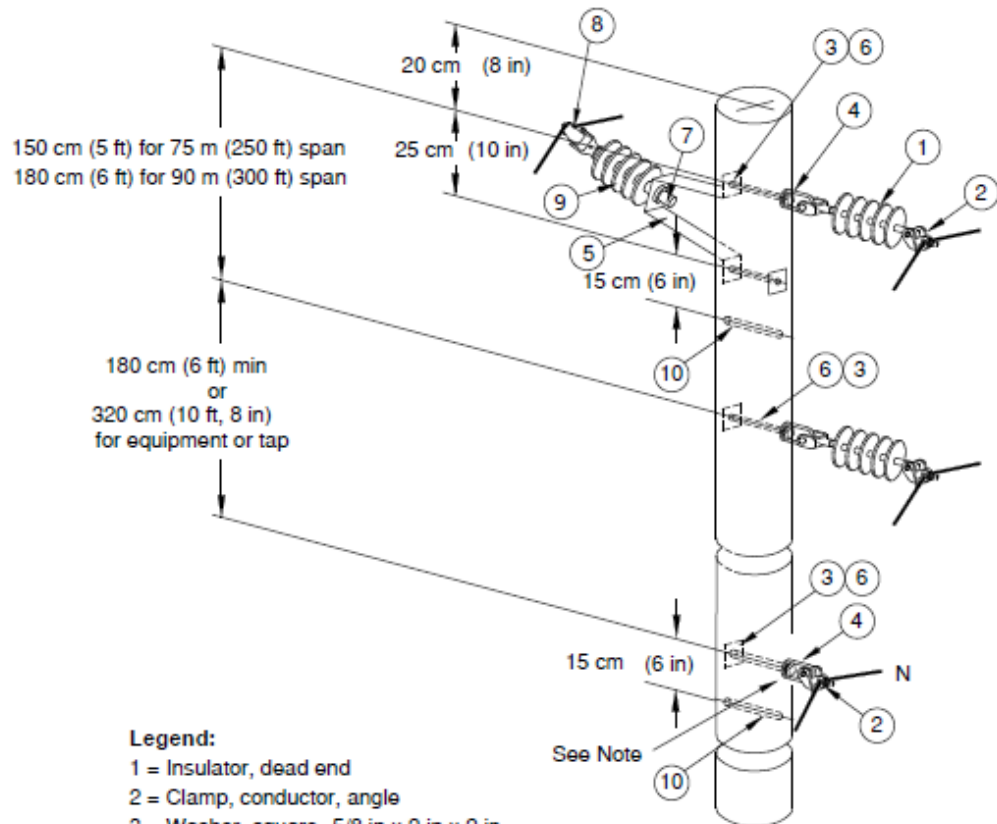
For maximum span	Stand-off bracket
75 m (250 ft)	23 cm (9 in)
90 m (300 ft)	45 cm (18 in)

### Specification 13.2

#### Primary 3-phase line angle $16^{\circ}$ to $45^{\circ}$

#### 2.4/4.16 to 16/27.6 kV

(See Rule 75-200)



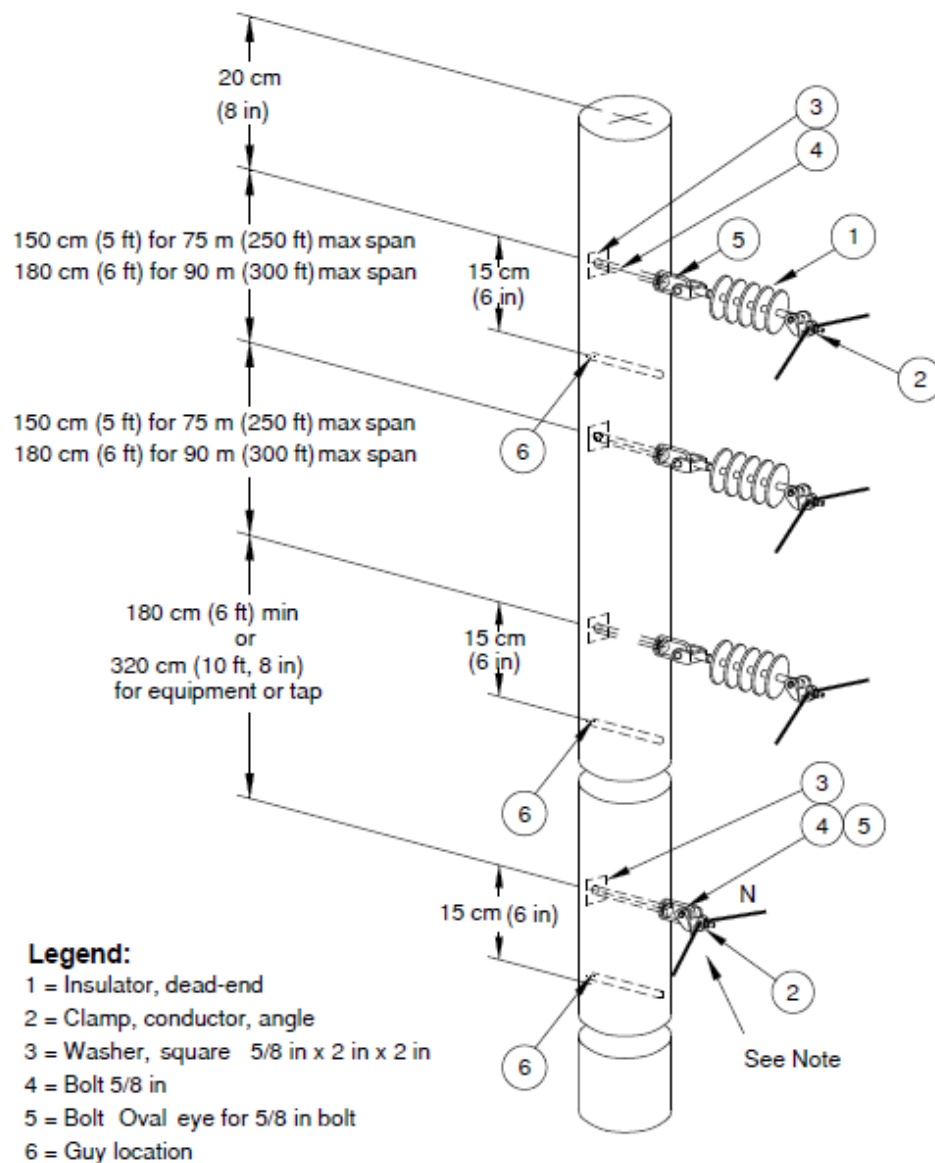
For maximum span	Stand-off bracket
75 m (250 ft)	23 cm (9 in)
90 m (300 ft)	45 cm (18 in)

### Specification 13.3

#### Primary 3-phase line angle 16° to 60°

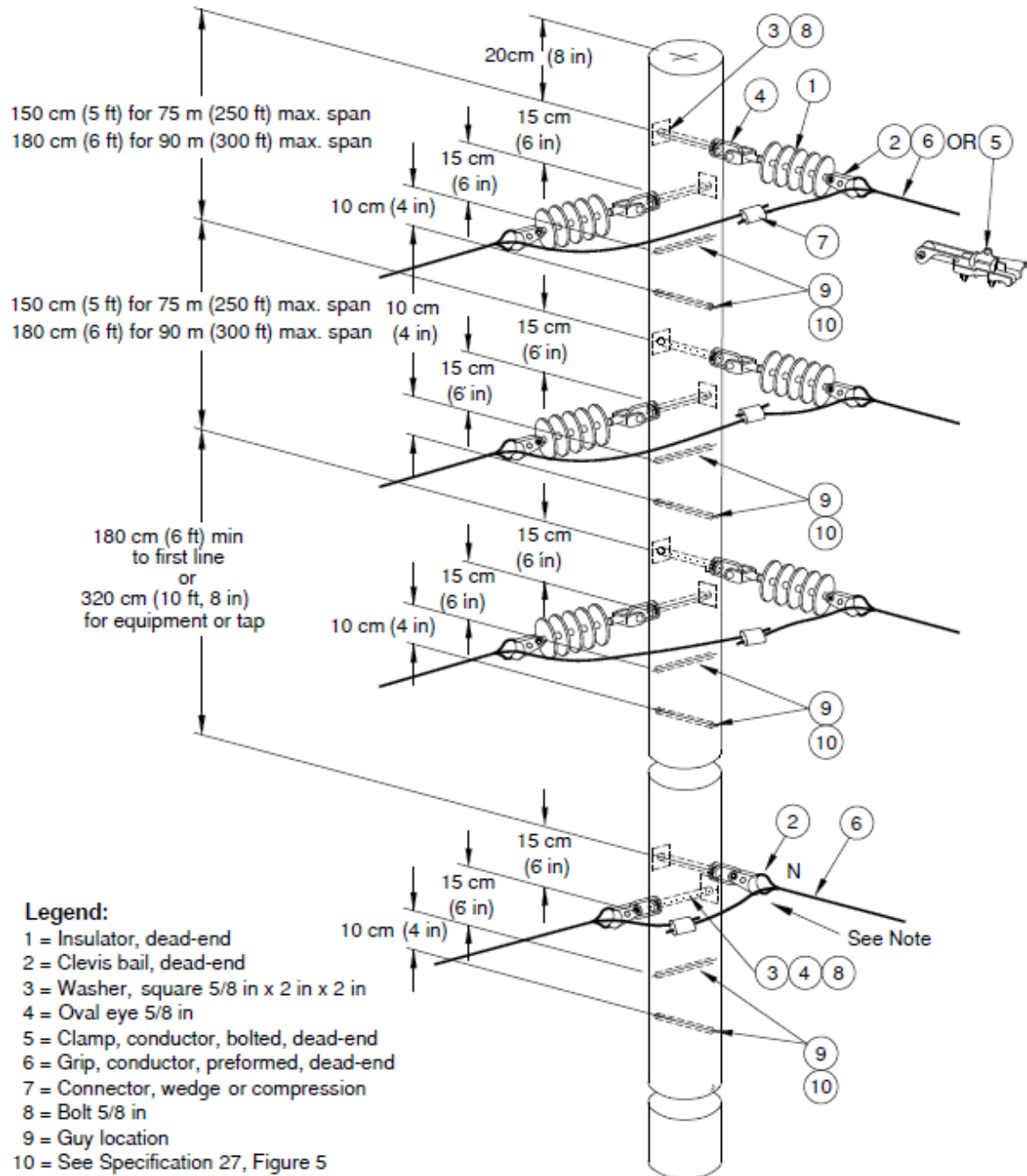
#### 2.4/4.16 to 16/27.6 kV

(See Rule 75-200)



### Specification 13.4 Primary 3-phase line angle 61° to 90° 2.4/4.16 to 16/27.6 kV

(See Rule 75-200)

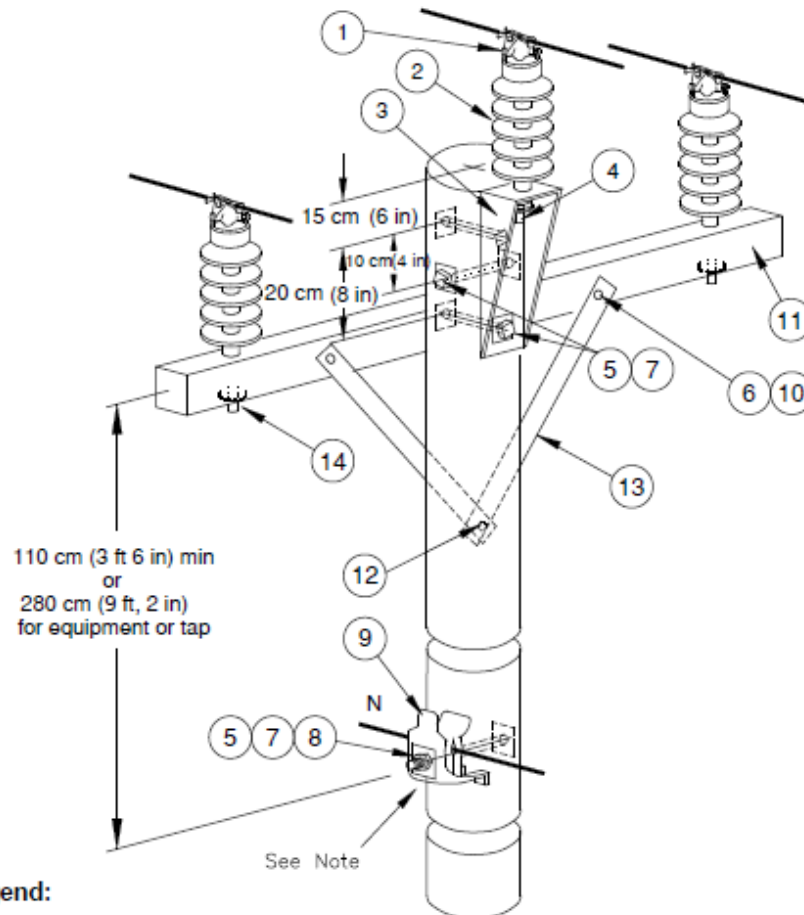


### Specification 14.1

#### Primary 3-phase, tangent, crossarm (LP insulator)

#### 2.4/4.16 to 16/27.6 kV

(See Rule 75-200)



#### Legend:

- 1 = Clamp, conductor, insulator
- 2 = Insulator, vertical
- 3 = Bracket, pole top, tangent
- 4 = Stud, insulator, 5/8 in x 3 in
- 5 = Bolt, 5/8 in
- 6 = Bolt, 3/8 in
- 7 = Washer, square 5/8 in x 2 in x 2 in
- 8 = Lockwasher for 5/8 in bolt
- 9 = Clamp, neutral conductor
- 10 = Washer, rd. 3/8 in
- 11 = Crossarm, wood (see span)
- 12 = Screw, lag 1/2 in x 4 1/2 in
- 13 = Brace
- 14 = Stud insulator, 5/8 in x 7 in

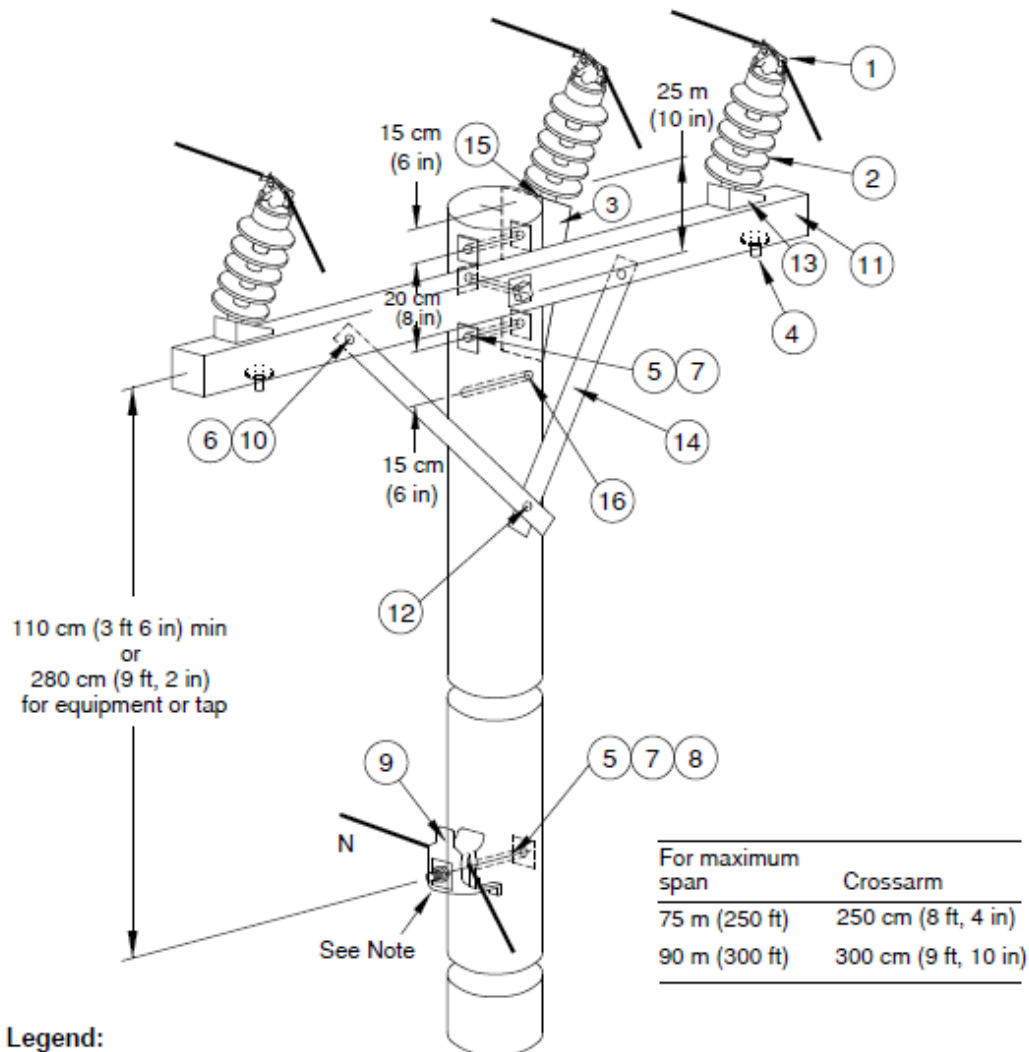
Note: See alternate Specification 35.1

For maximum span	Crossarm
75 m (250 ft)	250 cm (8 ft, 4 in)
90 m (300 ft)	300 cm (9 ft, 10 in)

### Specification 14.2

#### Primary 3-phase, line angle 4° to 15° crossarm (LP insulator), 2.4/4.16 to 16/27.6 kV

(See Rule 75-200)



#### Legend:

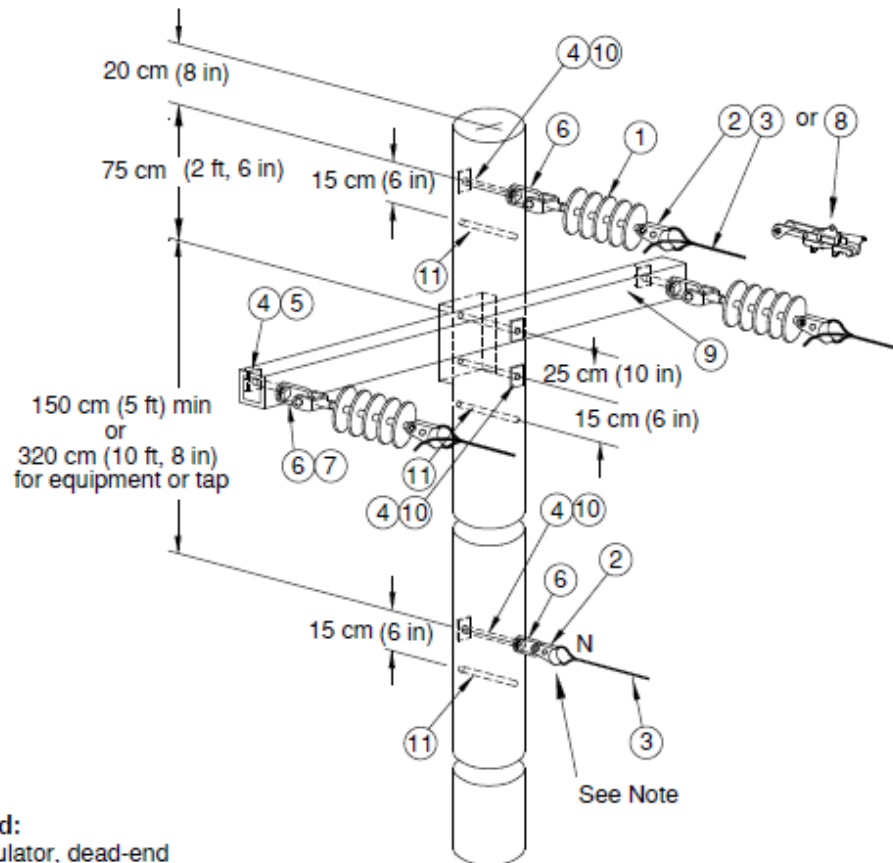
- 1 = Clamp, conductor, insulator
- 2 = Insulator, vertical
- 3 = Bracket, angle
- 4 = Stud, insulator, 5/8 in x 3 in
- 5 = Bolt, 5/8 in
- 6 = Bolt, 3/8 in
- 7 = Washer, square 5/8 in x 2 in x 2 in

Note: See alternate Specification 35.1

- 8 = Lockwasher for 5/8 in bolt
- 9 = Clamp, neutral conductor
- 10 = Washer, rd. 3/8 in
- 11 = Crossarm, wood (see span)
- 12 = Screw, lag 1/2 in x 4 1/2 in
- 13 = Bracket, insulator angle mount
- 14 = Brace
- 15 = Stud insulator, 5/8 in x 3 in
- 16 = Guy location

**Specification 14.3**  
**Primary 3-phase dead-end, crossarm (triangular)**  
**2.4/4.16 to 16/27.6 kV**

(See Rule 75-200)



Legend:

- 1 = Insulator, dead-end
- 2 = Clevis bail, dead-end
- 3 = Grip, conductor, preformed, dead-end
- 4 = Washer, square 5/8 in x 2 in x 2 in
- 5 = Lockwasher for 5/8 in bolt
- 6 = Oval eye for 5/8 in bolt
- 7 = Bolt 5/8 in
- 8 = Clamp, conductor, bolted, dead-end
- 9 = Crossarm, steel (see span)
- 10 = Bolt, 5/8 in x 6 in
- 11 = Guy location

**Note:** See *alternate Specification 35.1*

For maximum span	Crossarm, see Note
75 m (250 ft)	170 cm (5 ft, 6 in)
90 m (300 ft)	230 cm (7 ft, 6 in)

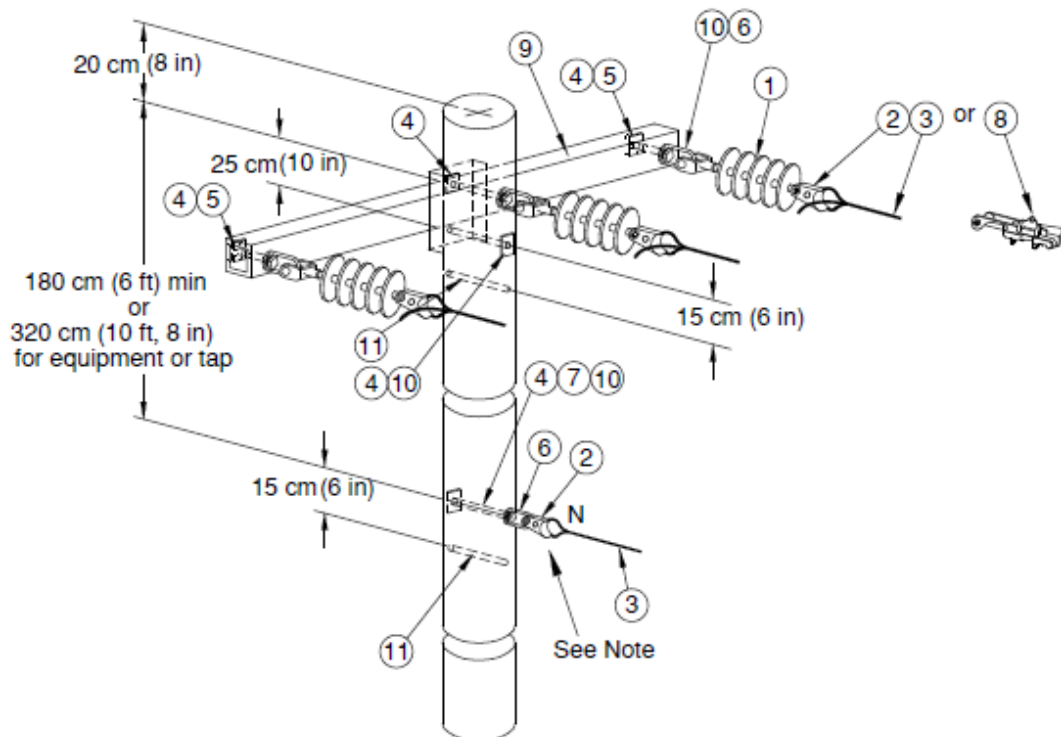


### Specification 14.4

#### Primary 3-phase, dead-end, crossarm (flat)

#### 2.4/4.16 to 16/27.6 kV

(See Rule 75-200)



#### Legend:

- 1 = Insulator, dead-end
- 2 = Clevis bail, dead-end
- 3 = Grip, conductor, preformed, dead-end
- 4 = Washer, square 5/8 in x 2 in x 2 in
- 5 = Lockwasher for 5/8 in bolt
- 6 = Oval eye for 5/8 in bolt
- 7 = Bolt 5/8 in
- 8 = Clamp, conductor, bolted, dead-end
- 9 = Crossarm, steel (see span)
- 10 = Bolt, 5/8 in x 6 in
- 11 = Guy location

**Note:** See alternate Specification 35.1

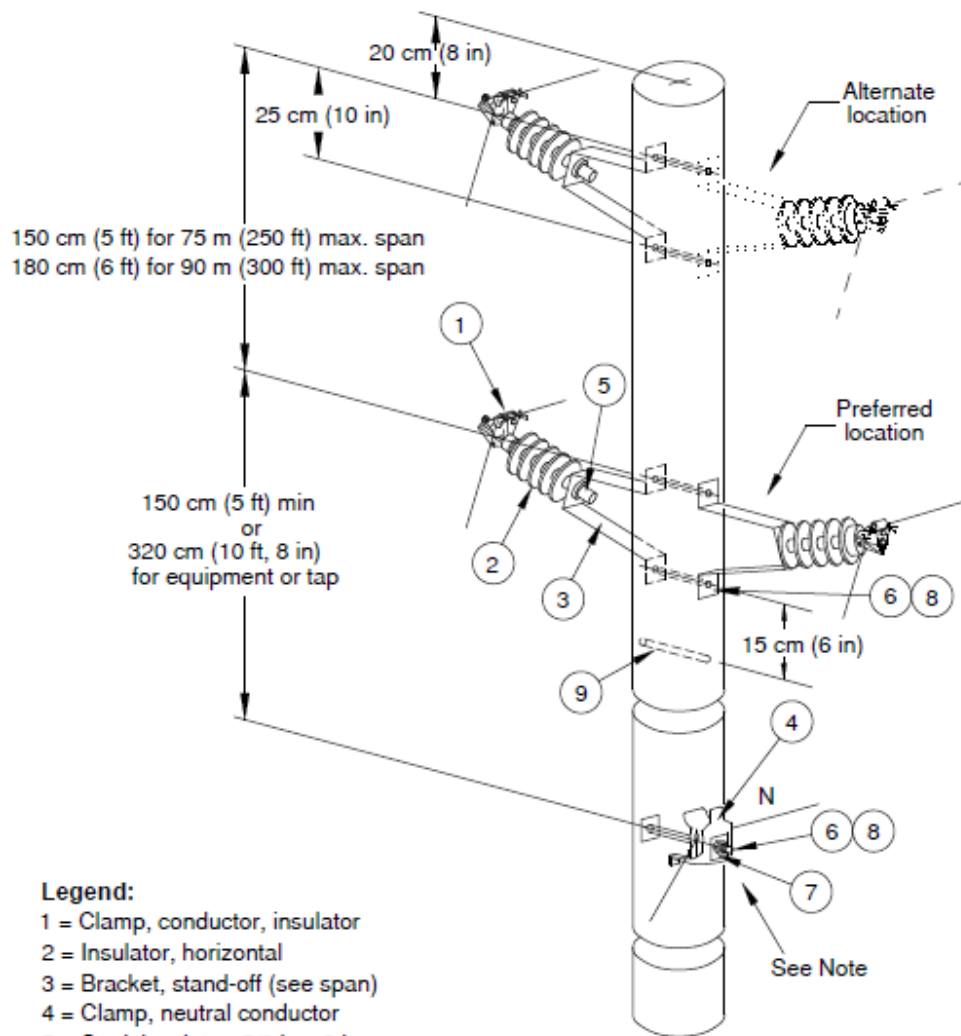
For maximum span	Crossarm
75 m (250 ft)	230 cm (7 ft, 6 in)
90 m (300 ft)	290 cm (9 ft, 6 in)

### Specification 15.1

#### Primary 3-phase, underbuilt, tangent or line angle $0^{\circ}$ to $15^{\circ}$

#### 2.4/4.16 to 16/27.6 kV

(See Rule 75-200)



#### Legend:

- 1 = Clamp, conductor, insulator
- 2 = Insulator, horizontal
- 3 = Bracket, stand-off (see span)
- 4 = Clamp, neutral conductor
- 5 = Stud, insulator, 5/8 in x 3 in
- 6 = Bolt, 5/8 in
- 7 = Lockwasher, for 5/8 in bolt
- 8 = Washer, square 5/8 in x 2 in x 2 in
- 9 = Guy location

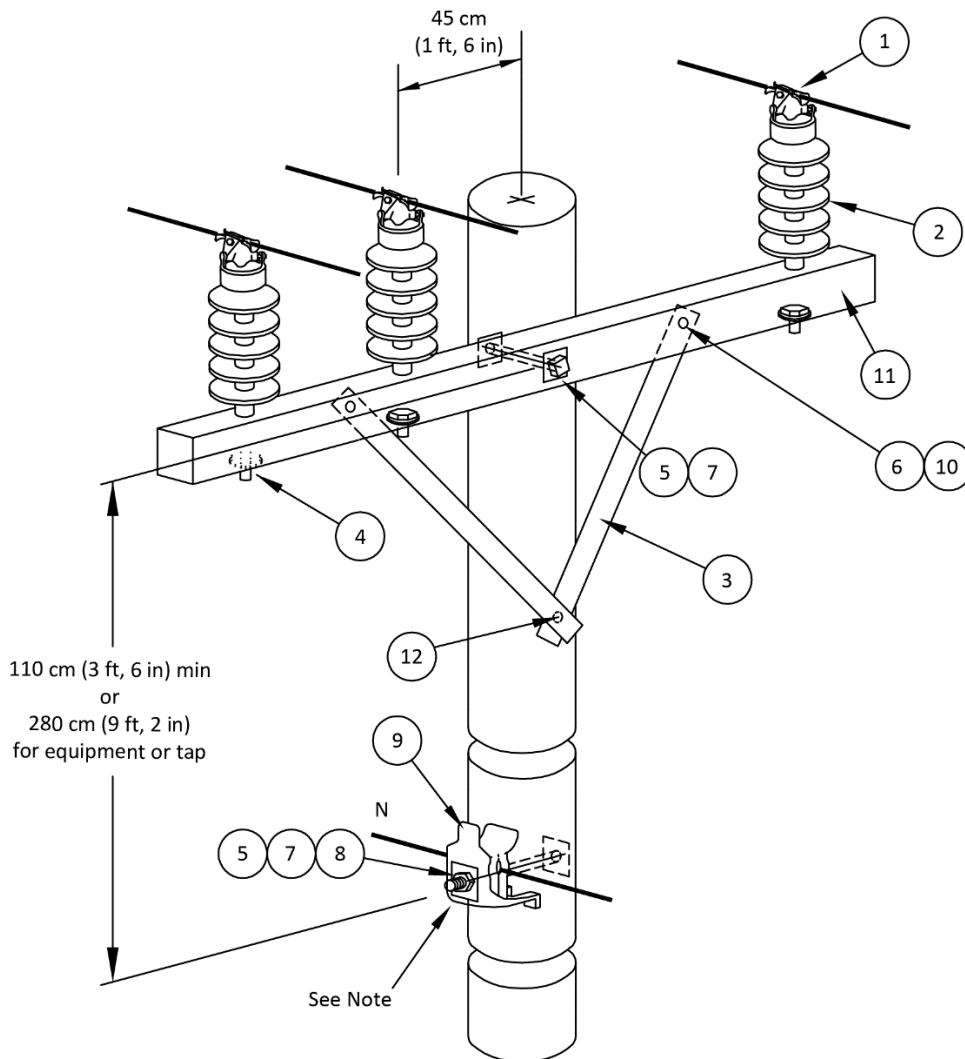
**Note:** See alternate Specification 35.1

For maximum span	Stand-off bracket
75 m (250 ft)	23 cm (9 in)
90 m (300 ft)	45 cm (18 in)

### Specification 15.2

**Primary 3-phase, underbuilt, tangent crossarm (LP insulator),  
2.4/4.16 to 16/27.6 kV, maximum span 60 m (200 ft)**

(See Rule 75-200.)



#### Legend:

- 1 = Clamp, conductor, insulator
- 2 = Insulator, vertical
- 3 = Brace
- 4 = Stud, insulator, 5/8 in × 7 in
- 5 = Bolt, 5/8 in
- 6 = Bolt, 3/8 in

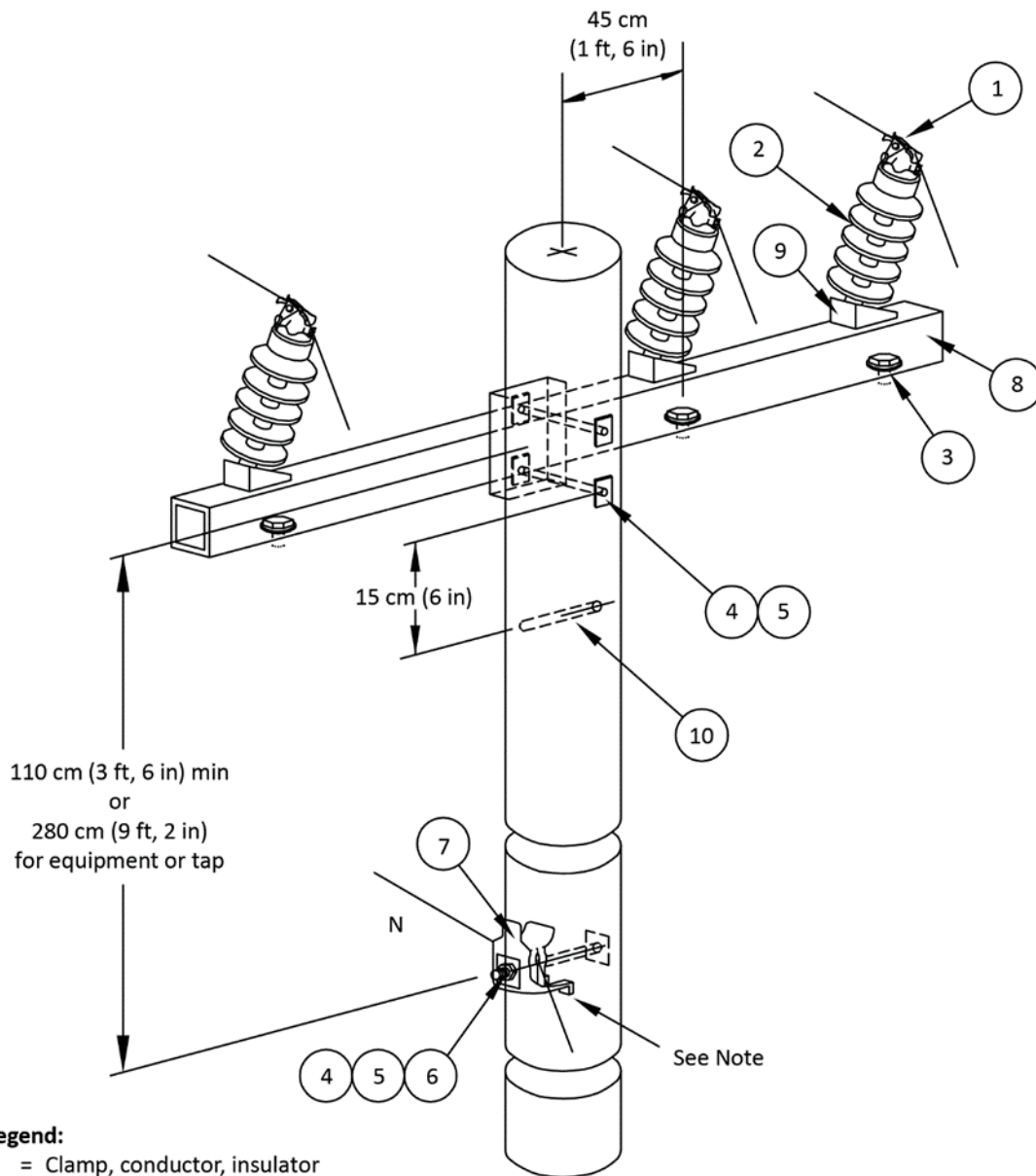
- 7 = Washer, square 5/8 in × 2 in × 2 in
- 8 = Lockwasher for 5/8 in bolt
- 9 = Clamp, neutral conductor
- 10 = Washer, rd. 3/8 in
- 11 = Crossarm, wood, 300 cm (9 ft, 10 in)
- 12 = Screw, lag 1/2 in × 4-1/2 in

**Note:** See alternate Specification 35.1.

### Specification 15.3

**Primary 3-phase, underbuilt, line angle 4° to 15° crossarm (LP insulator), 2.4/4.16 to 16/27.6 kV, maximum span 60 m (200 ft)**

(See Rule 75-200.)



#### Legend:

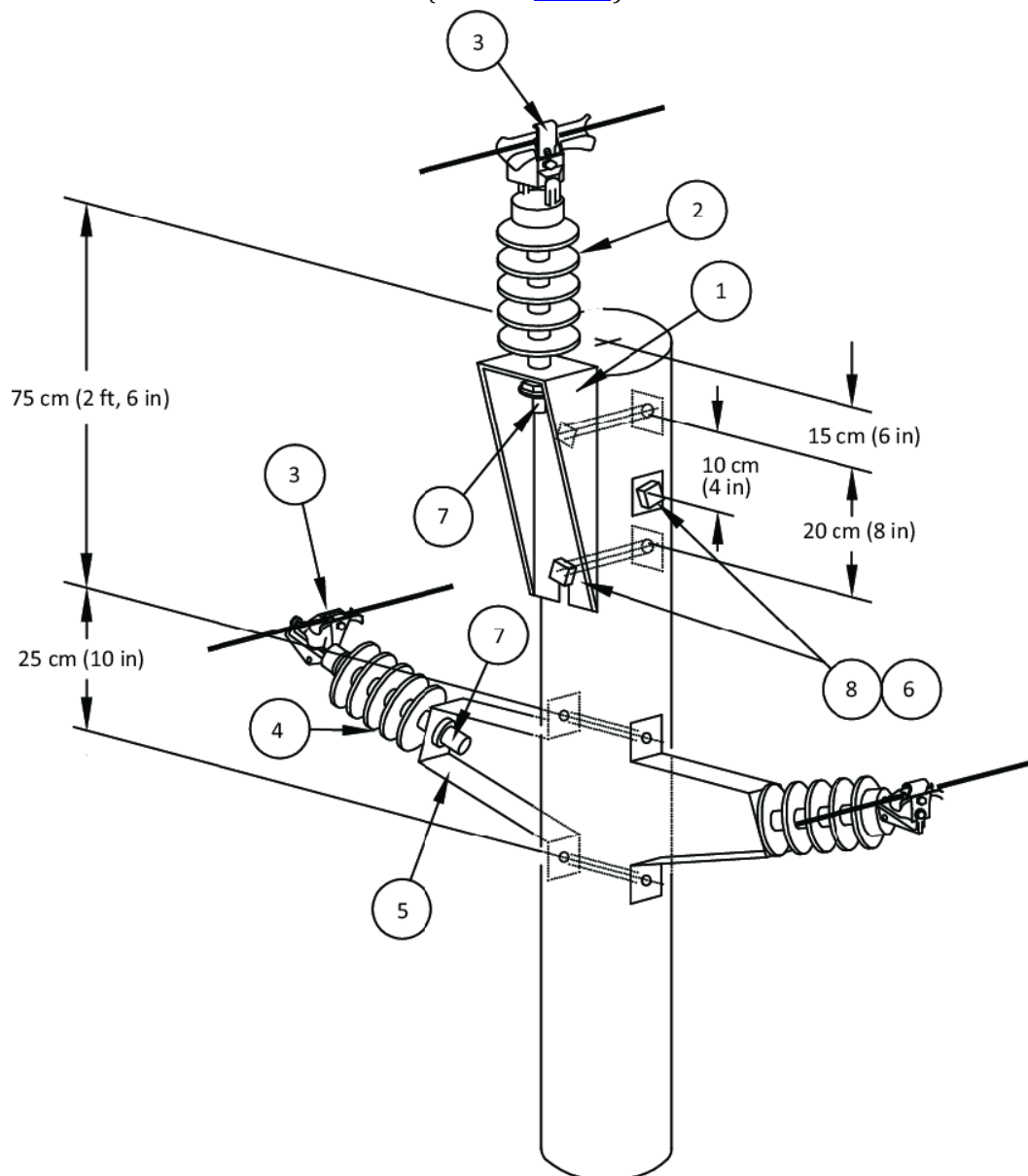
- 1 = Clamp, conductor, insulator
- 2 = Insulator, vertical
- 3 = Stud, insulator
- 4 = Bolt, 5/8 in
- 5 = Washer, square 5/8 in × 2 in × 2 in
- 6 = Lockwasher for 5/8 in bolt
- 7 = Clamp, neutral conductor
- 8 = Crossarm, steel 290 cm (9 ft, 6 in)
- 9 = Bracket, insulator angle mount
- 10 = Guy location

**Note:** See alternate Specification 35.1.

### Specification 16.1

### Subtransmission 3-phase tangent, 44 kV

(See Rule [75-200](#).)

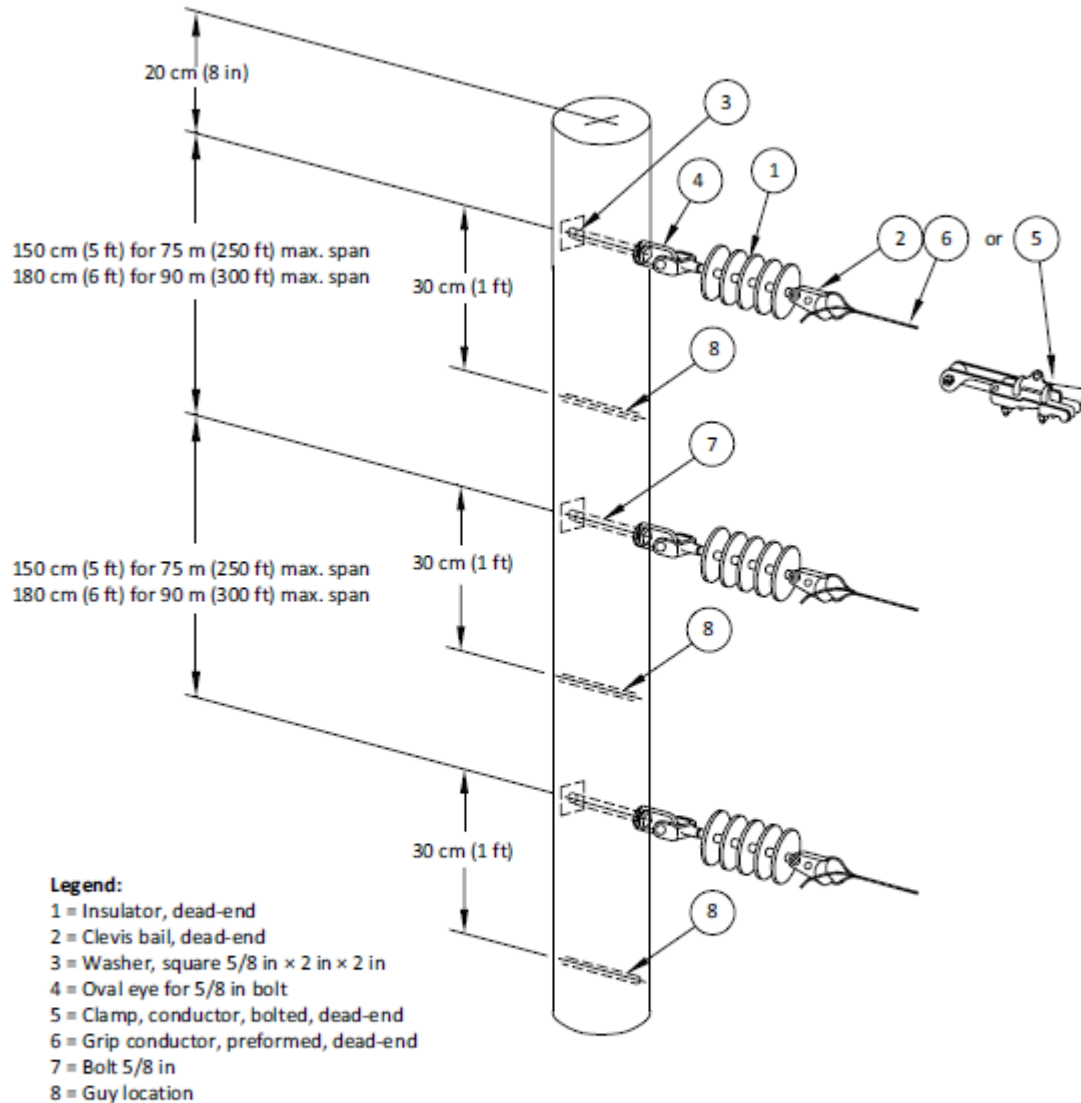


#### Legend:

- 1 = Bracket pole top, tangent
- 2 = Insulator, vertical
- 3 = Clamp, conductor insulator
- 4 = Insulator, horizontal
- 5 = Bracket, stand-off (see span)
- 6 = Washer, square 5/8 in x 2 in x 2 in
- 7 = Stud, insulator
- 8 = Bolt, 5/8 in

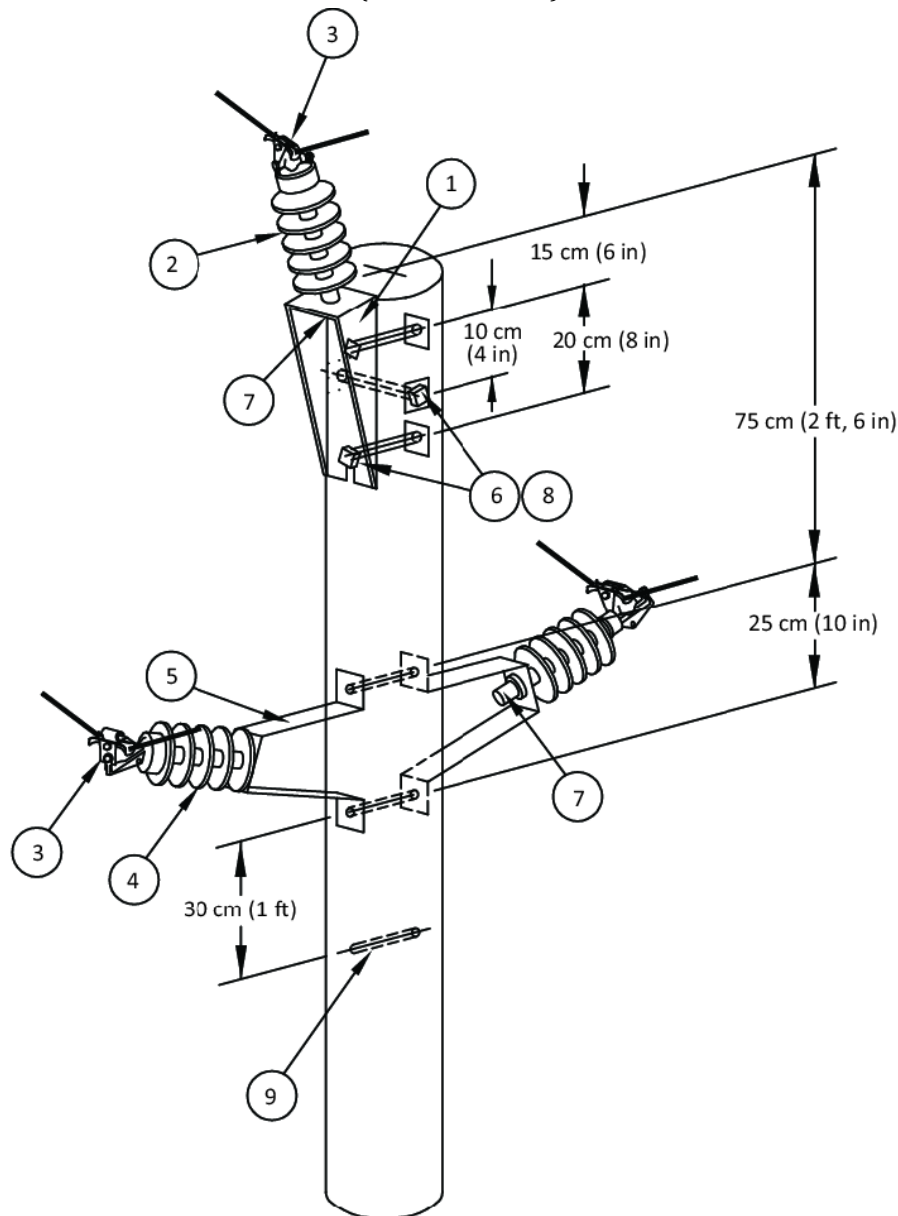
For maximum span	Stand-off bracket
75 m (250 ft)	23 cm (9 in)
90 m (300 ft)	45 cm (18 in)

**Specification 16.2**  
**Subtransmission 3-phase dead-end, vertical, 44 kV**  
(See Rule 75-200.)



**Specification 17.1**  
**Subtransmission 3-phase, line angle 4° to 15°, 44 kV**

(See Rule [75-200.](#))



**Legend:**

- 1 = Bracket pole top, angle
- 2 = Insulator, vertical
- 3 = Clamp, conductor, insulator
- 4 = Insulator, horizontal
- 5 = Bracket, stand-off (see span)
- 6 = Washer, square 5/8 in x 2 in x 2 in
- 7 = Stud, insulator
- 8 = Bolt, 5/8 in
- 9 = Guy location

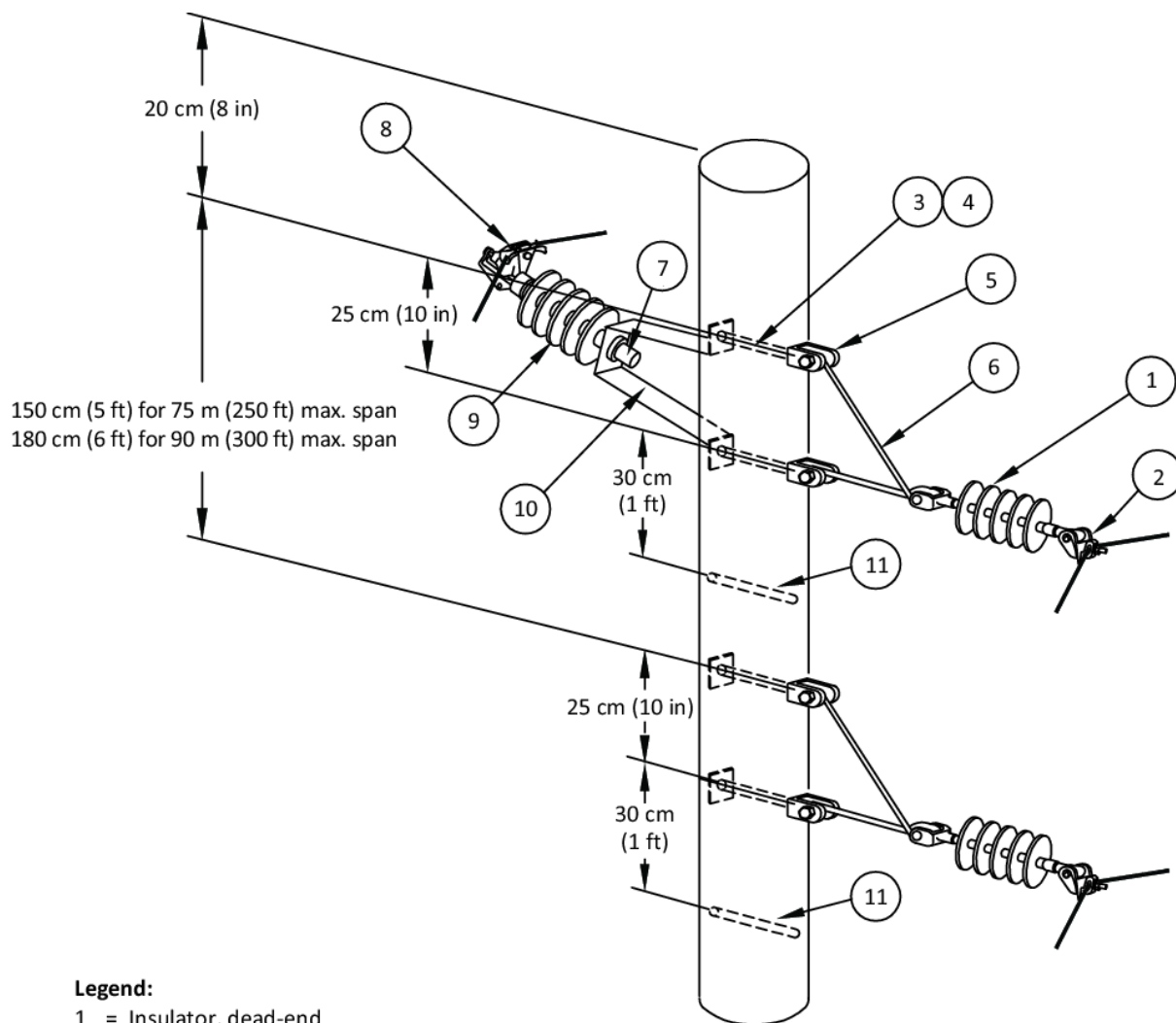
For maximum span	Stand-off bracket
75 m (250 ft)	23 cm (9 in)
90 m (300 ft)	45 cm (18 in)

**Specification 17.2**

**Subtransmission 3-phase, line angle 16° to 45°, 44 kV**

(See Rule [75-200.](#))





**Legend:**

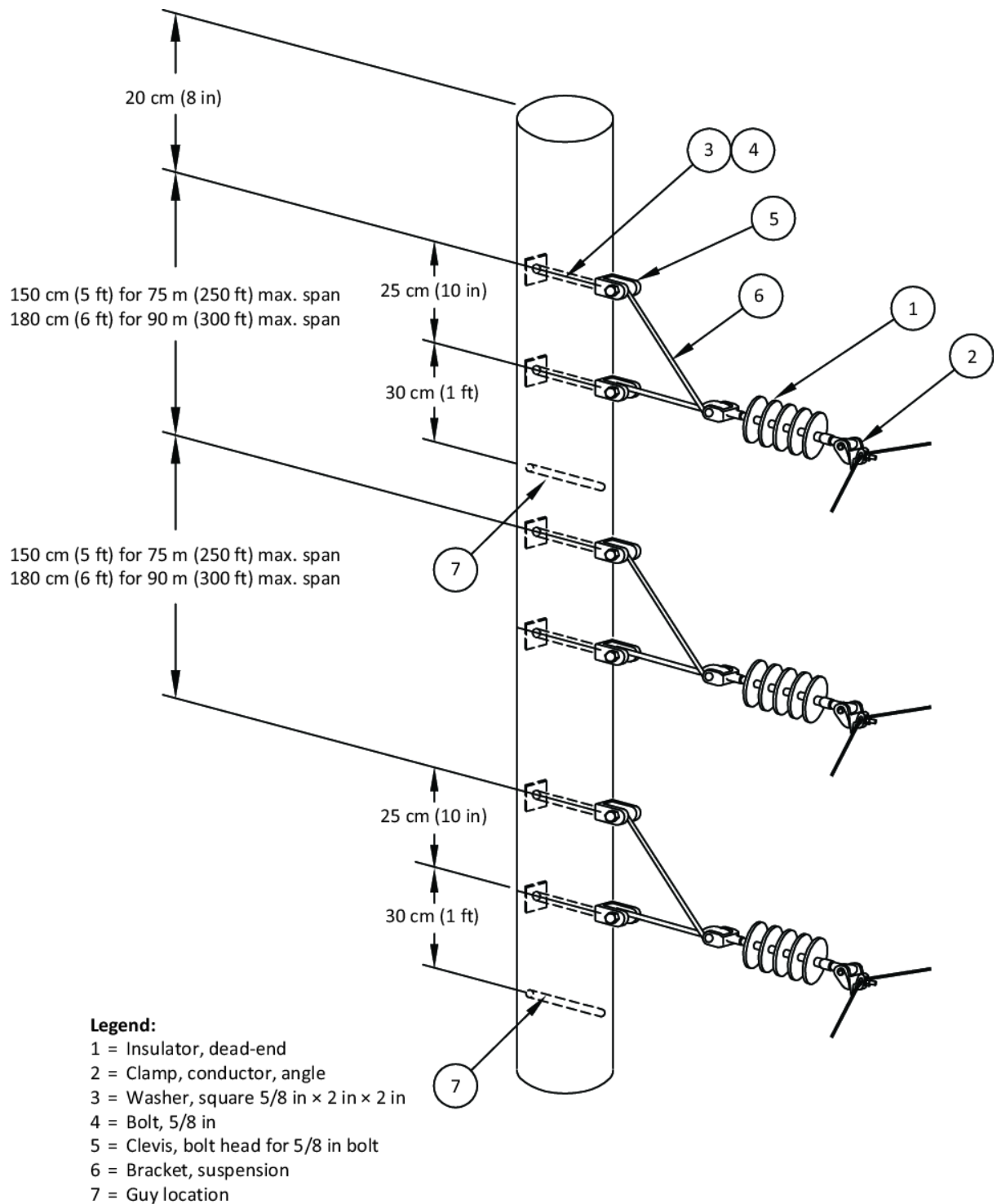
- 1 = Insulator, dead-end
- 2 = Clamp, conductor, angle
- 3 = Washer, square 5/8 in × 2 in × 2 in
- 4 = Bolt, 5/8 in
- 5 = Clevis, bolt head for 5/8 in bolt
- 6 = Bracket, suspension
- 7 = Stud, insulator
- 8 = Clamp, conductor, insulator
- 9 = Insulator, vertical
- 10 = Bracket, stand-off (see span)
- 11 = Guy location

For maximum span	Stand-off bracket
75 m (250 ft)	23 cm (9 in)
90 m (300 ft)	45 cm (18 in)

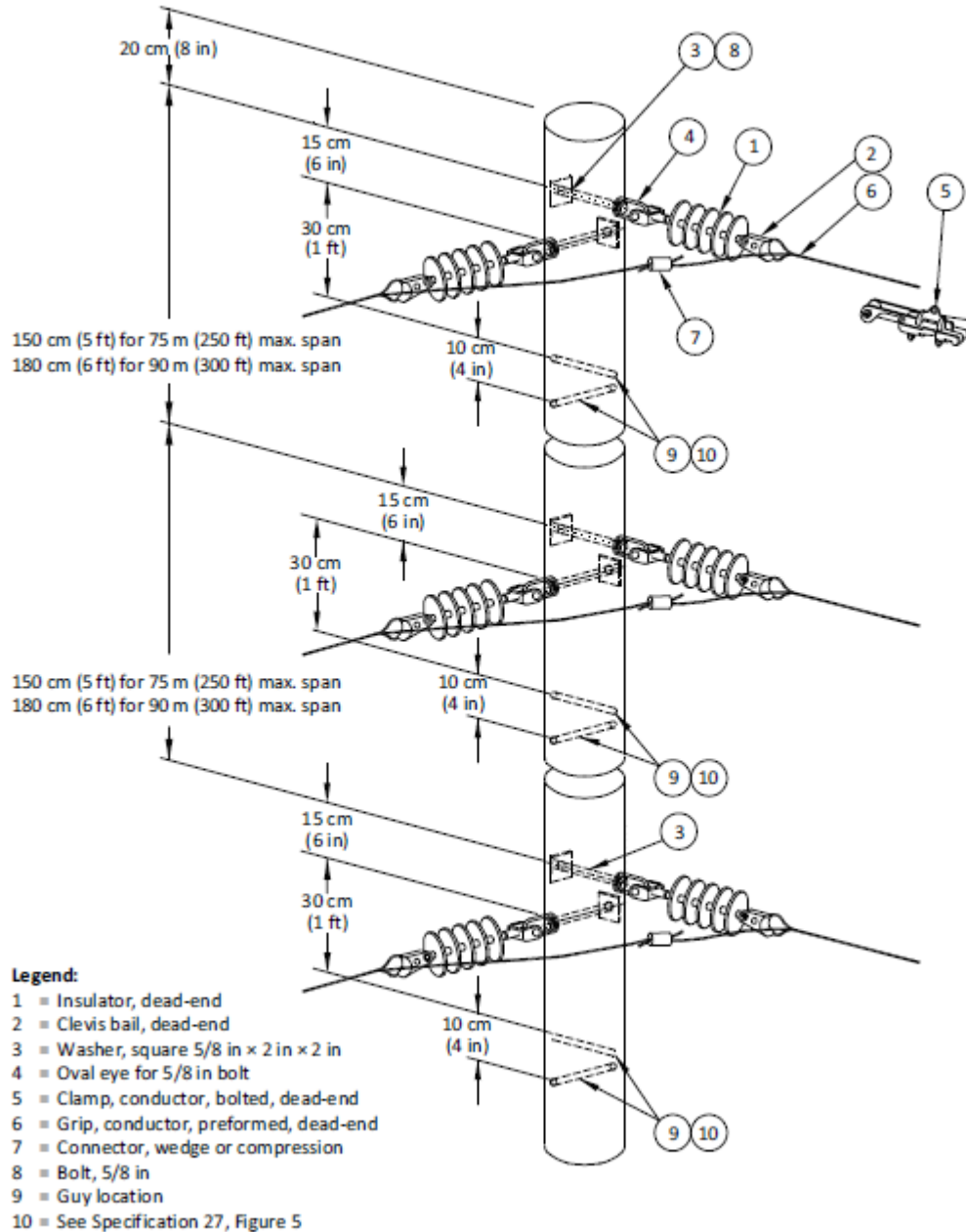
**Specification 17.3**

**Subtransmission 3-phase, line angle 16° to 60°, 44 kV**

(See Rule [75-200.](#))



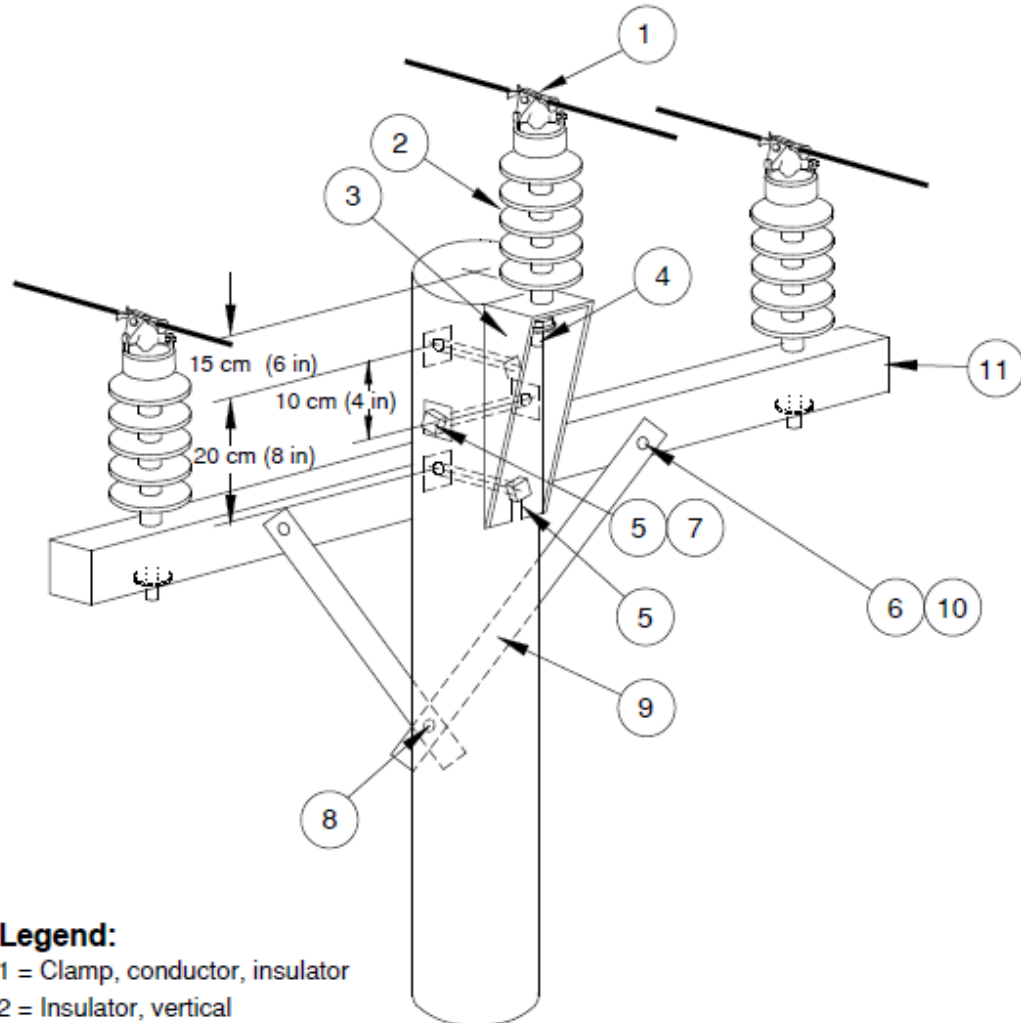
**Specification 17.4**  
**Subtransmission 3-phase, line angle 61° to 90°, 44 kV**  
(See Rule 75-200.)



### Specification 18.1

### Subtransmission 3-phase tangent, crossarm, 44 kV maximum span 90 m (300 ft)

(See Rule 75-200)



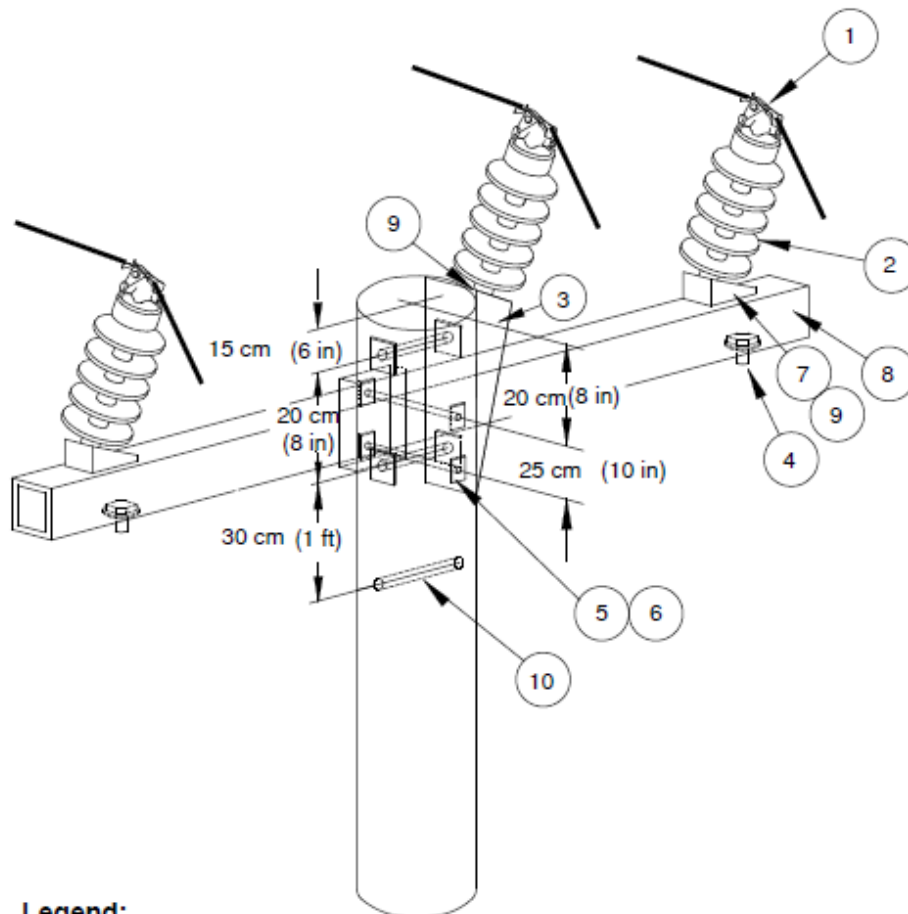
#### Legend:

- 1 = Clamp, conductor, insulator
- 2 = Insulator, vertical
- 3 = Bracket, pole top, tangent
- 4 = Stud, insulator
- 5 = Bolt, 5/8 in
- 6 = Bolt, 3/8 in
- 7 = Washer, square 5/8 in x 2 in x 2 in
- 8 = Screw, lag 1/2 in x 4-1/2 in
- 9 = Brace
- 10 = Washer, rd. 3/8 in
- 11 = Crossarm, wood 300 cm (9 ft, 10 in)

### Specification 18.2

#### Subtransmission 3-phase, line angle $4^{\circ}$ to $15^{\circ}$ , crossarm, 44 kV maximum span 90 m (300 ft)

(See Rule 75-200)



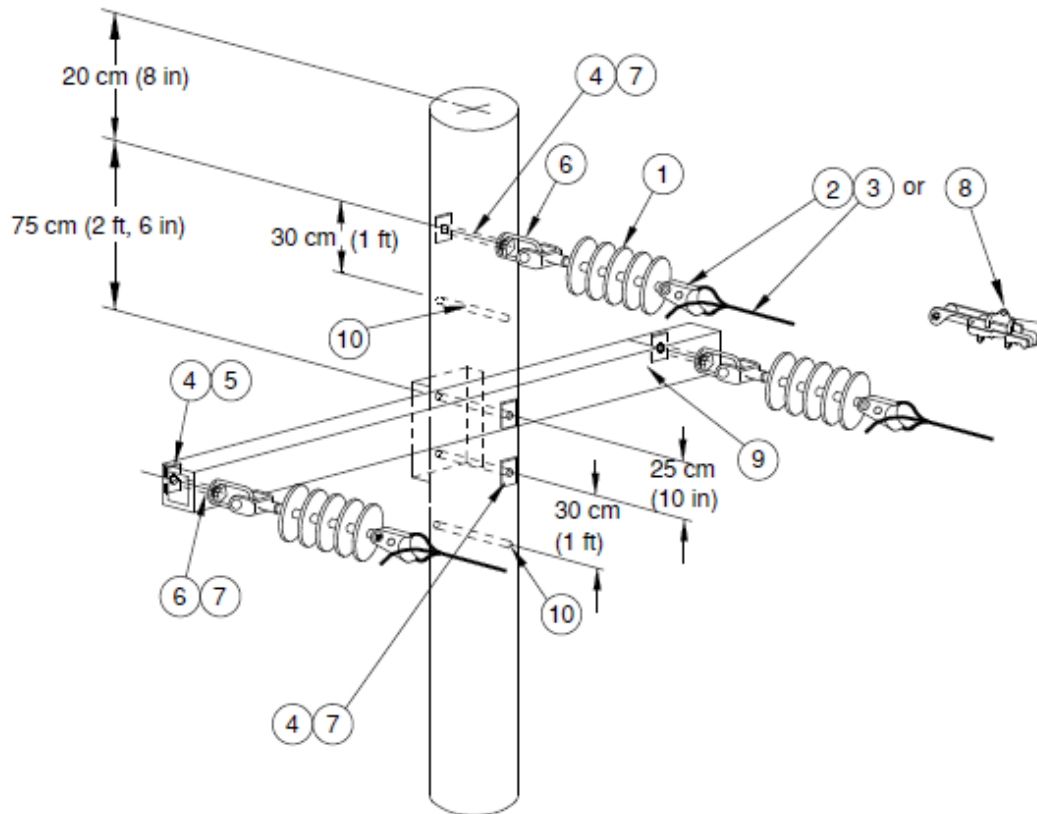
#### Legend:

- 1 = Clamp, conductor, insulator
- 2 = Insulator, vertical
- 3 = Bracket, pole top, angle
- 4 = Stud, insulator, 5/8 in x 7 in
- 5 = Bolt, 5/8 in
- 6 = Washer, square 5/8 in x 2 in x 2 in
- 7 = Bracket, insulator angle mount
- 8 = Crossarm, steel 290 cm (9 ft, 6 in)
- 9 = Stud, post insulator 5/8 in x 3 in
- 10 = Guy location

### Specification 18.3

#### Subtransmission 3-phase dead-end, crossarm (triangular), 44 kV

(See Rule 75-200)



#### Legend:

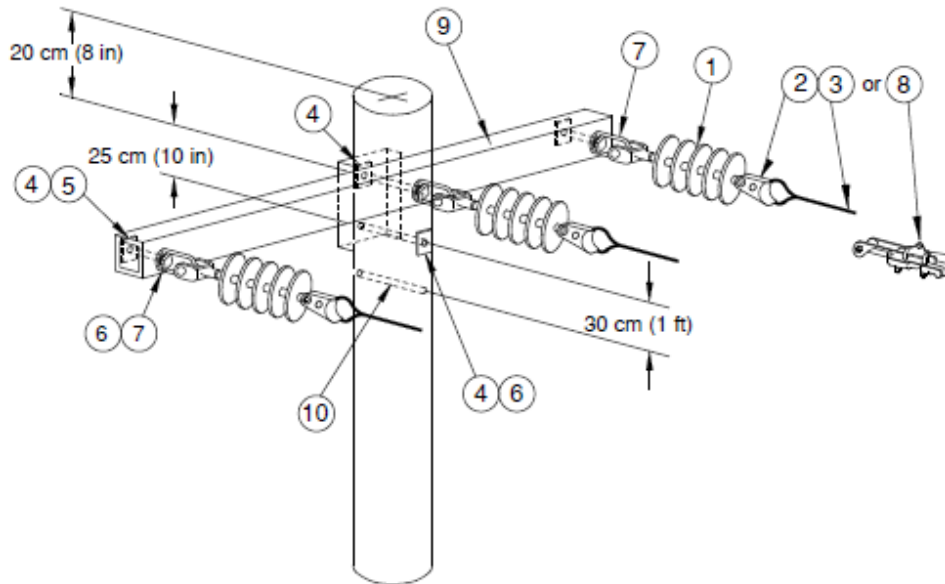
- 1 = Insulator, dead-end
- 2 = Clevis bail, dead-end
- 3 = Grip, conductor, preformed, dead-end
- 4 = Washer, square 5/8 in x 2 in x 2 in
- 5 = Lockwasher, 5/8 in
- 6 = Oval eye for 5/8 in bolt
- 7 = Bolt, 5/8 in
- 8 = Clamp, conductor, bolted, dead-end
- 9 = Crossarm, steel (see span)
- 10 = Guy location

For maximum span	Crossarm
75 m (250 ft)	170 cm (5 ft, 6 in)
90 m (300 ft)	230 cm (7 ft, 6 in)

### Specification 18.4

#### Subtransmission 3-phase dead-end, crossarm (flat), 44 kV

(See Rule 75-200)



#### Legend:

- 1 = Insulator, dead-end
- 2 = Clevis bail, dead-end
- 3 = Grip, conductor, preformed, dead-end
- 4 = Washer, square 5/8 in x 2 in x 2 in
- 5 = Lockwasher, 5/8 in bolt
- 6 = Bolt, 5/8 in
- 7 = Oval eye for 5/8 in Bolt
- 8 = Clamp, conductor, bolted, dead-end
- 9 = Crossarm, steel (see span)
- 10 = Guy location

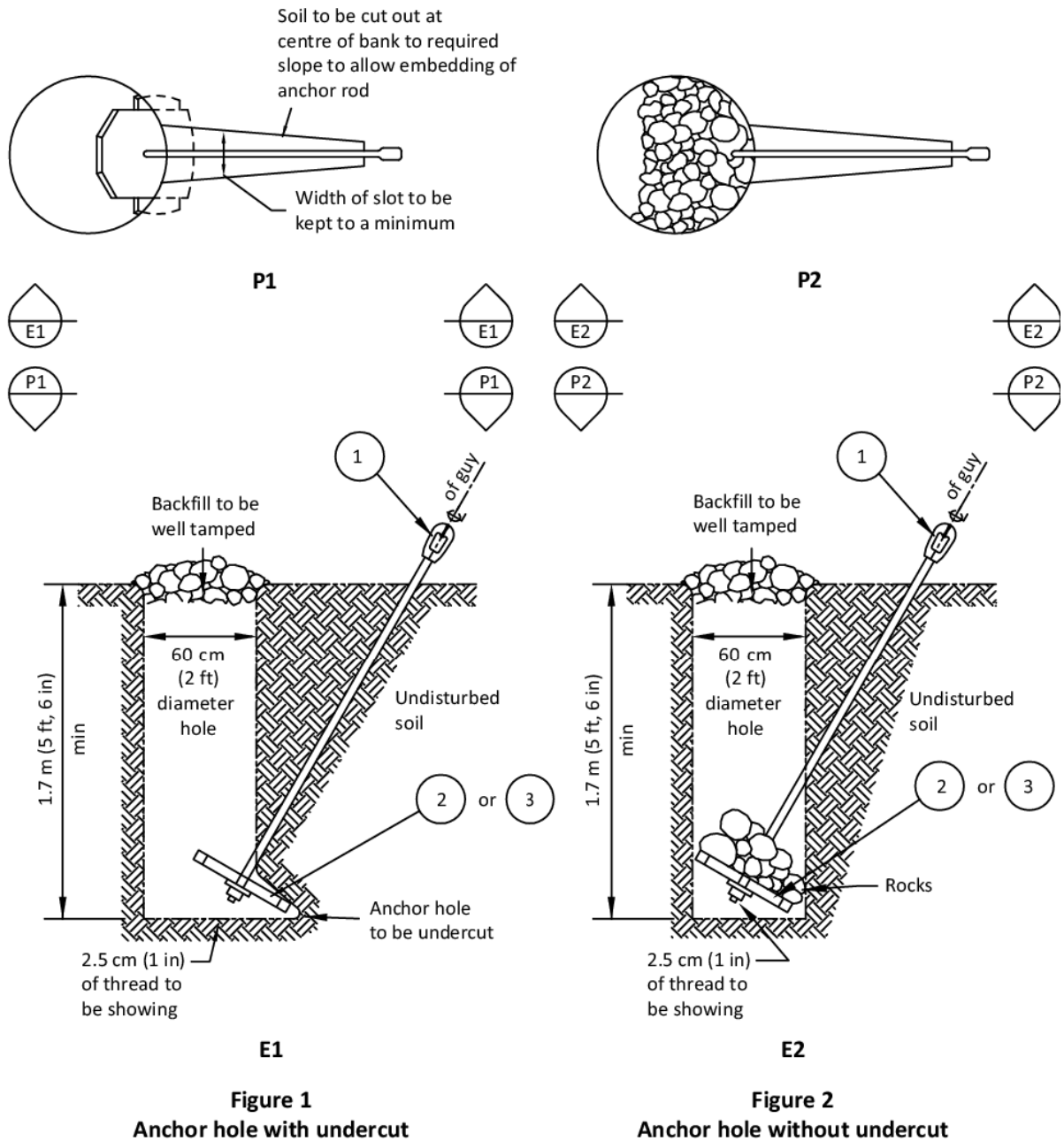
For maximum span	Crossarm
75 m (250 ft)	230 cm (7 ft, 6 in)
90 m (300 ft)	290 cm (9 ft, 6 in)

### Specification 19

#### Steel plate anchor in soil



[See Rule [75-302](#) 1) a).]



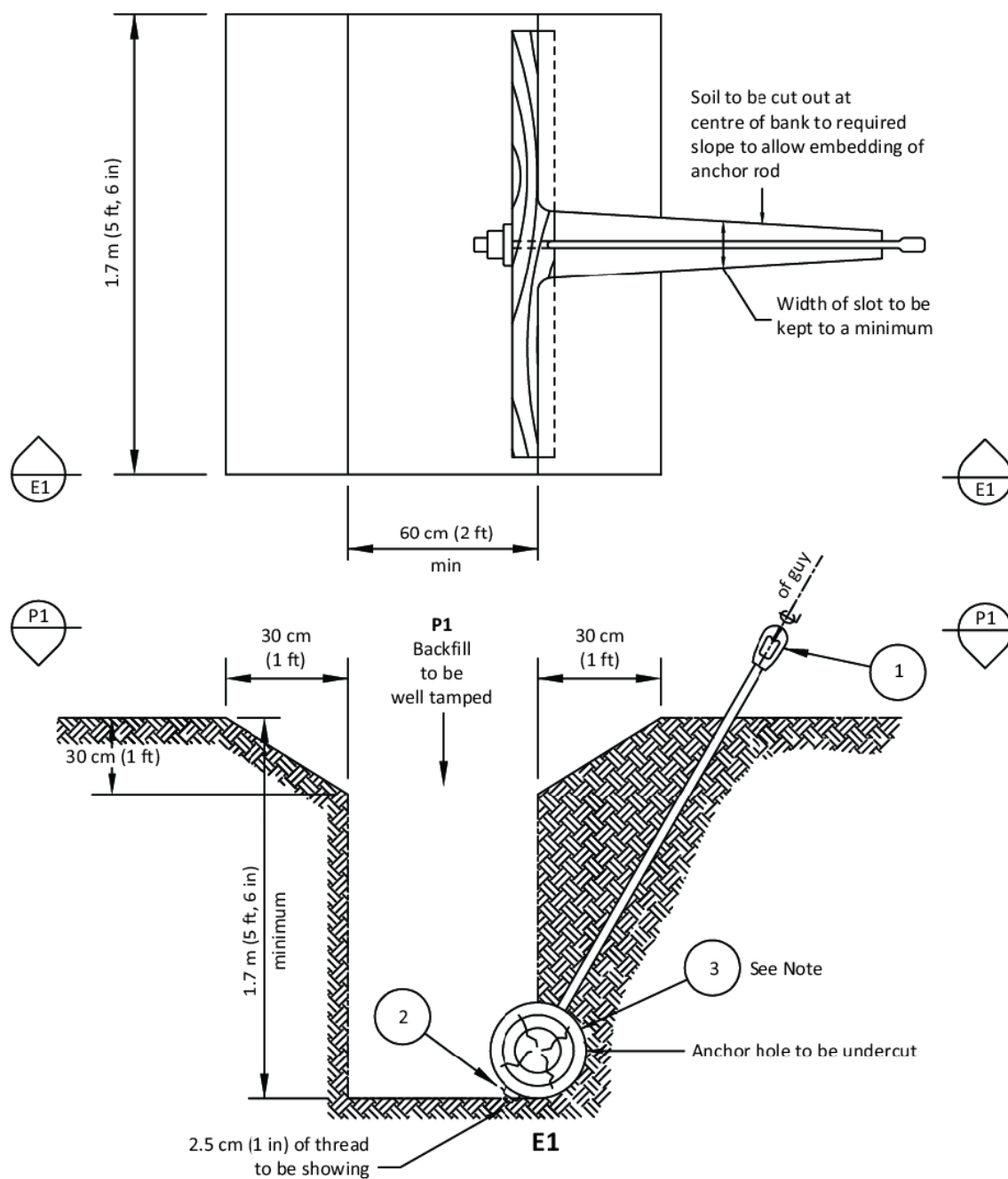
**Legend:**

- 1 = Rod, anchor 1.9 cm × 240 cm (3/4 in × 8 ft)
- 2 = Anchor steel plate, 50 cm (20 in)
- 3 = Anchor steel plate, 60 cm (24 in)

**Specification 20**

**Log (slug) anchor in soil**

[See Rule [75-302](#) 1) b).]



**Legend:**

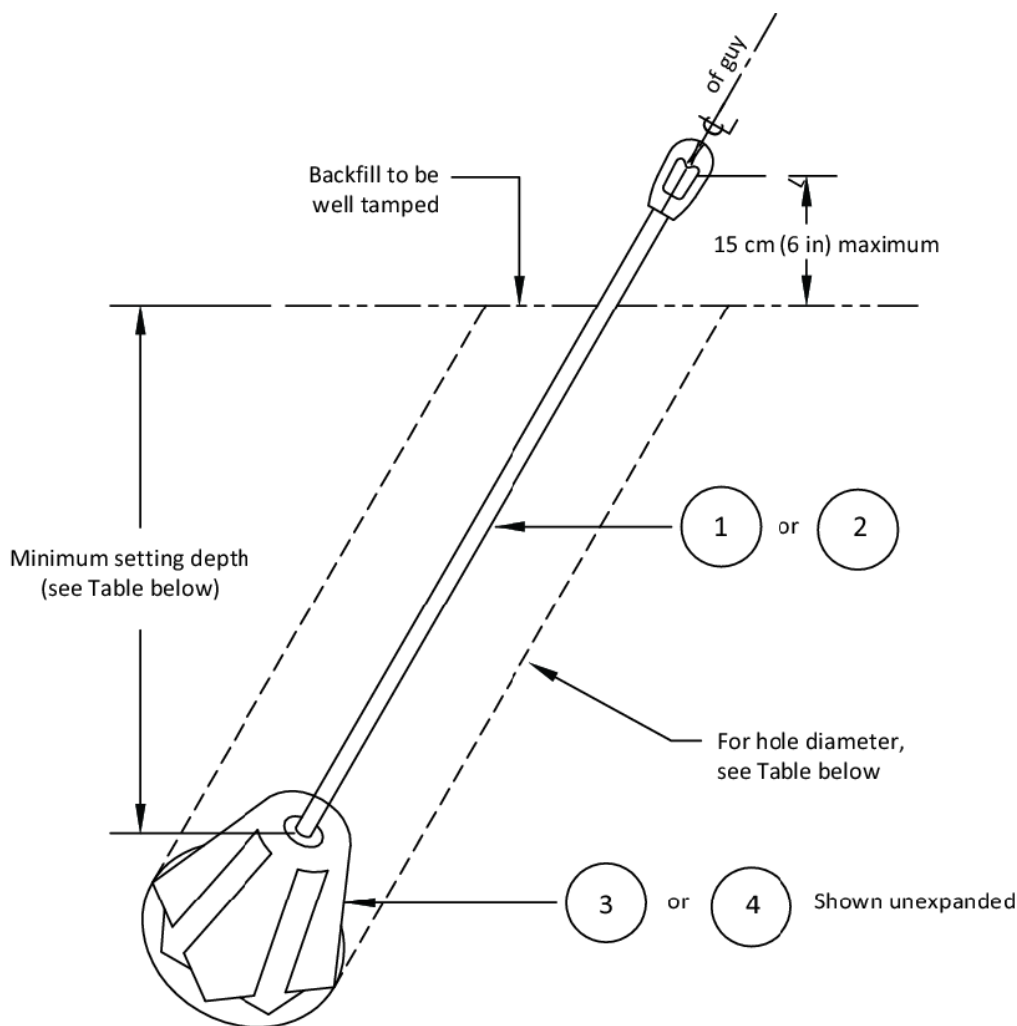
1 = Rod, anchor 1.9 cm × 240 cm (3/4 in × 8 ft)

2 = Washer, 3/4 in × 4 in × 4 in

3 = Log, anchor 20 cm × 152 cm (8 in × 5 ft) diameter

**Note:** Logs shall be either cedar or treated pine.

**Specification 21**  
**Expansion anchor in soil**  
[See Rule [75-302](#) 1) c).]



Anchor diameter	Rod diameter	Minimum setting depth	Hole diameter
20 cm (8 in)	1.9 cm (3/4 in)	1.7 m (66 in)	21 cm (8.5 in)
30 cm (12 in)	2.5 cm (1 in)	2.4 m (94 in)	31 cm (12.5 in)

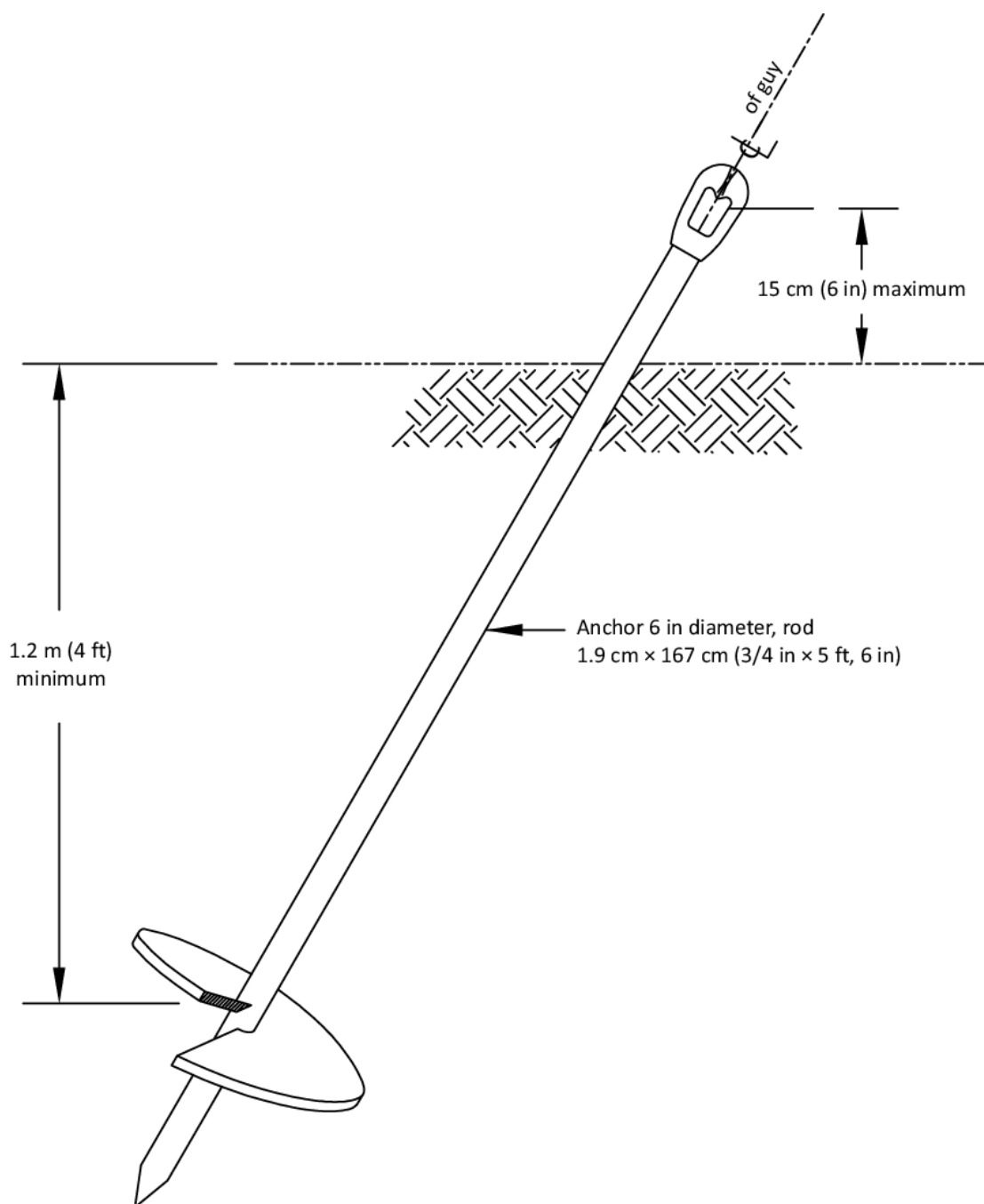
**Legend:**

- 1 = Rod, anchor 1.9 cm × 240 cm (3/4 in × 8 ft, 0 in)
- 2 = Rod, anchor 2.5 cm × 305 cm (1 in × 10 ft, 0 in)
- 3 = Anchor, expansion 20 cm (8 in)
- 4 = Anchor, expansion 30 cm (12 in)

**Specification 22**

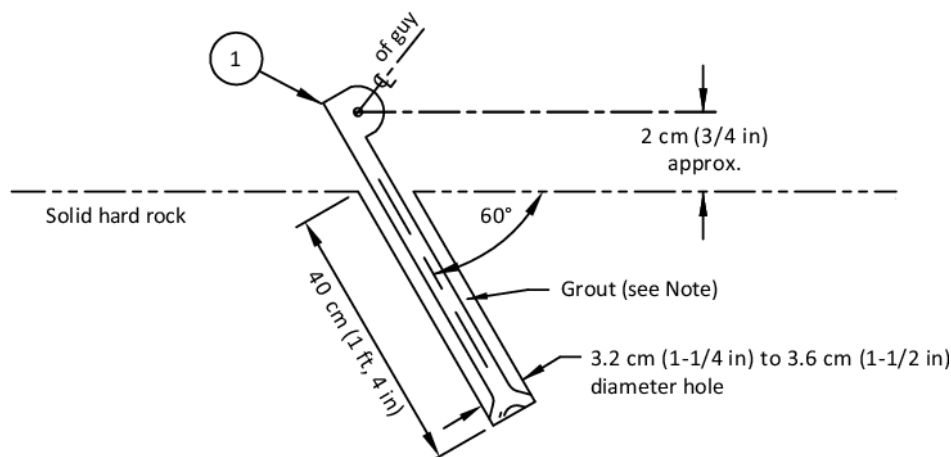
**Earth screw anchor**

[See Rule [75-302](#) 1) d).]

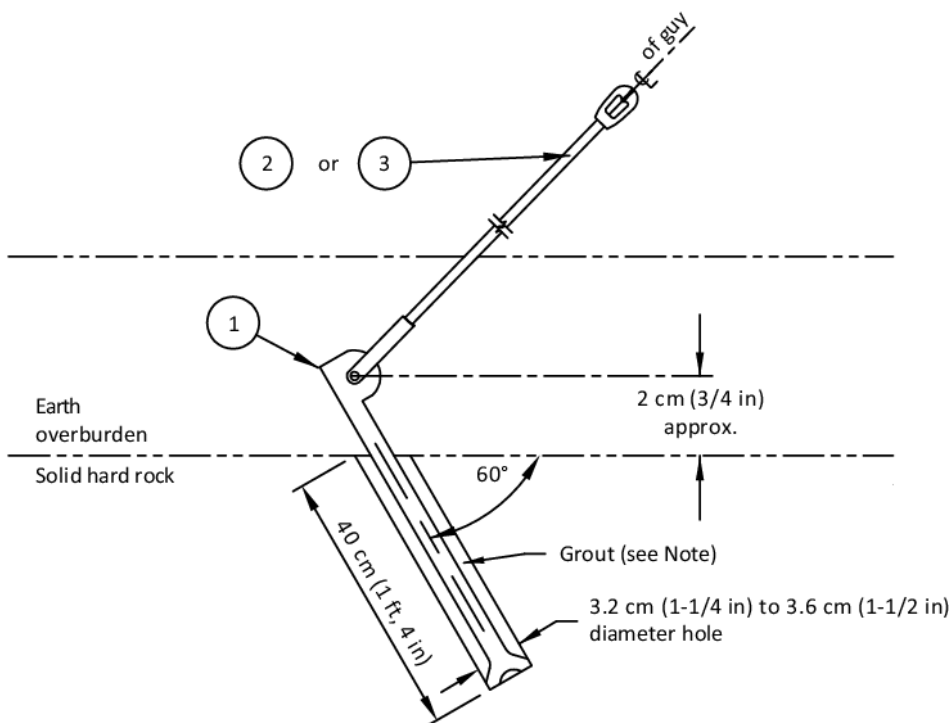


**Note:** This anchor shall be used for secondary services or storm guying in average or better soil only.

**Specification 23**  
**Rock (solid hard) anchor**  
[See Rule [75-302](#) 2) a).]



**Figure 1**  
**Rock anchor without earth overburden**



**Figure 2**  
**Rock anchor with earth overburden**

**Legend:**

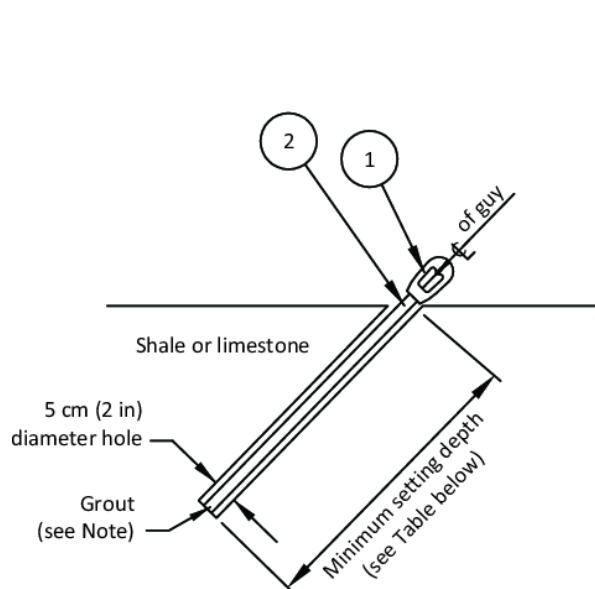
- 1 = Anchor, rock with wedge, 45 cm (18 in)
- 2 = Extension, rock anchor 1.6 cm × 90 cm (5/8 in × 3 ft)
- 3 = Extension, rock anchor 1.6 cm × 152 cm (5/8 in × 5 ft)

**Note:** Grout to be installed as per manufacturer's recommendation.

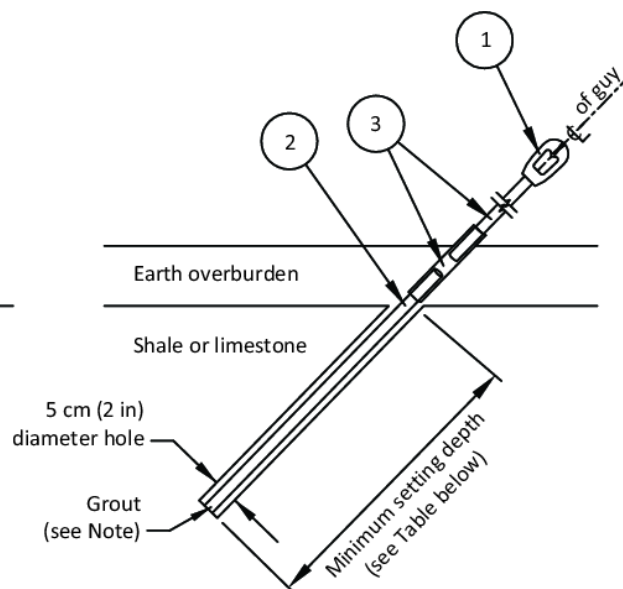
**Specification 24**

**Shale and limestone anchor**

[See Rule [75-302](#) 2) b).]



**Figure 1**  
**Shale and limestone anchor**  
**without earth overburden**



**Figure 2**  
**Shale and limestone anchor**  
**with earth overburden**

Type of rock	Minimum setting depth
Sound massive limestone	1.0 m (3 ft, 4 in)
Thickly bedded limestone	1.25 m (4 ft)
Thinly bedded limestone	1.75 m (5 ft, 8 in)
Shale	2.0 m (6 ft, 8 in)

**Legend:**

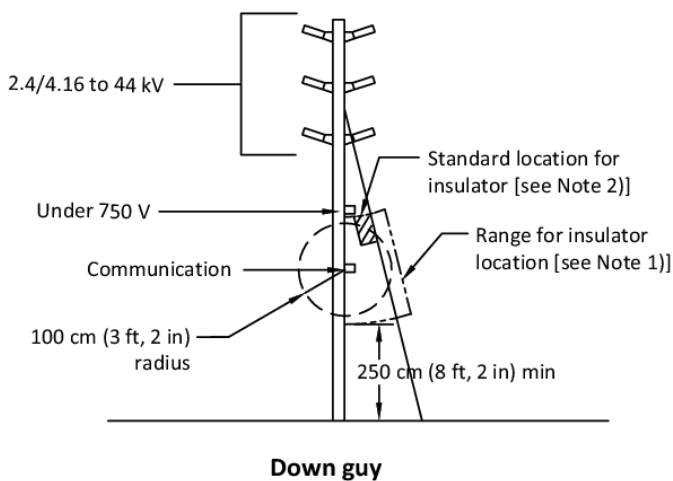
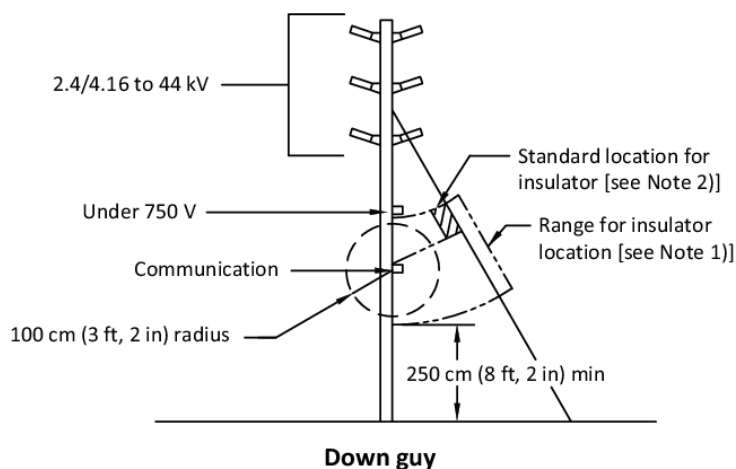
- 1 = Anchor, triple eye nut
- 2 = Anchor bar, deformed, 2.5 cm × 205 cm (1 in diameter × 6 ft, 9 in)
- 3 = Anchor rod, 2.5 cm × 99 cm (1 in × 3 ft, 6 in)

**Note:** Grout to be installed as per manufacturer's recommendation.

### Specification 25

**Location of guy strain insulator joint use and non-joint use, armless or crossarm for down guys**

[See Rule [75-310](#) 1) a).]



Guy passing within 100 cm (3 ft, 2 in) of communication circuit

**Notes:**

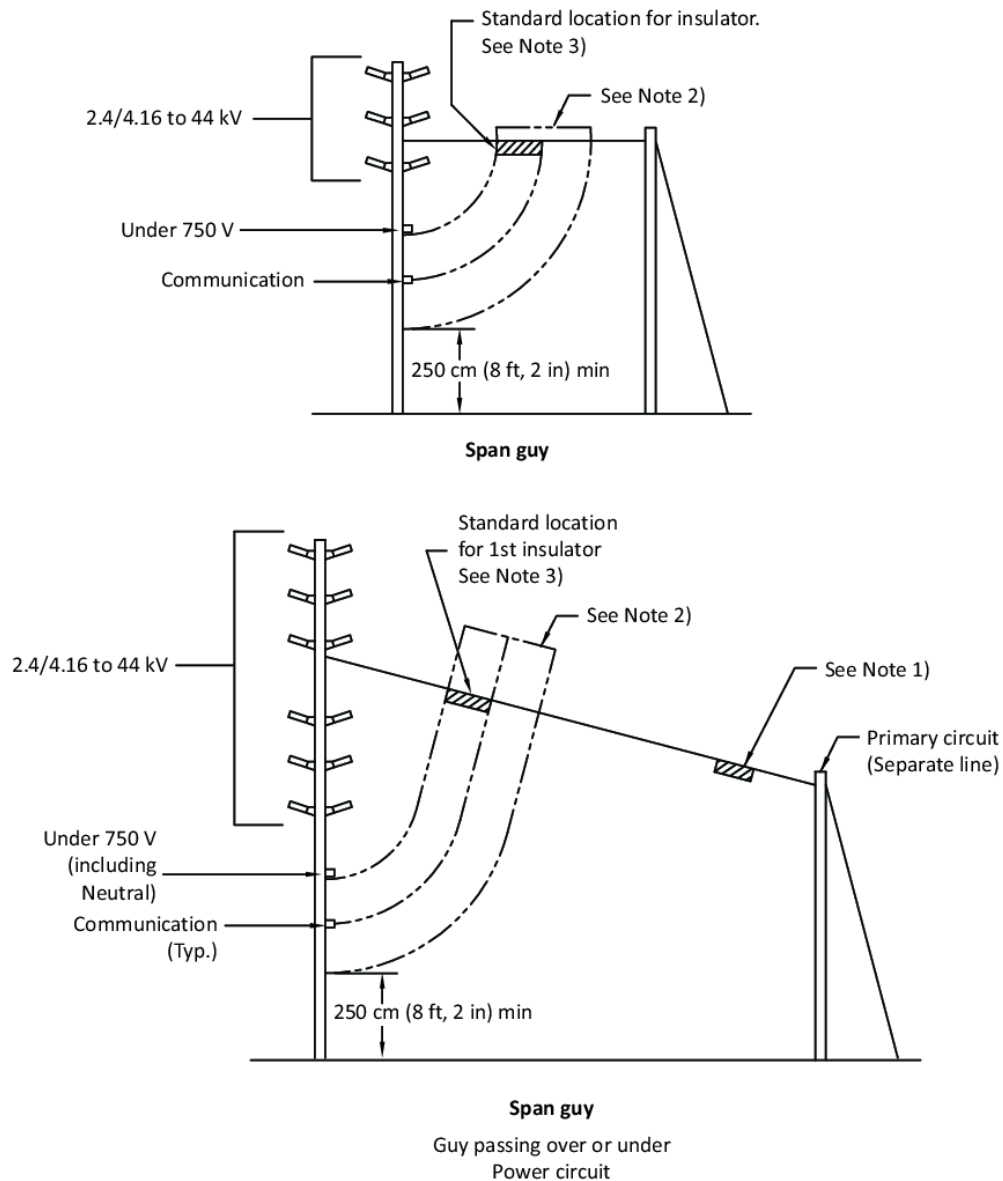
- 1) This insulator shall fall below all power attachment (including neutral) under broken guy conditions, and it should be a minimum of 200 cm (6 ft, 8 in) (where possible) from the pole attachment.
- 2) If communication (telephone or TV cable) connections are on the pole, the guy insulator shall be in the standard location as shown.

### Specification 25.1

**Location of guy strain insulator joint use and non-joint use, armless or crossarm for span guys**

[See Rules [75-310](#) 1) a) and [75-310](#) 2).]

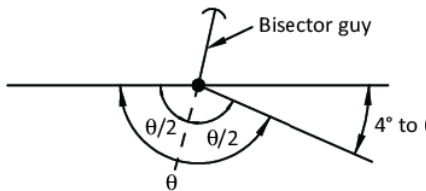
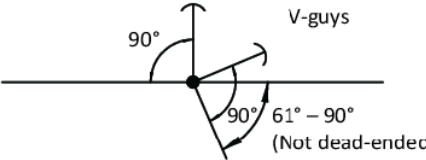
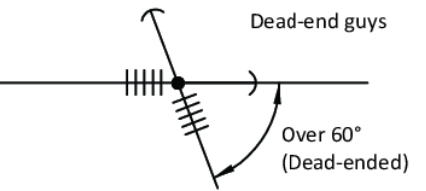
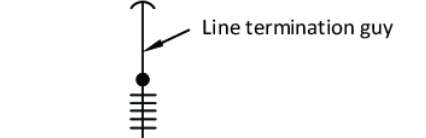
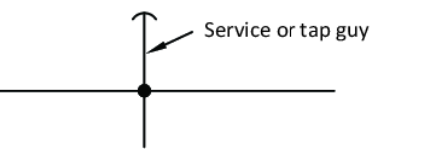
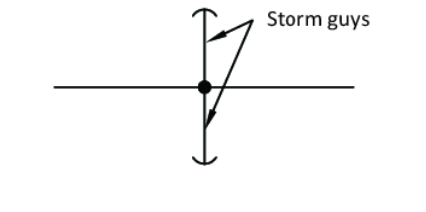
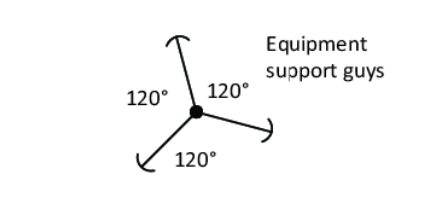




**Notes:**

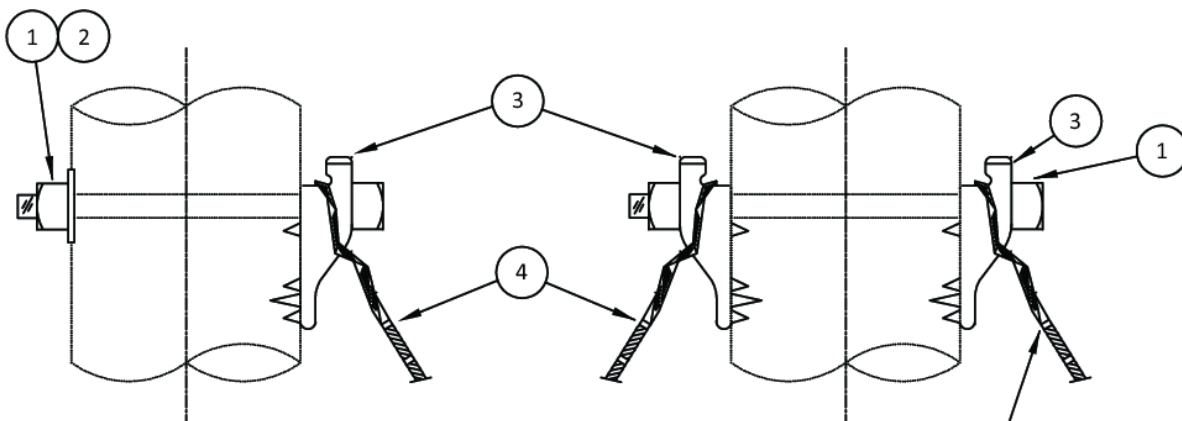
- 1) A second insulator is required if the power circuit of a separate line is crossing above or below the span guy. This second insulator should be located so as to isolate the section of the span guy that is exposed to the crossing circuit.
- 2) This insulator shall fall below all power attachment (including neutral) under broken guy conditions, and it should be a minimum of 200 cm (6 ft, 8 in) (where possible) from the pole attachment.
- 3) If communication (telephone or TV cable) connections are on the pole, the guy insulator shall be in the standard location as shown.

**Specification 26**  
**Typical guy arrangements**  
[See Rule [75-300](#) 1).]

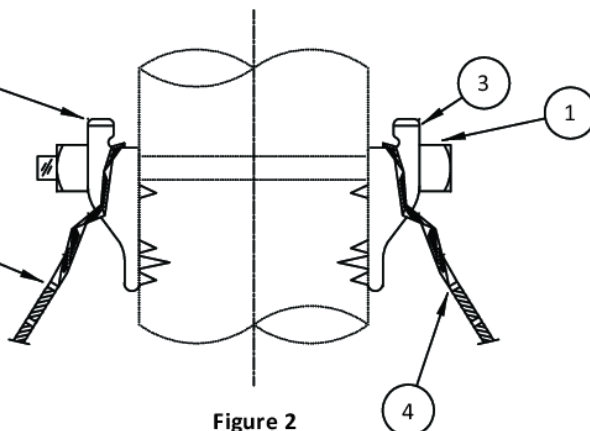
	<b>No. 1</b>	<b>Line angles 4° to 60°</b> Guy(s) shall be placed so that the angle is bisected as shown in sketch. This shall apply regardless of number of guys used.
	<b>No. 2</b>	<b>Line angles 61° to 90° (conductors not dead-ended)</b> Guys shall be placed at 90° to each line section as shown in sketch.
	<b>No. 3</b>	<b>Line angles over 60° (conductors dead-ended)</b> Guys shall be placed in line as shown in sketch.
	<b>No. 4</b>	<b>Line termination guying (conductors dead-ended)</b> Guy(s) shall be placed as shown in sketch.
	<b>No. 5</b>	<b>Service or tap</b> Guy(s) shall be placed as shown in sketch.
	<b>No. 6</b>	<b>Line angles 0° to 3°</b> Storm guys shall be used where specified as shown in sketch.
	<b>No. 7</b>	<b>3 down guys 120°</b> located below equipment. Guy location for equipment pole with no overhead distribution.

**Note:** These arrangements shall be permitted to be altered to suit local conditions.

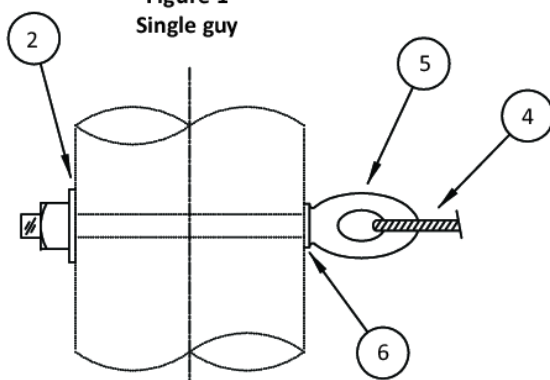
**Specification 27**  
**Attachment of guys**  
[See Rule [75-308](#) 1) a).]



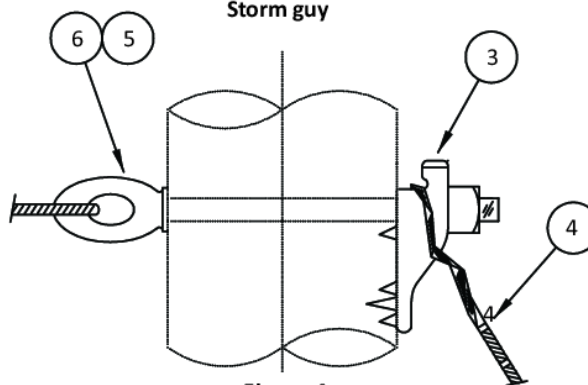
**Figure 1**  
Single guy



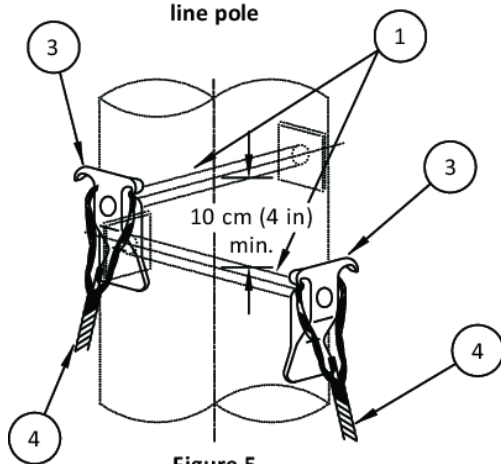
**Figure 2**  
Storm guy



**Figure 3**  
Span and anchor guy  
line pole



**Figure 4**  
Span and anchor guy  
stub pole

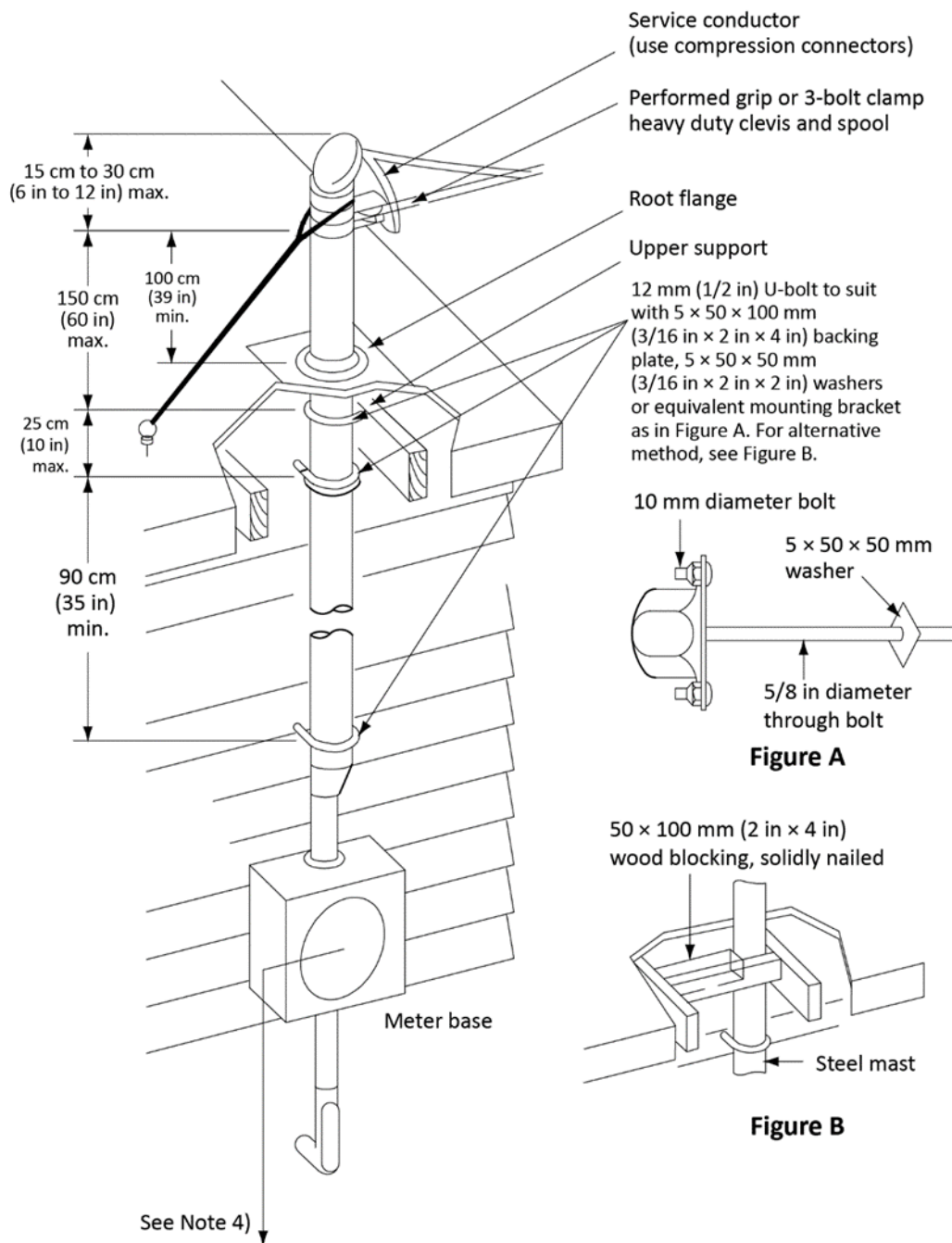


**Figure 5**  
V-guy

**Legend:**

- 1 = Bolt, 3/4 in
- 2 = Washer, curved, galvanized
- 3 = Hook, guy, horn type
- 4 = Grip, guy wire 9 mm
- 5 = Bolt, eye, thimble, 3/4 in
- 6 = Washer, 2 x 2 x 3/4 in

### Specification 28 Service mast installation [See Rules 6-112 5) and 6-118.]



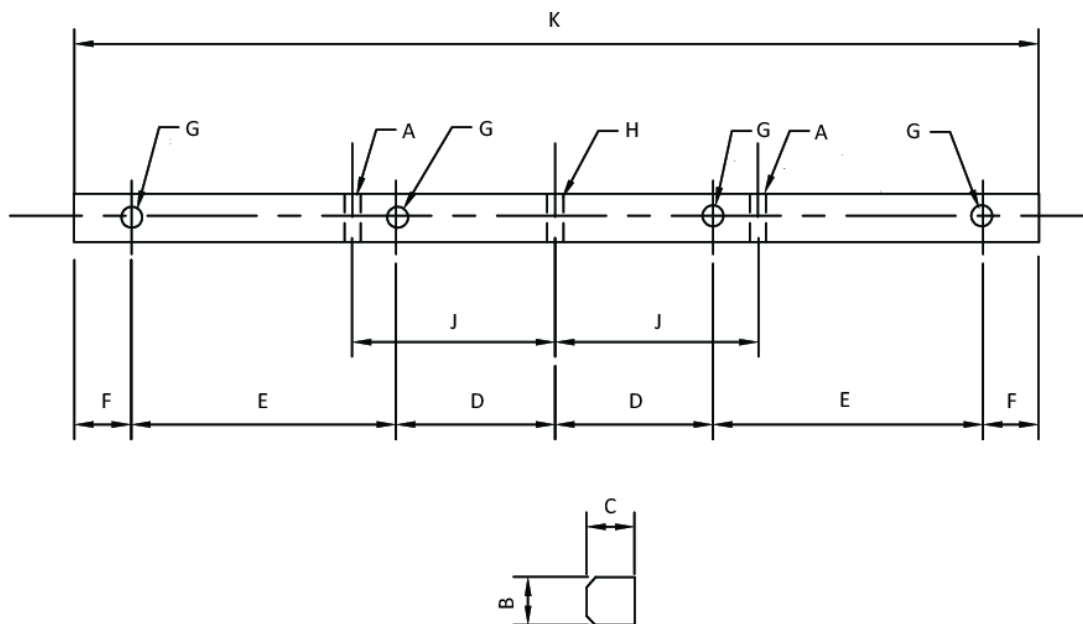
#### Notes:

- 1) All hardware shall be hot dipped, galvanized steel or corrosion resistant.
- 2) Where the maximum attachment height exceeds 150 cm (60 in), guying shall be employed and connected to an eye bolt fastened to a building structural member.
- 3) Compression connectors shall be used where required.
- 4) Height from meter base to finished grade in compliance with the requirements of the supply authority.

### Specification 29

### Wood crossarm

(See Rule [75-202](#).)



#### Dimensions

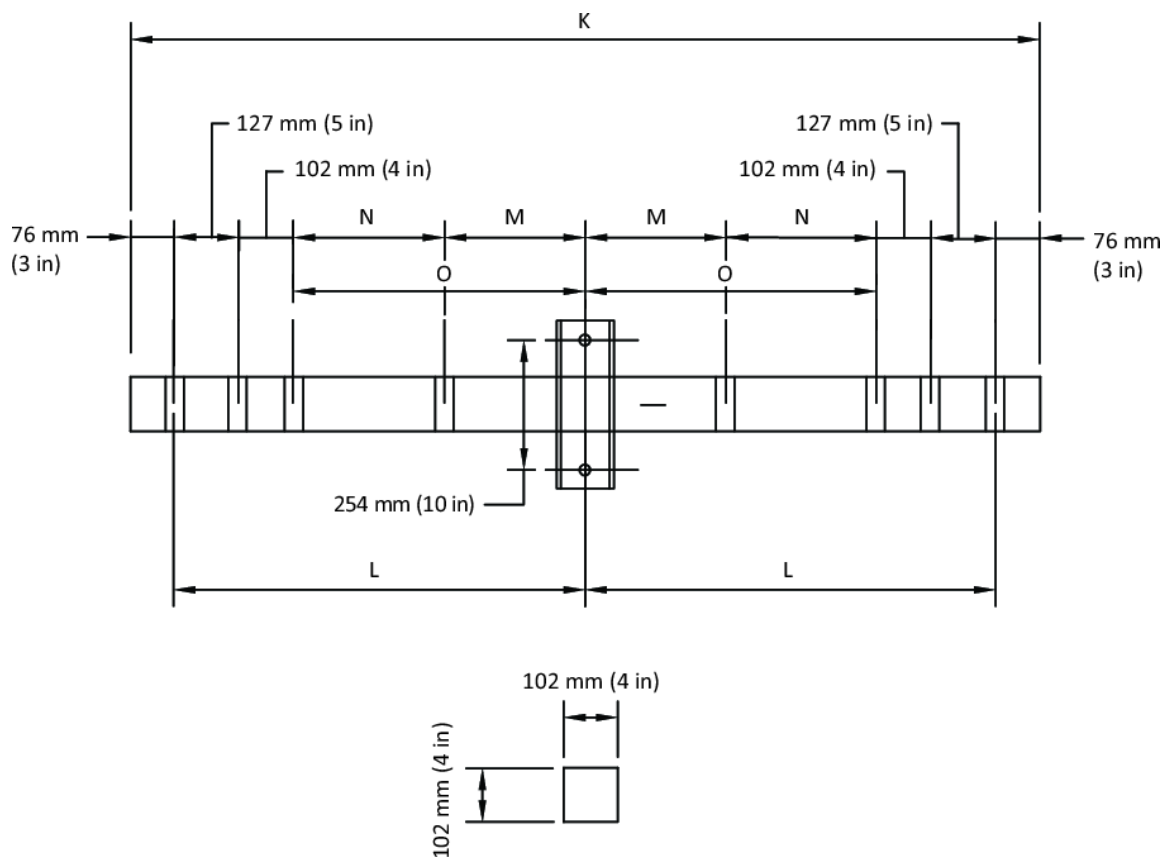
K	B	C	D	E	F	G	H	J	A
2997 mm (9 ft, 10 in)	95.25 mm (3-3/4 in)	120.65 mm (4-3/4 in)	457 mm (1 ft, 6 in)	914.5 mm (3 ft, 0 in)	127 mm (5 in)	17.5 mm (11/16 in)	20.6 mm (13/16 in)	559 mm (1 ft, 10 in)	9.5 mm (3/8 in)
2540 mm (8 ft, 4 in)	95.25 mm (3-3/4 in)	120.65 mm (4-3/4 in)	381 mm (1 ft, 3 in)	762 mm (2 ft, 6 in)	127 mm (5 in)	17.5 mm (11/16 in)	20.6 mm (13/16 in)	508 mm (1 ft, 8 in)	9.5 mm (3/8 in)

**Note:** All holes shall be in the centre of the face in which they are bored.

### Specification 30

#### Steel crossarm

[See Rule [75-202](#) 2).]



### Hollow steel crossarms with welded steel end plates

Dim. K	Dim. L	Dim. M	Dim. N	Dim. O	Total weight, kg (lbs)	Max. tension per conductor, kg (lbs)
1676 mm (5 ft, 6 in)	762 mm (30 in)	—	—	533 mm (21 in)	24 kg (53 lbs)	1360 kg (3000 lbs)
2286 mm (7 ft, 6 in)	1067 mm (42 in)	457 mm (18 in)	381 mm (15 in)	—	38 kg (84 lbs)	1360 kg (3000 lbs)
2896 mm (9 ft, 6 in)	1372 mm (54 in)	457 mm (18 in)	686 mm (27 in)	—	69 kg (152 lbs)	1590 kg (3500 lbs)

#### Notes:

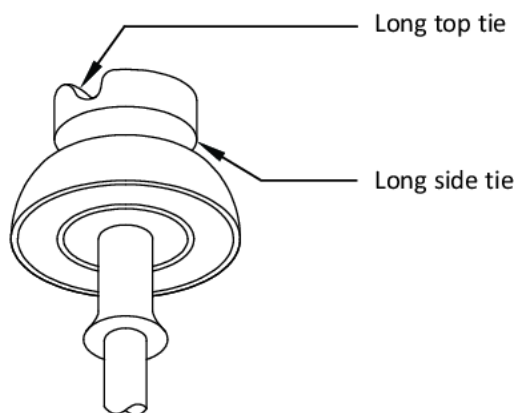
- 1) All holes shall be 20.6 mm (13/16 in) diameter.
- 2) Ground connector supplied with crossarm, conductor range No. 4 STR to No. 2/0 SOL.

### Specification 31

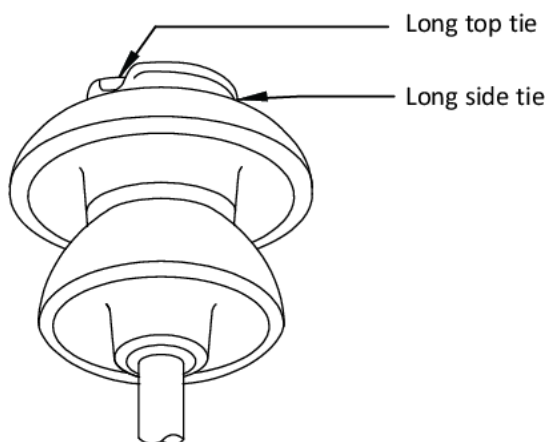
#### Pin-type insulators for crossarm framing

(See Rule [75-400](#).)

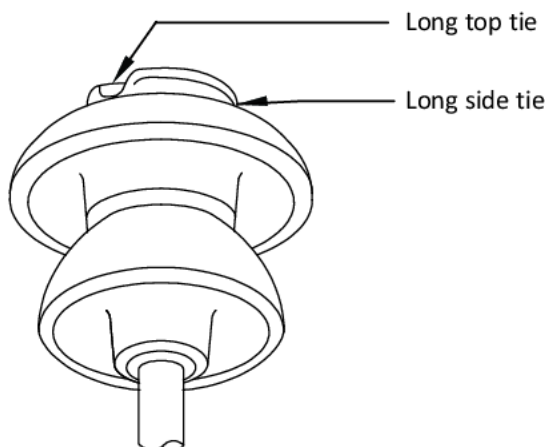
Primary  
(Four-wire systems)  
Line voltage, kV  
2.4/4.16 to 4.8/8.32,  
7.2/12.47, 8/13.8



Primary  
Line voltage, kV  
14.4/24.9, 16/27.6



Subtransmission  
(Three-wire systems)  
Line voltage, kV  
27.6 (including 13.8), 44



**Specification 32**  
**Post-type insulators for armless framing**  
(See Rule [75-400.](#))



### Primary

(Four-wire systems)

### Line voltage, kV

2.4/4.16 to 4.8/8.32

7.2/12.47

8/13.8

14.4/24.9

16/27.6

### Subtransmission

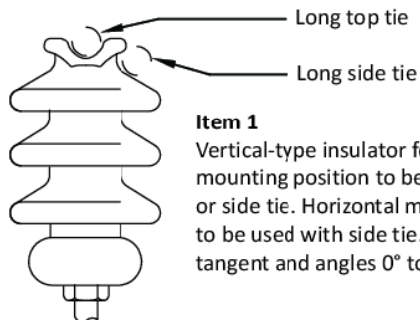
(Three-wire systems)

### Line voltage, kV

27.6 (including 13.8)

44

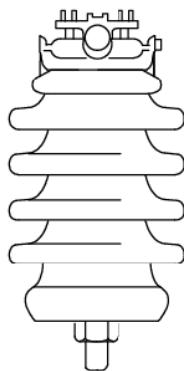
### Tie top — vertical and horizontal



#### Item 1

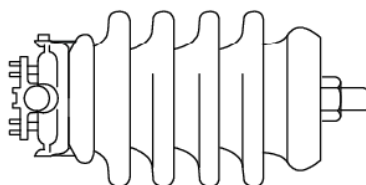
Vertical-type insulator for vertical mounting position to be used with top or side tie. Horizontal mounting position to be used with side tie. Suitable for tangent and angles  $0^{\circ}$  to  $15^{\circ}$ .

### Clamp top — vertical or horizontal



#### Item 2a

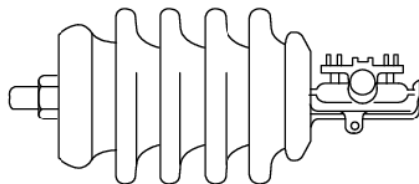
Vertical-type clamp top insulator in vertical mounting position for tangent and angles  $0^{\circ}$  to  $15^{\circ}$ .



#### Item 2b

Vertical-type clamp top insulator in horizontal mounting position for angles  $16^{\circ}$  to  $45^{\circ}$ .

### Clamp top — horizontal



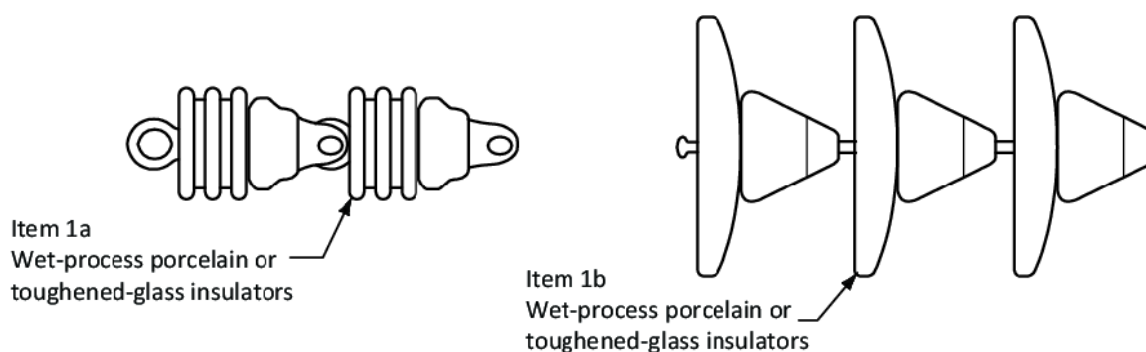
#### Item 3

Vertical-type clamp top insulator in horizontal mounting position for angles  $0^{\circ}$  to  $15^{\circ}$ .

### Specification 33

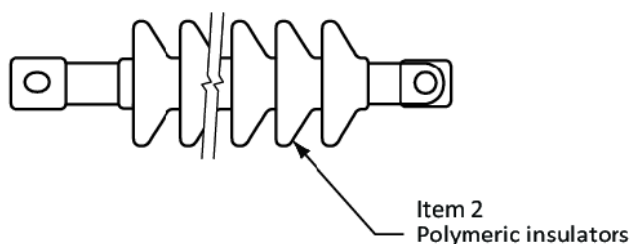
### Suspension-type insulators

(See Rule [75-400](#).)



### Application of porcelain or glass suspension-type insulators — Number required

System	Angles, switches and dead-ends		In-span live-line openers	Floating dead-end
	Wood	Steel		
Primary (4-wire) up to 8/13.8 kV	Item 1a 2 required	Item 1a 3 required	Item 1a 4 required	Item 1a 4 required
14.4 /24.9 kV and 16/27.6 kV	Item 1a or 1b; 3 required	Item 1a or 1b 4 required	Item 1b 4 required	Item 1a 6 required
Subtransmission (3-wire) 27.6 and 44 kV	Item 1b 4 required	Item 1b 4 required	Item 1b 4 required	N/A

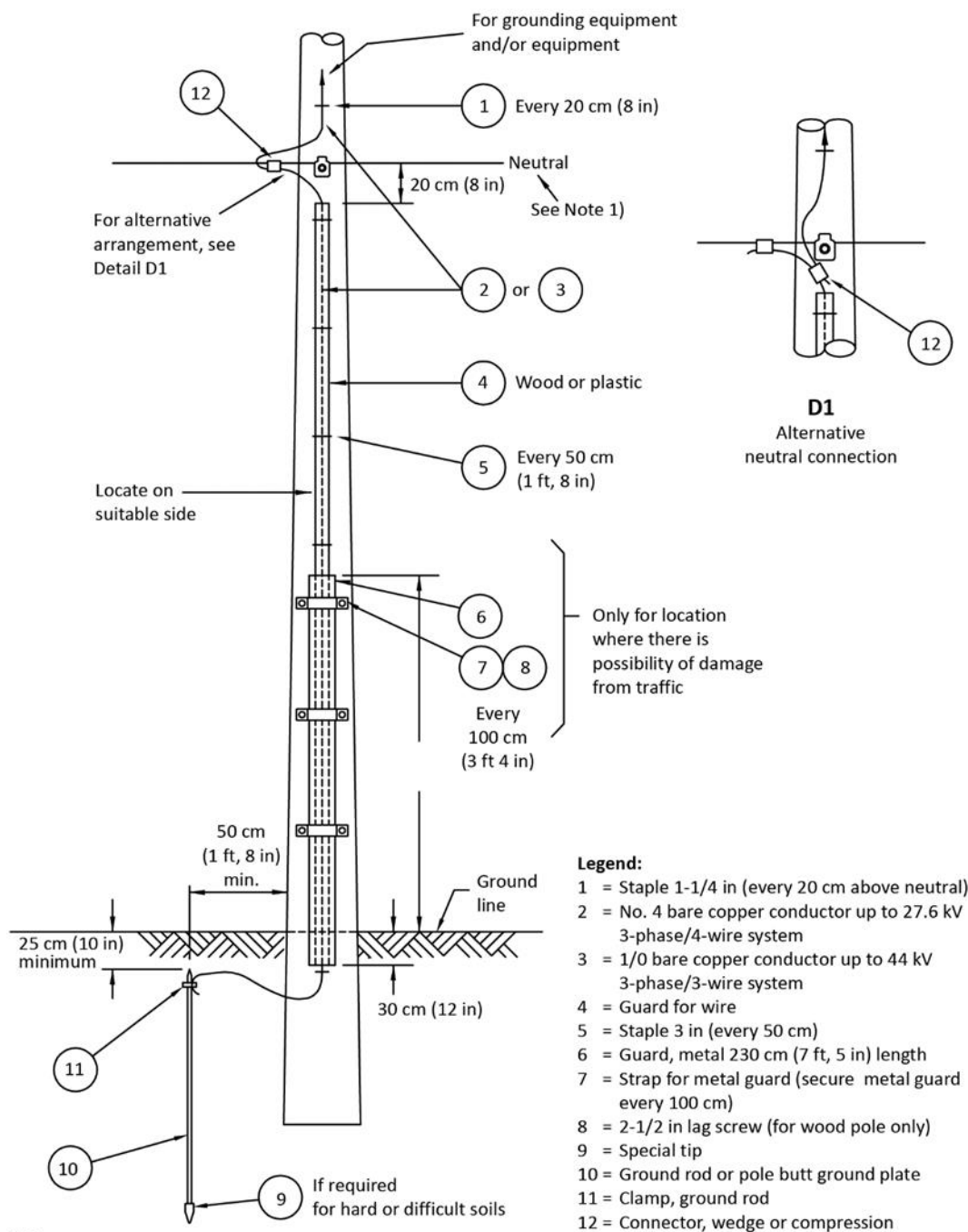


### Application of polymeric suspension-type insulators (Item 2)

System voltage	Marking
15 kV	DS 15
27.6 kV	DS 28
44 kV	DS 46

### Specification 34 Grounding for overhead installations on pole

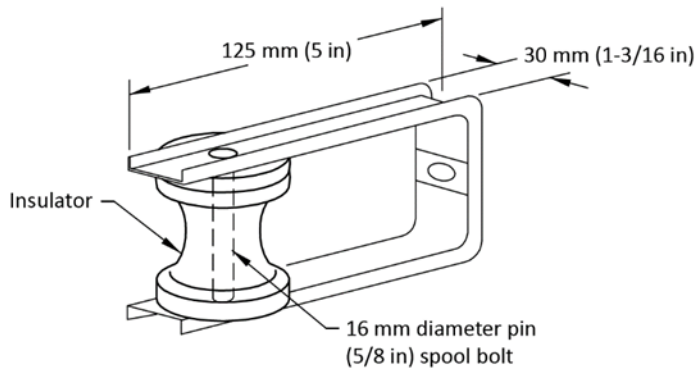
[See Rules 75-806 and 75-812 2).]



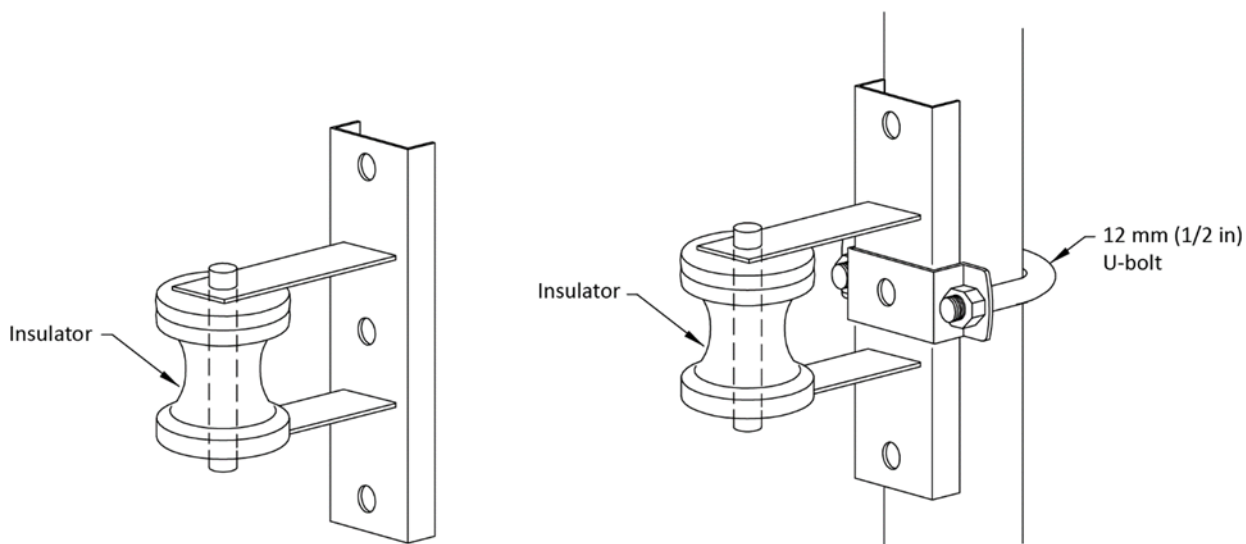
#### Notes:

- 1) For installation without a neutral, continue the ground wire and moulding up near the level of the first grounding connection of the equipment or hardware.
- 2) Where a service box is installed on pole, a ground electrode meeting the requirements of Rule 10-102 shall be used.
- 3) The method of securing ground guard is determined by the pole type. Spec. 34 applies to a wood pole; securing for other poles shall be as per manufacturer's requirements.

**Specification 35**  
**Details of secondary service rack**  
*[See Rule 75-406 1) a) and Appendix B Note to Rule 6-112 1).]*



**Figure 1**  
**One-wire rack**



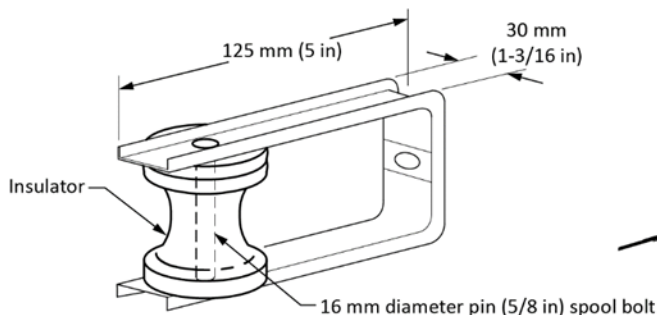
**Figure 2**  
**One-wire rack**

**Figure 3**  
**One-wire rack**  
 (mounted to service mast)

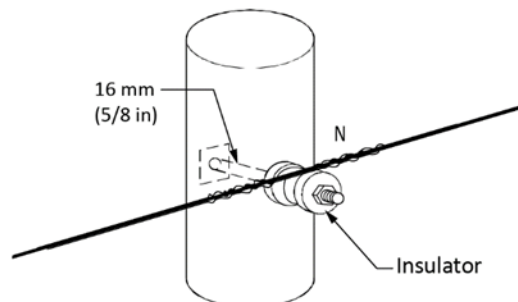
### Specification 35.1

#### Details neutral pole attachment

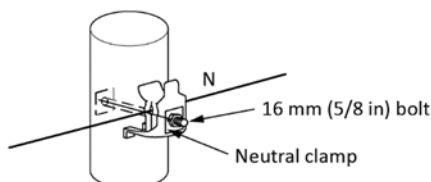
[See Rule 75-406 2)]



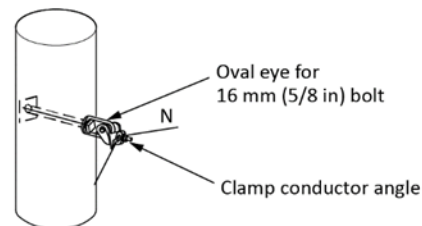
**Figure 1**  
One-wire rack  
Dead end spool  
Tangent ( $0^\circ$  to  $3^\circ$ )



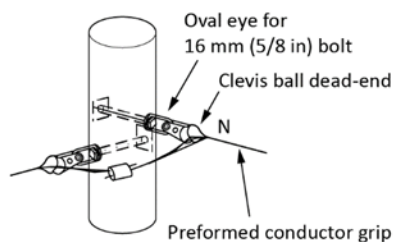
**Figure 2**  
Neutral spool  
Tangent ( $0^\circ$  to  $3^\circ$ )



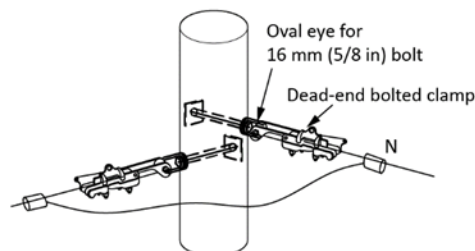
**Figure 3**  
Neutral clamp  
Tangent ( $0^\circ$  to  $3^\circ$ )  
Angle ( $4^\circ$  to  $15^\circ$ )



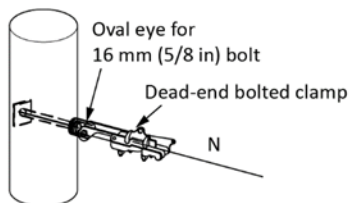
**Figure 4**  
Neutral clamp angle  
( $16^\circ$  to  $60^\circ$ )



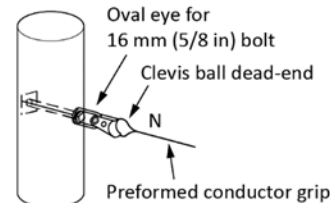
**Figure 5**  
Dead-end corner  
( $61^\circ$  to  $90^\circ$ )



**Figure 6**  
Dead-end corner  
( $61^\circ$  to  $90^\circ$ )



**Figure 7**  
Dead-end



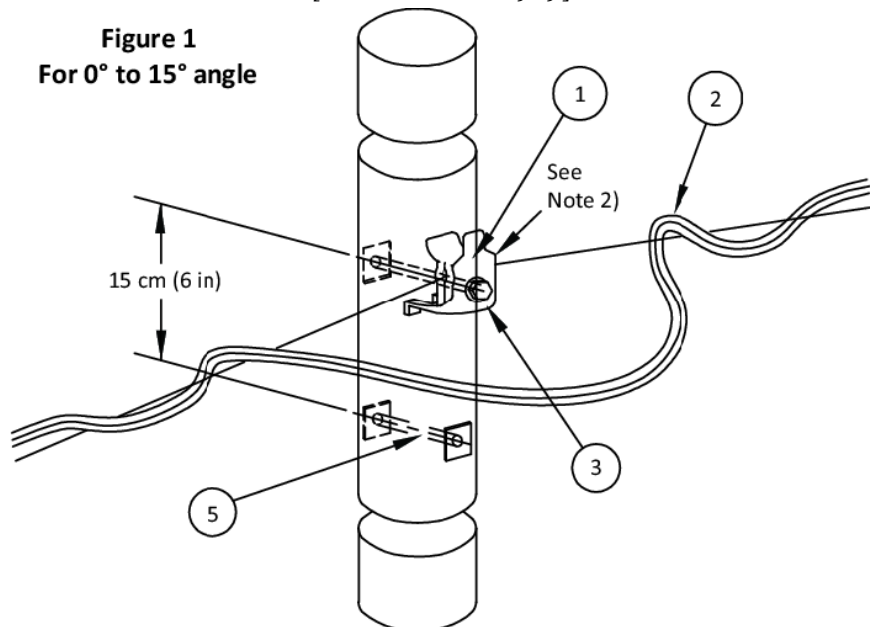
**Figure 8**  
Dead-end

### Specification 36

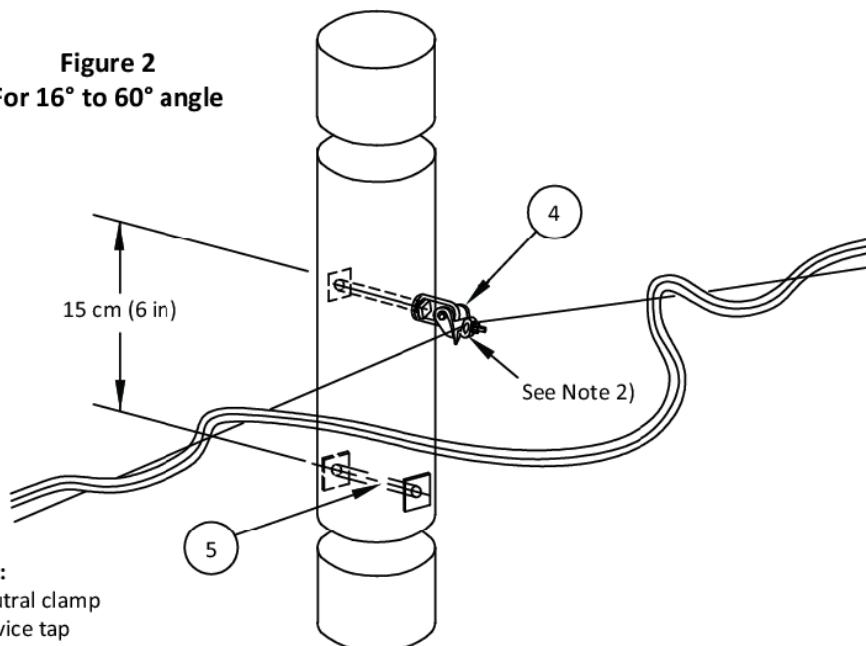
#### Secondary — Attaching service tap to an intermediate pole for support

[See Rule 75-406 1) b).]

**Figure 1**  
For 0° to 15° angle



**Figure 2**  
For 16° to 60° angle



**Legend:**

- 1 = Neutral clamp
- 2 = Service tap
- 3 = Bolt, 5/8 in
- 4 = Corner clamp for conductors
- 5 = Guy location

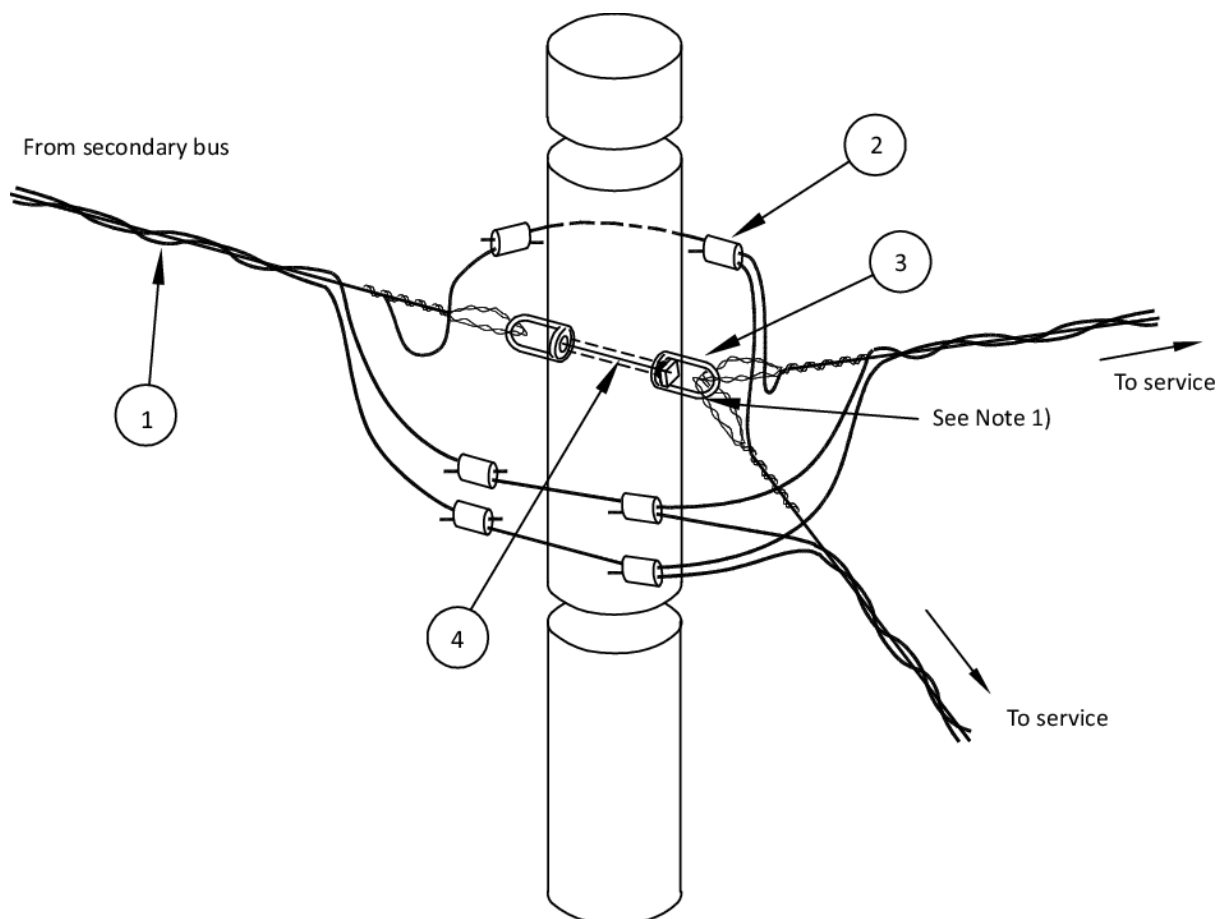
**Notes:**

- 1) All bare connections shall be taped except neutral.
- 2) Secondary one-wire rack shall be permitted to be used. See Specification 35, Figure 1.

**Specification 37**

**Secondary — Attaching service tap to an intermediate pole for splitting into 2 or more services**

[See Rule 75-406 1) b).]



### Legend:

- 1 = Service tap
- 2 = Tap connector with cover
- 3 = Oval eye for 5/8 in bolt
- 4 = Bolt, 5/8 in

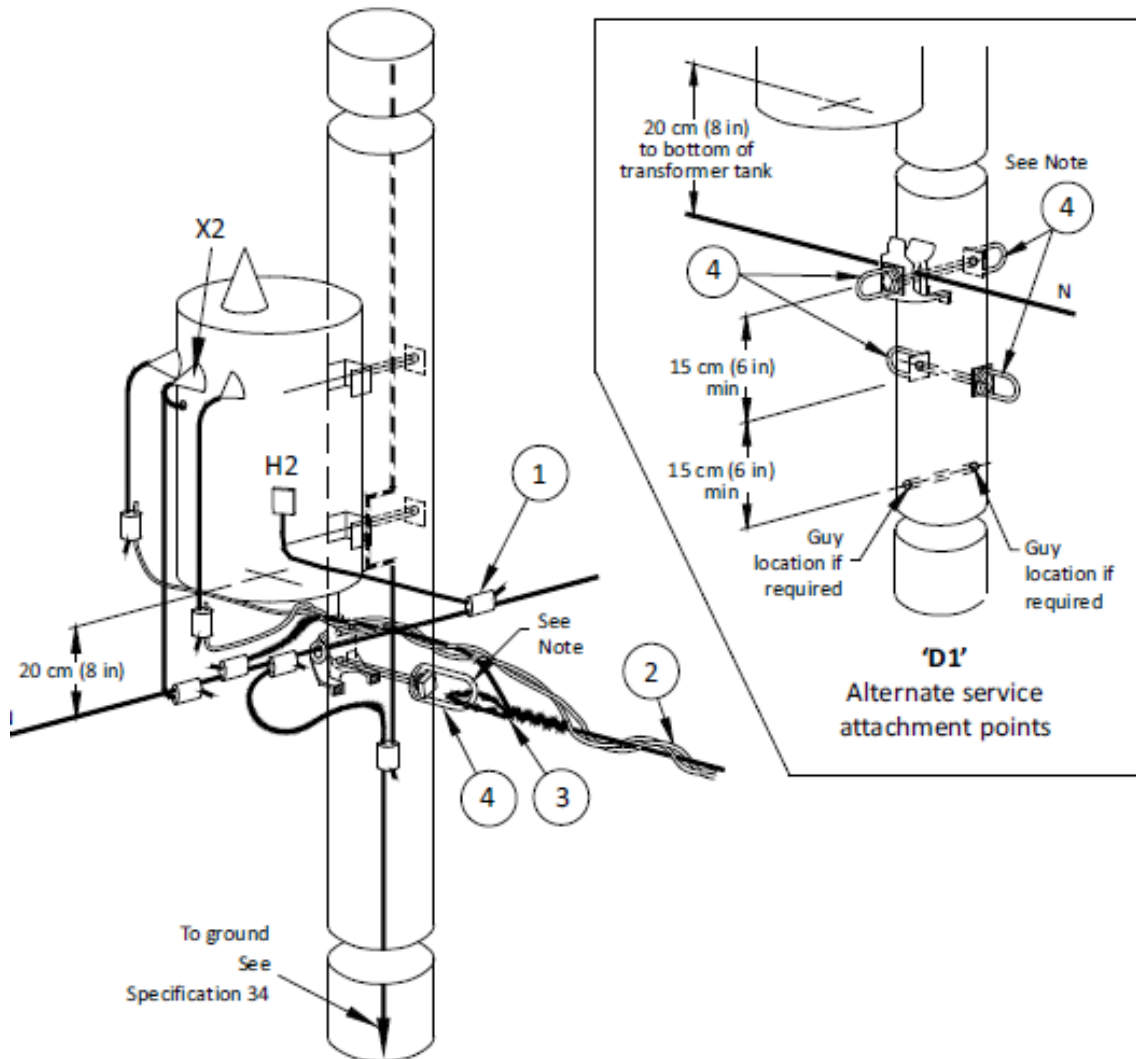
### Notes:

- 1) Secondary one-wire rack shall be permitted to be used. See Specification 35, Figure 1.
- 2) All bare connections shall be taped except neutral.
- 3) Compression connector shall be used where required by Rule 75-504.



**Specification 38**

**Secondary: Connecting pre-assembled single-phase service below transformer**  
[See Rules 75-406 1) b) and 75-806.]



**Legend:**

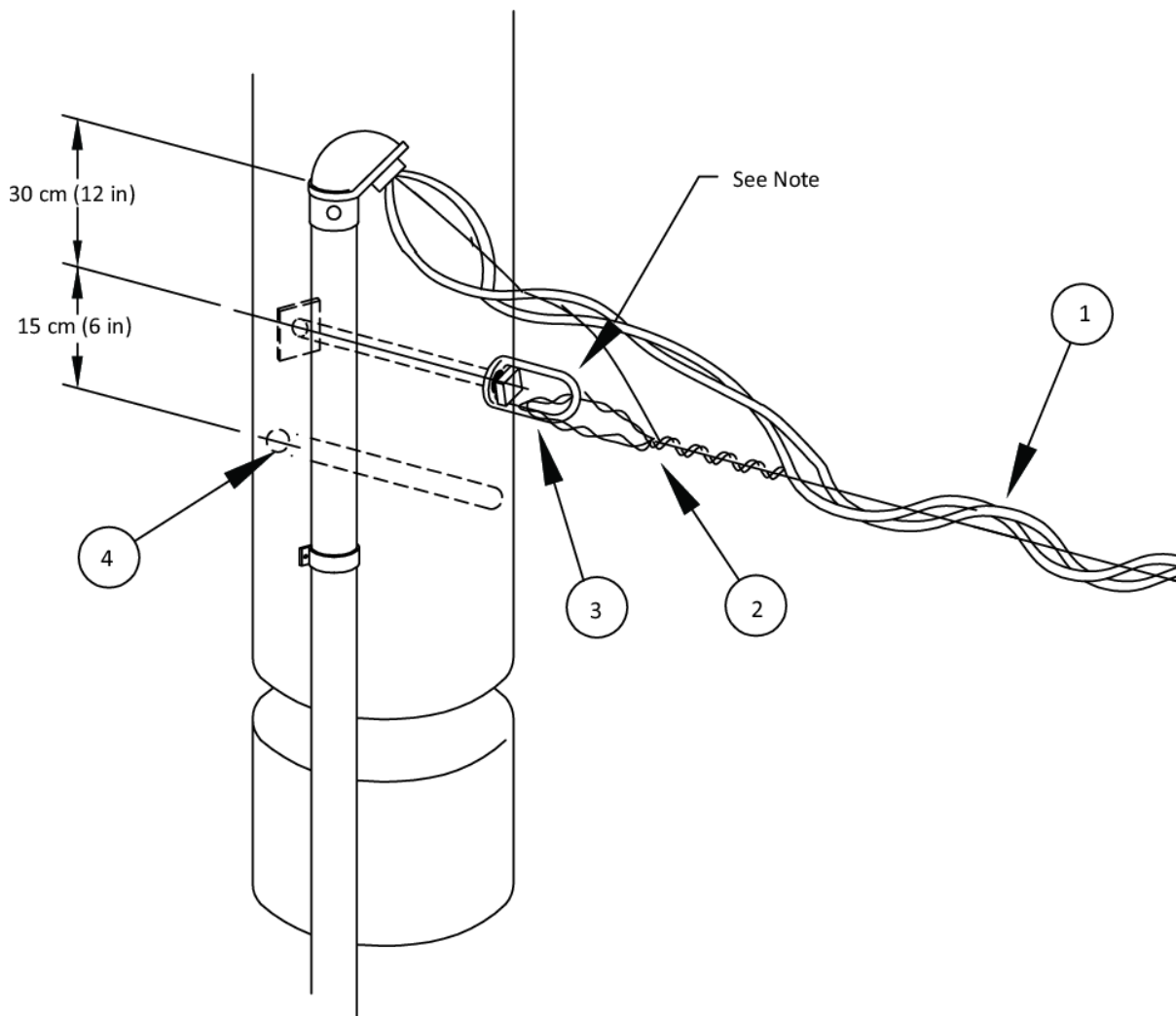
- 1 = Tap Connector with cover
- 2 = Service tap
- 3 = Preformed grip (clamp)
- 4 = Oval eye for 5/8 in bolt

**Note:** See alternate Specification 35.

**Specification 39**

### *Secondary dead end*

[See Rule [75-406](#) 1) b).]



#### **Legend:**

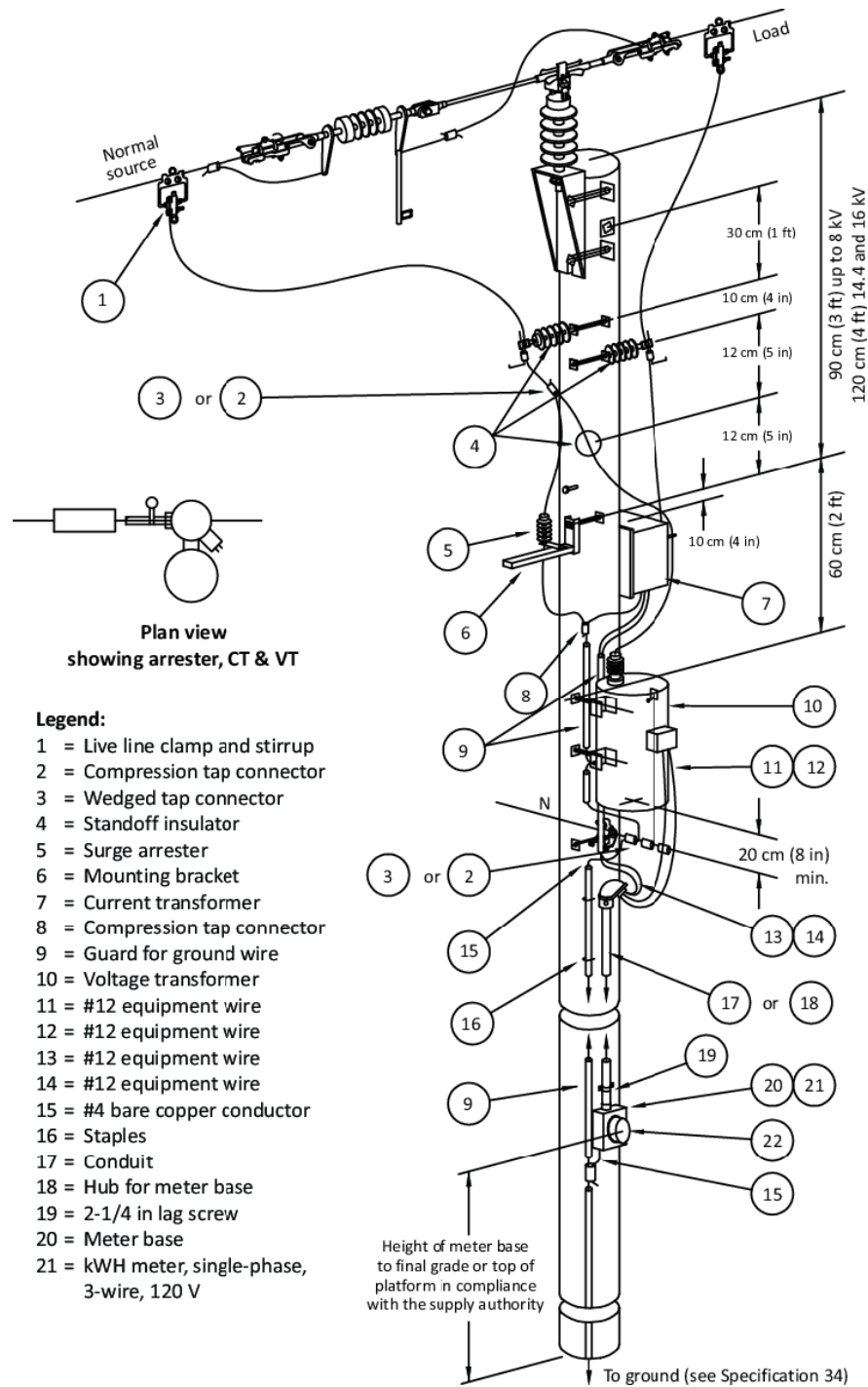
- 1 = Service tap
- 2 = Preformed grip (clamp)
- 3 = Oval eye for 5/8 in bolt
- 4 = Guy location

**Note:** See alternate Specification 35.

### *Specification 40*

**Metering — 2.4 to 16 kV single-phase grounded primary**

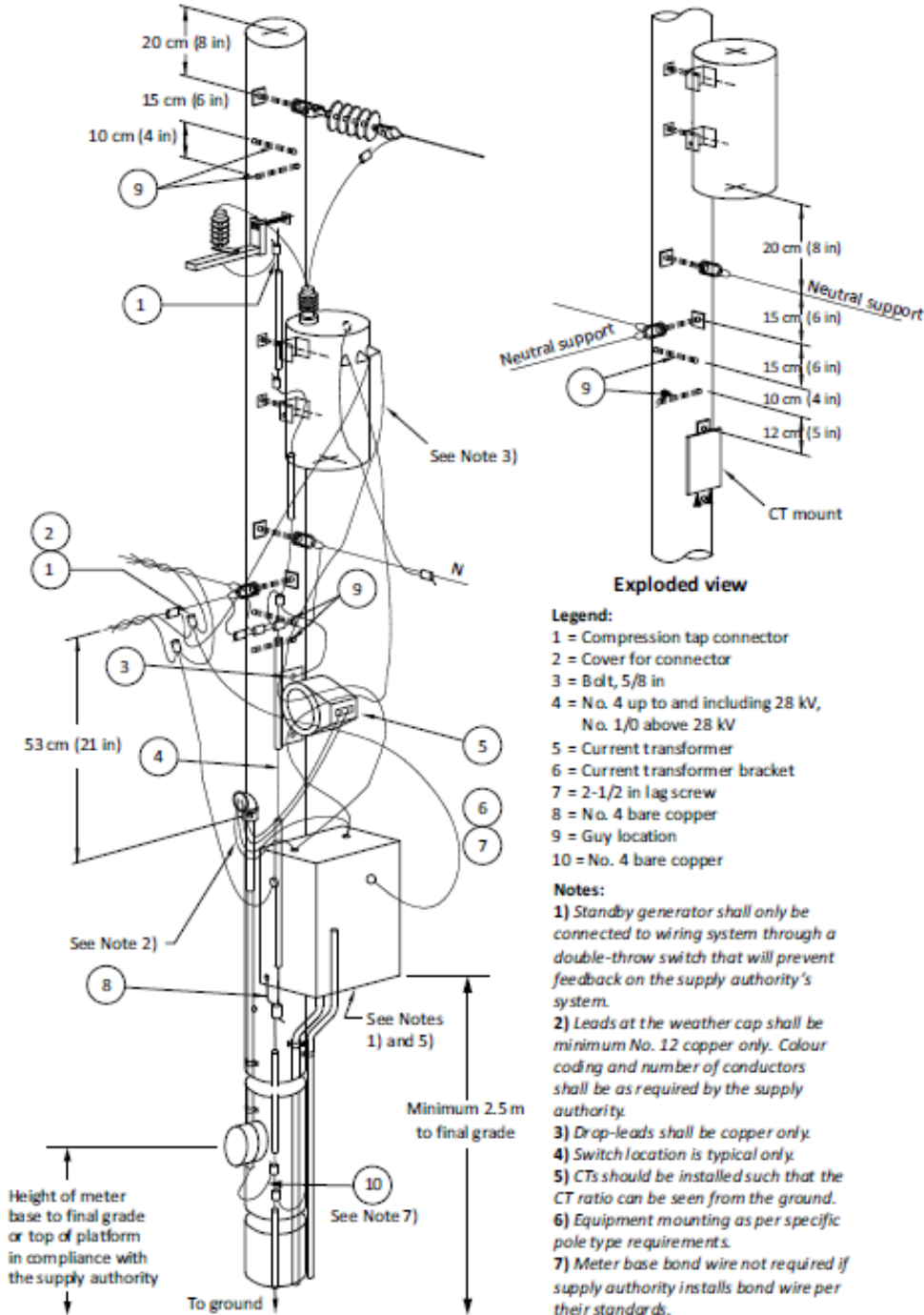
(See Rule [75-806](#).)



### Specification 41

#### Metering: Central metering for secondary drop-leads 4/0 and smaller

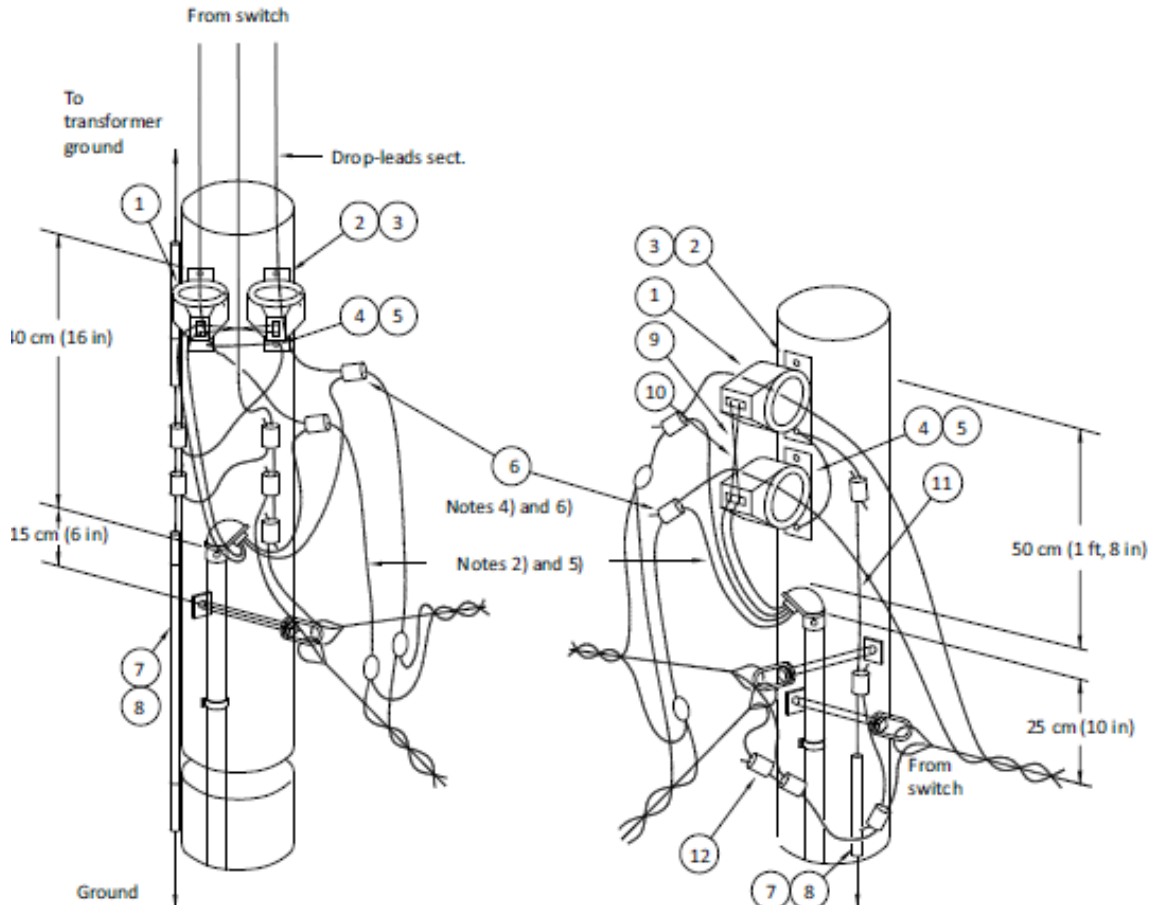
[See Rules 6-116, 75-806, 75-900, 75-902, and 75-904.]



### Specification 42

#### *Metering: Central metering for secondary drop-leads larger than 4/0*

[See Rules 75-806 and 75-902 f).]



**Figure 1**  
**Transformer pole**

**Figure 2**  
**Intermediate pole**

#### Legend:

- |                             |                                      |
|-----------------------------|--------------------------------------|
| 1 = Current transformer     | 7 = Guard for ground wire            |
| 2 = Bracket for transformer | 8 = 2-1/2 in staples                 |
| 3 = 2-1/2 in lag screw      | 9 = Yel/blk, 1C, #12 equipment wire  |
| 4 = Bolt, 5/8 in            | 10 = Yel/blk, 1C, #12 equipment wire |
| 5 = Ground splice connector | 11 = #4 bare copper conductor        |
| 6 = Bolted tap connector    | 12 = Compression tap connector       |

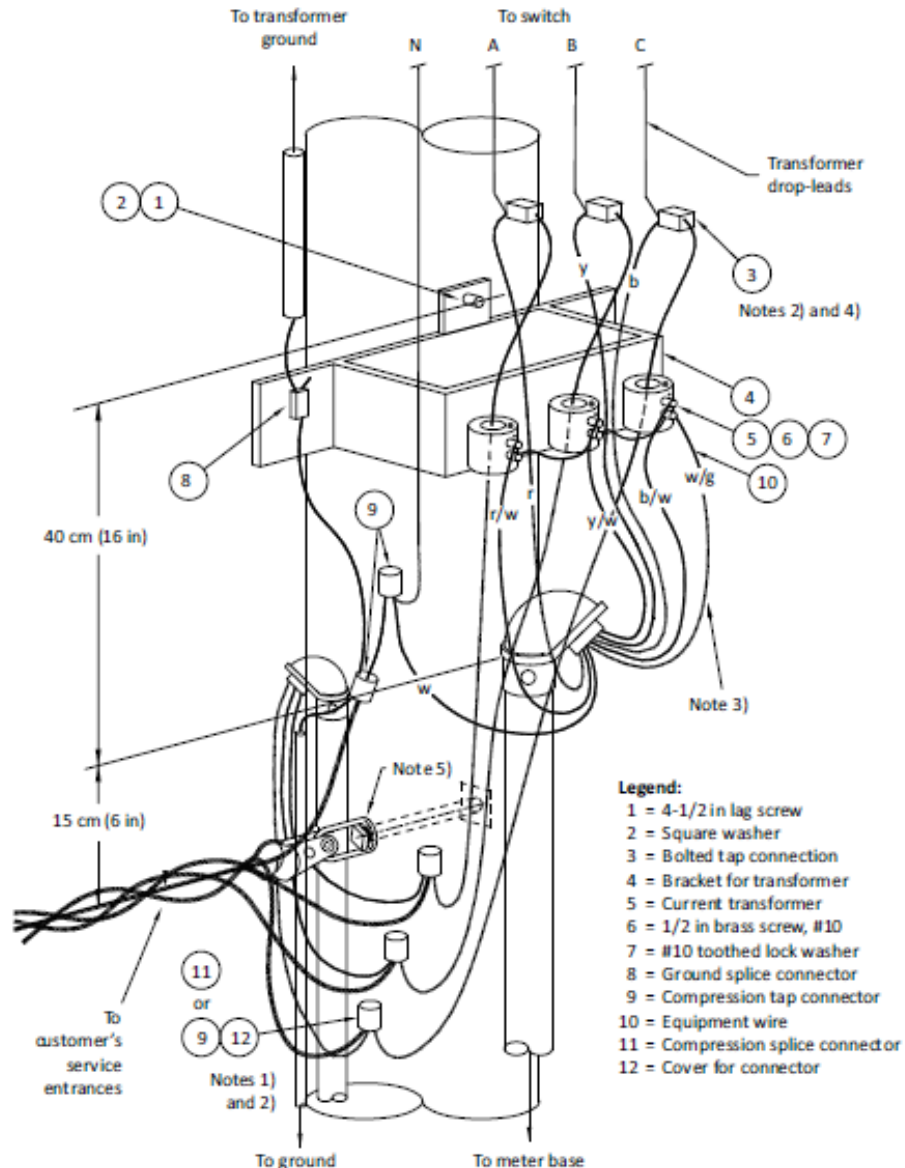
#### Notes:

- 1) This arrangement is for conductors larger than No. 4/0.
- 2) Maximum voltage 1-phase, 3 W, 120/240 V service.
- 3) The potential lead shall be doubled up to obtain adequate fill of the connector groove. Insulation shall not be removed from either lead.
- 4) Leads at the weather cap shall have drip loops.
- 5) Drip loops shall be provided at all insulated conductor connections.
- 6) CTs should be installed such that the CT ratio can be seen from the ground.
- 7) Equipment mounting as per specific pole type.

### Specification 43

#### Metering for 3-phase, 120/208 V, 4-wire system

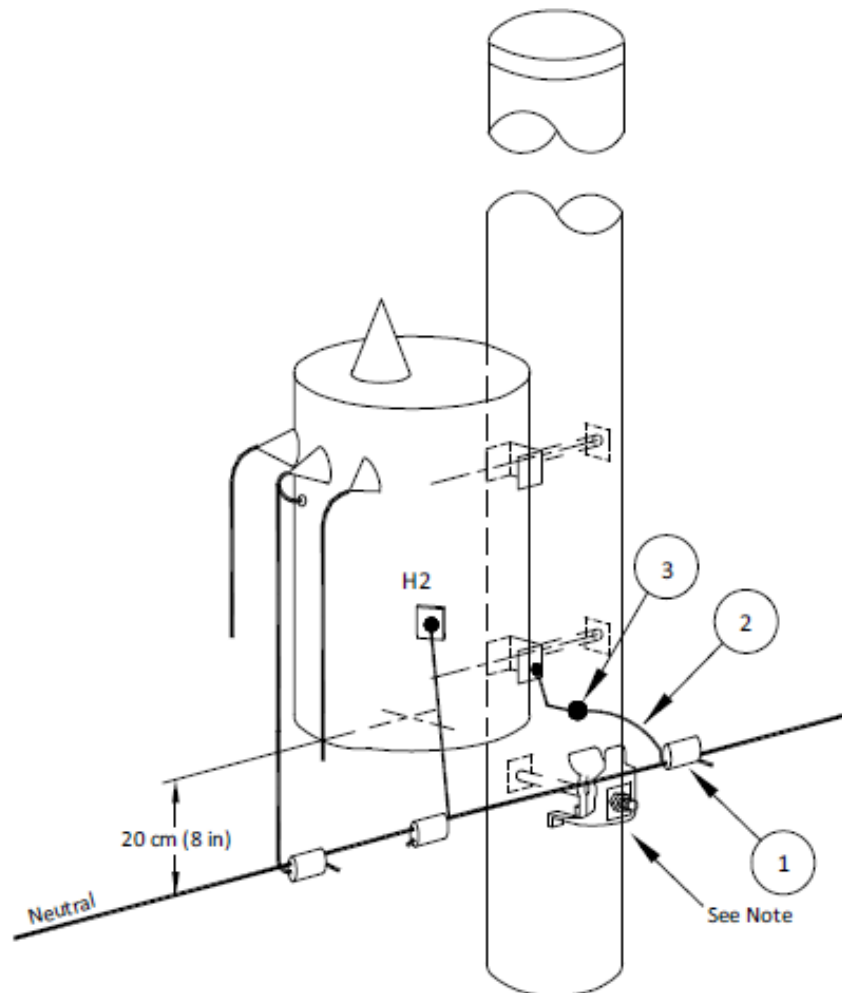
[See Rules 75-806 and 75-902 f.)]



#### Notes:

- 1) Underground service shall be permitted to replace overhead. If required, either service shall be permitted to connect to copper drop leads.
- 2) Drip loops shall be provided at all insulated conductor connections.
- 3) All metering leads shall be bundled to provide mechanical rigidity.
- 4) Potential leads shall be doubled up to obtain adequate fill of the connector groove. Insulation shall not be removed from either leads.
- 5) One-wire rack shall be permitted to be used. See Specification 35, Figure 1.
- 6) Equipment mounting as per specific pole type.

**Specification 44**  
*Grounding connection to steel pole, single-phase transformer*  
*[See Rules 75-800 2) and 75-806.]*



**Legend:**

- 1 = Connector, conductor, wedge
- 2 = Conductor, bare, copper #4
- 3 = Connector, ground, bolted

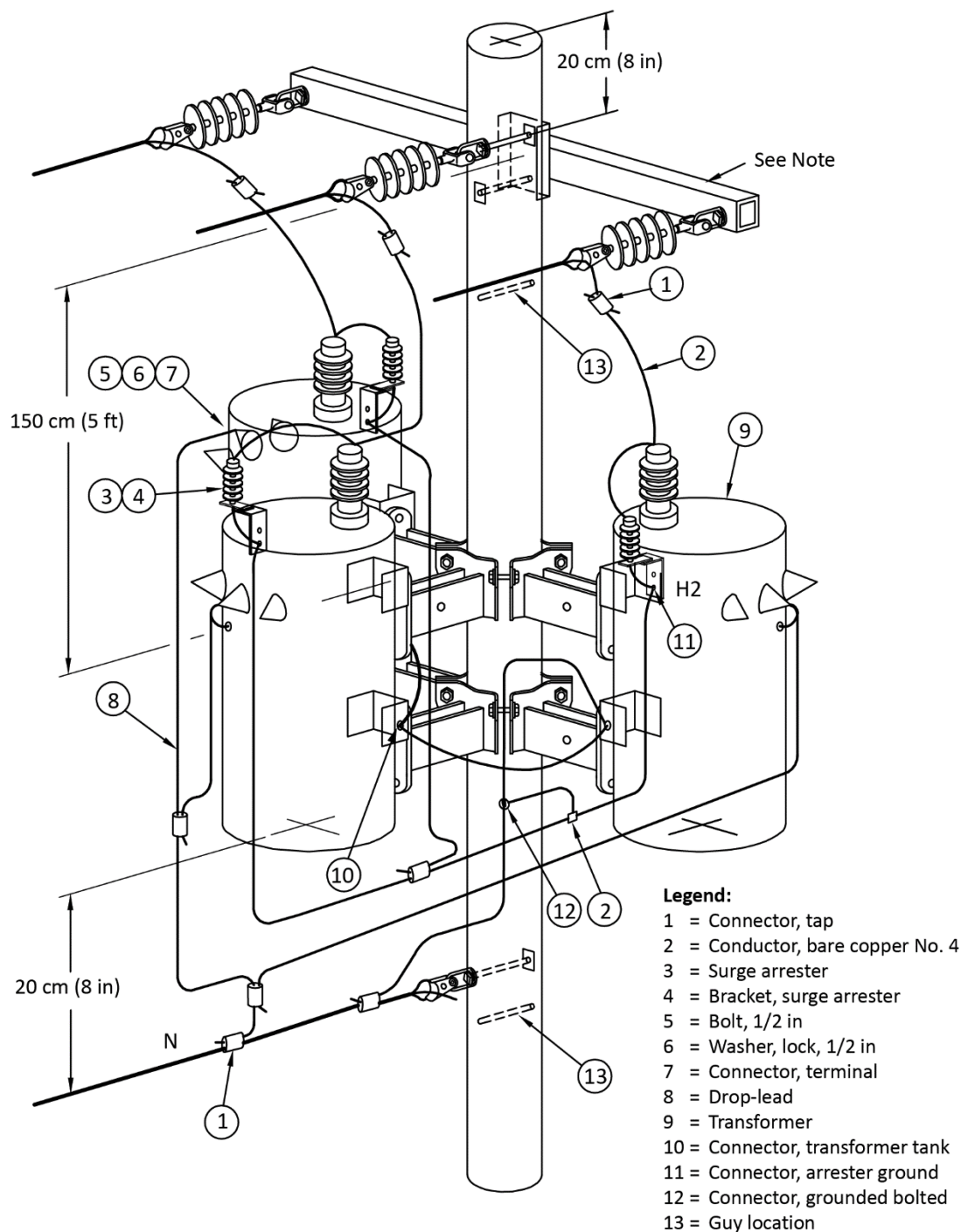
**Note:** See alternate Specification 35.1.



### Specification 45

#### Grounding connection to steel pole, three-phase transformer

[See Rules 75-800 2) and 75-806.]



**Note:** Rule 75-804 requires steel crossarms to be connected to a ground electrode where porcelain dead-end insulators are used with a copper conductor.

#### Appendix B —Notes on Rules

### Section 2

67. Add Appendix B Note to Rule 2-000 a) as follows:

**Δ Rule 2-000 a)**

*This Code applies to electrical equipment and electrical installations used in the generation of electrical power or energy intended for sale or distribution to the public. This Code does not apply retroactively for existing installation and equipment. However, this Code is applicable when any legacy installations and equipment are altered, upgraded, or replaced.*

*In the event of any perceived or real conflict or inconsistency between the codes at the federal, provincial and municipal levels, the electrical power operator (i.e., generator) should consult with other authorities having jurisdiction as applicable (e.g., the Canadian Nuclear Safety Commission, the Technical Standards and Safety Authority, or municipal building officials) to determine the approach to resolve the inconsistency.*

68. Add Appendix B Note to Rule 2-000 h) as follows:

**Rule 2-000 h)**

*For electrical vehicles, this Code applies to electrical vehicle supply equipment and requires the equipment to be approved and installed in accordance with applicable Code requirements. This Code does not apply to the inlet or on-board charging equipment that does not provide bi-directional power feed, as specified by Rule 86-308. The on-board charging equipment and inlet are considered to be part of the vehicle and not part of the electrical vehicle supply equipment.*

69. Add Appendix B Note to Rule 2-005 f) as follows:

**Rule 2-005 f)**

*Some supply authorities do not permit the installation of a meter-base plug-in transfer device or require a connection authorization. Therefore, it is the responsibility of the licensed electrical contractor to ensure the supply authority permits the use of meter-base plug-in transfer devices and to verify if a notification needs to be filed for the purpose of connection authorization for the installation of these devices.*

70. Add Appendix B Note to Rule 2-005 h) as follows:

**Rule 2-005 h)**

*Clause 2.(3) of Ontario Regulation 209/01 (ELEVATING DEVICES) states*

*“This Regulation does not apply to,*

- (a) elevating devices in or in connection with,*
  - (i) private dwelling houses used exclusively by the occupants and their guests, unless the owner requests in writing that they apply to them,...”*

71. Add Appendix B Note to Rule 2-010 as follows:

**Rule 2-010**

*The intent is to have the submitter file with the Electrical Safety Authority complete wiring plans and specifications relating to the proposed work*

- a) before any request for proposal or other document inviting tenders, bids, or quotations for work on the installation; or*
- b) within the time specified by the Electrical Safety Authority.*

*Proceeding with the job to the energization point without prior approval is done solely at the contractor’s risk. Essential information must be supplied as specified by the Electrical Safety Authority.*

72. Add Appendix B Note to Rule 2-010 6) as follows:

**Rule 2-010 6)**

To determine the plan review submittal requirements for a specific electrical installation, refer to the ESA Plan Review Submission Form and Checklist. The Plan Review Submission Form and Checklist are required to be included with every plan review submission.

73. Add Appendix B Note to Rule 2-022 as follows:

**Rule 2-022**

Class 2 power supplies certified to CSA C22.2 No. 223, or both CSA C22.2 No. 66.1 and CSA C22.2 No. 66.3, shall not exceed 100 V•A with the operating voltage not more than 30 V rms, 42.4 V peak, or 60 V dc. Limited power supply (LPS) is required to be certified to CAN/CSA-C22.2 No. 60950-1.

It is permitted by Subrule 2) that approval is not required for electrical equipment connected to a Class 2 power supply or LPS if the power supply is not an integral part of the equipment. If the Class 2 power supply or LPS is within a product enclosure, or part of a product, the product is required to be approved in accordance with applicable Canadian standards as per Subrule 1).

The light source for the lighting equipment referenced by Subrule 3) a), b), or f) may be an incandescent, halogen, or light-emitting diode (LED) lamp or module, or as specified in CSA C22.2 No. 250.0. Based on CSA C22.2 No. 250.13, there is a risk of electric shock if LED equipment is used in wet locations even with the output voltages below Class 2 power supply limits. Therefore, it is important for this equipment to be approved to the appropriate standards.

It is intended by Subrule 2) d) that electrical equipment intended to be used solely outside of Ontario, such as travel adapter plugs for using electrical equipment overseas, does not require approval because there is no applicable standard for Canadian certification.

It is intended by Subrule 4) a) that battery-operated portable products could become an ignition source in hazardous (classified) locations as explained by Appendix B Note to Rules 18-050 and 18-066.

It is not intended by Subrule 4) a) to require approval of equipment powered by a maximum of two button cell batteries (e.g., electronic wristwatches, hearing aids, calculators), as they are deemed incapable of causing an ignition under normal conditions as per ANSI/ISA-12.12.03.

For battery-operated medical devices as defined by the Food and Drugs Act, refer to all approval requirements of Health Canada.

74. Delete CE Code Appendix B Note to Rule 2-024 1) and replace with the following:

**Rule 2-024 1)**

Electrical equipment is deemed to be approved if it is certified by a certification body, is field evaluated by a field evaluation agency, or is determined by the Electrical Safety Authority not to present any hazard to persons or property.

CSA SPE-1000 sets out the testing and marking requirements for the field evaluation of electrical equipment in accordance with the national accreditation body, Standards Council of Canada (SCC).

75. Keep CE Code Appendix B Note to Rule 2-032 3):

**Rule 2-032 3)**

*The intent of this Subrule is that equipment subjected to the adverse impact of water be evaluated by an organization that is acceptable to the authority having jurisdiction for compliance with the applicable safety Standards to which the equipment was originally approved. The following should be consulted for specific recommendations:*

- a) *the original equipment manufacturer; and*
- b) *NEMA GD 1, which could be used as a supplementary tool for such evaluation and is available for free download at <https://www.nema.org>.*

76. Keep CE Code Appendix B Note to Rule 2-034 and number it “Rule 2-038”, as follows:

**Δ Rule 2-038**

*The objective of this Rule is to ensure the requirements of CE Code, Part I, are met only by electrical equipment that is part of an electrical installation covered by the Scope of Part I. For example, electrical equipment located in electrical installations “employed by an electric distribution system utility in the exercise of its function as a utility” cannot be used to meet Part I bonding and grounding, overcurrent, or disconnecting means requirements.*

### Section 6

77. Add Appendix B Note to Rule 6-112 1) as follows:

**Δ Rule 6-112 1)**

*A means of attachment should be provided for all supply or consumer’s service conductors in accordance with one of the following:*

- a) *a single point of attachment as identified in Figure 1 of Specification 35 utilizing a 16 mm bolt with a 5 mm × 50 mm × 100 mm backing plate with 5 mm × 50 mm × 50 mm washers;*
- b) *a two-hole bracket point of attachment as identified in Figure 2 of Specification 35*
  - i) *in wood frame walls, attached with a minimum of two 9.5 mm diameter by 100 mm long lag screws, penetrating at least 75 mm into the solid wood utilizing pre-bored pilot holes plus counterbores for proper installation; or*
  - ii) *in brick block or concrete walls, attached with a minimum of two 9.5 mm diameter by 47 mm long expanding-type sleeve anchors or equivalent installed in a 50 mm clearance hole;*
- c) *a single point of attachment as identified in Figure 1 of Specification 35 utilizing a 16 mm thru bolt with 5 mm × 50 mm × 50 mm washers or equivalent for a pole; or*
- d) *a single point of attachment as identified in Figure 3 of Specification 35 utilizing a 12 mm U-bolt when attached to a service mast.*

### Section 8

78. Add Appendix B Note to Rule 8-106 10) as follows:

**Δ Rule 8-106 10)**

*It is intended by this Subrule that the loads of the electrical equipment controlled by an energy management system should be considered to have a demand within the maximum limits allowed by the energy management system. The energy management system is provided with a maximum load rating, which determines the branch circuit, feeder, and service loading.*

79. Add Appendix B Note to Rule 8-202 3) d) as follows:

**Δ Rule 8-202 3) d)**

*Item d) applies to installations when electric vehicle supply equipment is either supplied from a panelboard installed in a dwelling unit or outside of a dwelling unit.*

### Section 14

80. Add Appendix B Note to Rule 14-418 as follows:

#### **Rule 14-418**

The term “unit” refers to individual areas such as those found in shopping malls, industrial malls, or similar areas. The term “unit” does not apply to the breakdown of office space in office towers to accommodate various tenants. Where no distribution equipment is installed (i.e., only branch circuits), then the single disconnecting means is not required.

### Section 16

81. Delete the CE Code Appendix B Note to Rule 16-222 1) a), Rule 16-222 2), and Rule 16-222 3) a) i), ii), and iii), and replace with the following:

#### **Rule 16-222**

With respect to the acceptance of equipment for connection to Class 2 circuits operating at not more than the limits specified by the Rule, consideration should be given to the fact that while Class 2 circuits limit the power that can be dissipated in the circuit continuously, this power is more than sufficient to be a fire hazard if dissipated in a fault within improperly designed equipment (e.g., shorted turns in a coil or too many decorative light strings connected to exceed the circuit rating).

### Section 20

82. Delete the CE Code Appendix B Note to Rule 20-060 and replace with the following:

#### **Rule 20-060**

Information on the non-electrical aspects of compressed natural gas (NGV) refuelling stations and NGV storage facilities may be found in CSA B149.1.

Certified vehicle refuelling appliances (VRAs) are those that meet the definition and approval requirements under the Technical Standards and Safety Act, Ontario Regulation 212/01 (Gaseous Fuels). It is recognized by Subrule 2) that only vehicle refuelling appliances without storage, certified to CSA 12.6 or another applicable standard, are permitted to be installed in accordance with CSA B149.1. A VRA is permitted to be installed in non-hazardous locations. Field evaluation is not permitted for VRAs.

Other vehicle refuelling stations must be installed as per the requirements of CSA B108 and require hazardous location area classification.

### Section 28

83. Add Appendix B Note to Rule 28-500 4) as follows:

#### **Rule 28-500 4)**

Example of acceptable marking: “WARNING — DO NOT USE TO DISCONNECT MOTOR. MOTOR DISCONNECTING MEANS LOCATED AT PANEL XX, CIRCUIT XX.”

### Section 30

84. Add Appendix B Note to Rule 30-200 1) as follows:

#### **Rule 30-200 1)**

Heat emissions from luminaires installed in close proximity to combustible materials (e.g., wood cabinets, doors, panels, shelving, clothes) may pose a fire hazard if the distance between the luminaire and the combustible material and the amount of heat are enough to ignite the combustible material.

As a guideline, the following clearances between luminaires (ceiling or wall-mounted) and the nearest point of combustible material may be used to minimize any potential overheating of combustible materials surrounding luminaires:

- a) 300 mm for surface-mounted incandescent or LED luminaires with a completely enclosed light source (lamp) type;
- b) 150 mm for recessed incandescent or LED luminaires with a completely enclosed light source (lamp) type; and
- c) 150 mm for surface-mounted or recessed fluorescent luminaires.

85. Add Appendix B Note to Rule 30-1009 1) as follows:

**Rule 30-1009 1)**

*This Subrule is intended to address the installation of free-standing poles supporting floodlighting near existing customer-owned power lines. Refer to Rule 75-710 c) for the installation of power lines to existing free-standing poles.*

86. Add Appendix B Note to Rule 30-1009 2) as follows:

**Rule 30-1009 2)**

*This Subrule is intended to address the installation of free-standing poles supporting floodlighting near existing power lines owned by the supply authority.*

Table 9 of CSA C22.3 No.1 requires the following minimum clearances:

- a) vertical clearance (at maximum sag above the pole supporting luminaires):
  - i) 0.5 m for insulated conductors ranging from 0 to 750 V; and
  - ii) 2.5 m for non-insulated conductors above 750 V to 22 kV; and
- b) horizontal clearances (add maximum swing to below values):
  - i) 0.3 m for insulated conductors ranging from 0 to 750 V; and
  - ii) 2.0 m for non-insulated conductors above 750 V to 22 kV.

*The supply authority may have additional clearances that are required to be met.*

*For roadway lighting installed on the public right-of-way near existing overhead power lines, refer to Rule 30-1300.*

*For lighting mounted on distribution poles (whether it is customer-owned or owned by the supply authority), refer to Rule 30-1007.*

87. Add Appendix B Note to Rule 30-1300 5) as follows:

**Rule 30-1300 5)**

*For roadway lighting mounted on distribution poles (whether it is customer-owned or owned by the supply authority), refer to Rule 30-1007.*

88. Add Appendix B Note to Rule 30-1400 as follows:

**Rule 30-1400**

*These Rules also apply to installations of LED luminaires, supplied by Class 2 power and data communication circuits [i.e., PoE (Power over Ethernet)], required by the provisions of the Ontario Building Code in buildings of residential occupancy.*

*Installation of LED luminaires may consist of a complete LED lighting system or be an assembly of individual products.*

89. Add Appendix B Note to Rule 30-1404 as follows:

**Rule 30-1404**

*The power supply referenced by Subrule 1) a) is a Class 2 power supply certified to CSA C22.2 No. 223, or a Class 2 transformer certified to both CSA C22.2 No. 66.1 and CSA C22.2 No. 66.3. Based on the Standards' requirements, a Class 2 power supply shall not exceed 100 V•A with the operating voltage not more than 42.4 V peak (30 V rms) or 60 Vdc.*

*The power supply referenced by Subrule 1) b) is a limited power supply (LPS) certified to CAN/CSA-C22.2 No. 60950-1.*

### Section 36

90. Add Appendix B Note to Rule 36-200 2) as follows:

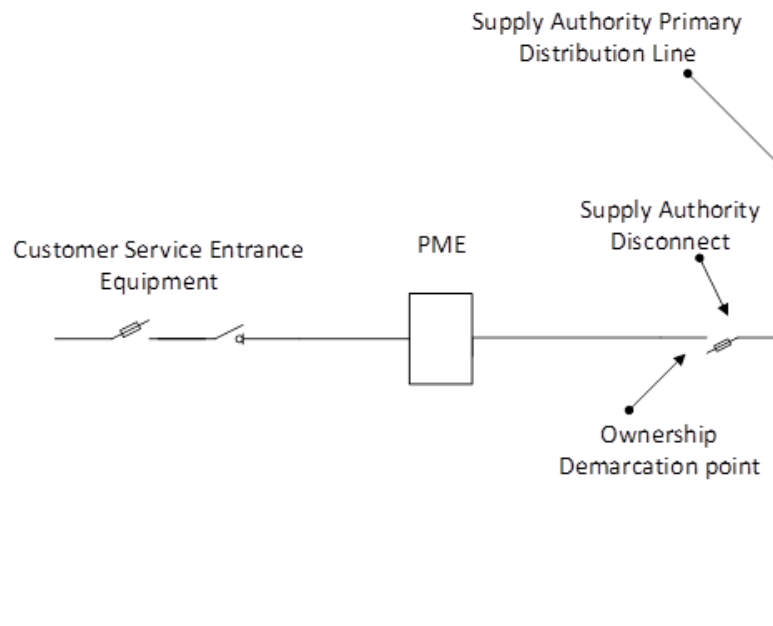
#### **Δ Rule 36-200 2)**

Any access to the primary metering equipment (PME) should be coordinated with the supply authority.

Figure B36-1 shows an example of a revenue metering ahead of the consumer's service equipment.

**Figure B36-1**

**Basic service layout identifying supply authority's revenue metering ahead of the consumer's service equipment**



91. Add Appendix B Notes to Section 75 as follows:

### Section 75

#### **Rule 75-002**

##### **Demarcation point**

The demarcation point is determined by the supply authority and is indicated in their conditions of service. This may also be known as the point of common coupling for installations within the scope of Section 64.

##### **Pipelines**

A pipeline

- a) includes all associated branches, extensions, tanks, reservoirs, pumps, racks, compressors, loading facilities, and other outside works;
- b) does not include pipe-type electric power cables; and
- c) can be above-ground or underground.

#### **Rule 75-004 5)**

The authority having jurisdiction may be one or more of the following: Transport Canada, the Canadian Coast Guard, or a provincial body. Navigable waters include all bodies of water that you can navigate from one place to another by any type of floating vessel for transportation, recreation, or commerce.



**Rule 75-142**

*For situations where aggressive corrosion exists, the steel pole manufacturer shall be consulted for appropriate additional below-grade corrosion protection (e.g., polyurethane coatings or other proven methods). Where the embedded section of a steel pole is fully coated, proper grounding can be achieved by utilizing the threaded insert provided above the groundline on the pole to connect to a driven ground rod.*

**Rule 75-162**

*Concrete poles are graded according to strength in alphabetical sequence, with pole strength increasing in alphabetical progression. The sizes of poles in these categories are so arranged that all poles of the same class, regardless of length, will resist the same horizontal force applied 60 cm (2 ft) from the top of the pole when supported 180 cm (6 ft) from the butt.*

**Rules 75-180 and 75-202**

*The use of fibre-reinforced poles and crossarms shall adhere to the design principles of CSA C22.3 No. 1.*

**Reference publication****ASCE (American Society of Civil Engineers)**

*Manual 104, Recommended Practice for Fiber-Reinforced Polymer Products For Overhead Utility Line Structures, as referenced in CSA C22.3 No. 1.*

**Rule 75-306 4)**

*It is the intent of this Rule to prevent injuries from the down guy when participating in activities such as skiing, snowmobiling, tobogganing, and sledding.*

*A heavy snow area is considered to be an area in which the mean annual recorded depth of snow is more than 500 mm. This information can be obtained from the following:*

- a) Meteorological Service of Canada, Environment Canada; and*
- b) Atlas of Canada, published by Natural Resources Canada.*

**Rule 75-708**

*Article 3.1.19.1 of the Ontario Building Code (OBC) contains clearance requirements when locating a building adjacent to above-ground electrical conductors. Horizontal clearances from the building are to include balconies, fire escapes, flat roofs, or other accessible projections beyond the face of the building.*

*Clearance requirements apply to all buildings which fall under Part 3 (buildings of major occupancy and exceeding three storeys) and Part 9 (buildings three or fewer storeys) of the OBC.*

*Clearance of conductors to mobile homes is required to meet the same clearance requirements as a building.*

**Rule 75-710**

*“Structures” may include but not limited to floodlighting poles, signs, flagpoles or other high-reach objects, mobile homes, trailers, tents, and amusement devices used for events such as carnivals and entertainment.*

**Rule 75-710 c)**

*Free-standing engineered structures are structures such as wind turbines, communication towers, and transmission towers that are engineered to self-support and do not rely on lateral supports.*

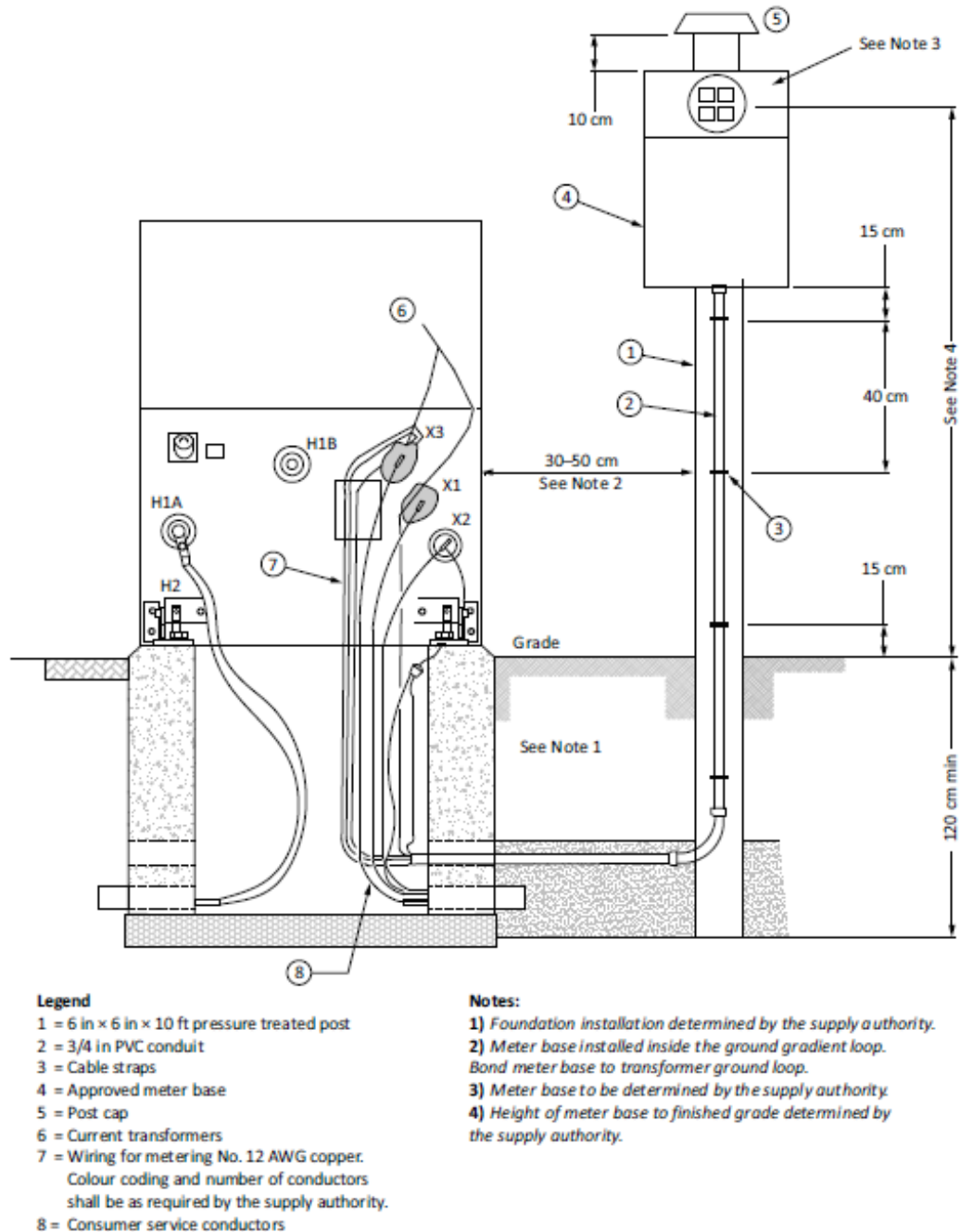
**Δ 75-814 3)**

*The intent of this Subrule is to limit the neutral voltage in order to reduce the risk of shock hazard, property damage, or loss. This may be achieved by limiting the neutral voltage to 10 V rms or less measured to a remote ground.*

**Rule 75-902 g)**

Figure B75-1 shows an example of a pad-mounted central metering installation.

*Figure B75-1*  
*Central metering system — Pad mounted installation*



92. *Delete CE Code Appendix I.*