PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

COMMISSION ADVISORY
AND COMPLIANCE DIVISION
Service and Safety Branch

RESOLUTION E-3076
March 9, 1988

R E S O L U T I O N

RESOLUTION E-3076 ORDER AUTHORIZING RULE CHANGES TO GENERAL ORDER NO. 95 (G.O. 95), RULE FOR OVERHEAD ELECTRIC LINE CONSTRUCTION AND GENERAL ORDER NO. 128 (G.O. 128), RULES FOR CONSTRUCTION OF UNDERGROUND ELECTRIC SUPPLY AND COMMUNICATION SYSTEMS

SUMMARY

1. The staff of the Division's Service and Safety Branch requests authorization for changes to G.O. 95 and G.O. 128 contained in the enclosed Appendix A, Identification and Purpose of Rules and Justification for Changes; Appendix B Changes in Text.

2. The Changes are to rules concerning exemptions or modifications of G.O. 95; clearances of wires over water surfaces, clearances between wires, crossarm and pin strength, and hardware separation from bond and ground wires. Also included are changes in climbing and working space location and obstructions; post insulator designation, messenger cable bonding, and riser covering. A rule on dead ended conductors in horizontal configuration will be deleted. Numerous typographical and punctuation errors are being corrected.

3. Changes to G.O. 128 concern depths communication cables shall be buried and exceptions to those depths.

BACKGROUND

4. The proposed changes are the result of a number of informal proposals submitted by utilities or initiated by the Commission Advisory and Compliance Division CACD staff. The staff has reviewed the proposed changes.

5. The review of the utilities' proposals was conducted in a series of 15 workshop meetings for study and discussion at five regional locations. Participants were CACD staff members, representatives of 15 of the leading public and privately owned electric and Communication utilities, the California Cable Television Association and related labor unions.

6. Rule change proposals found to be controversial or that could not be fully justified by the workshop participants were deleted from final consideration. Consensus has been reached by the workshop participants on the changes presented in the appendices.

PROTESTS

7. The proposed general order changes were mailed to all (400) public and privately owned electric and communication utilities operating overhead and underground lines in California. One protest was received from the Associated General Contractors of California. It has been resolved in meetings witht eh affected utilities.

DISCUSSION

8. The proposed rule changes are contained in the enclosed appendices as follows:

APPENDIX A	-	Each rule is identified by number, its general purpose explained, and proposed changes outlines and justified by supporting rationale.
APPENDIX B	-	The actual changes in text to be made in G.O. 95 and G.O. 128 are written out as they will be inserted in the general orders..

9. The staff believes the changes provide for safety to utility workers and the general public and encourages economical and improved construction and maintenance procedures. The CACD staff recommends authorization of the changes.

FINDINGS

1. We find that the changes to rules in G.O. 95 and G.O 128 authorized in this resolution are just and reasonable.

THEREFORE, IT IS ORDERED THAT:

1. The changes in text shown in Appendix B shall be made in G.O. 95 and G.O. 128.

2. All rules changed shall be marked "Revised March 9, 1988, by Resolution E-3076."\

3. This Resolution is effective today.

I certify this Resolution was adopted by the Public Utilities Commission at its regular meeting on March 9, 1988. The following Commissioners approved it.

STANLEY W. HULETT
President
DONALD VIAL
FREDERICK R. DUDA
G. MITCHELL WILK
JOHN B. OHANIAN
Commissioners

RESOLUTION E-3076
March 9, 1988

APPENDIX A

IDENTIFICATION AND PURPOSE OF RULES
AND JUSTIFICATION FOR CHANGES

Appendix A is a description of the rules to be changed in G.O. 95 and G.O. 128. The content of the rules, proposed changes and justification or rationale for the changes are given.

Item 1 – G.O. 95

Rule 15 – Exemption or Modifications

Rule Purpose, Content

This rule authorizes exemption from the rules of the general order for a particular case or special type of construction". Such exemption can be sought by application and must include appropriate justification.

Proposed Rule Change

Present Rule 15 is recommended to be expanded to include authorization that the language of Rule 15 of G.O 128 be used and modified to apply to G.O. 95 as well.

The amended Rule 15 would then consist of:

15. EXEMPTIONS OR MODIFICATIONS

15.1 Changes and Special Installations

15.2 Experimental Installations

15.3 Notification

(see Appendix B, Item 1 for complete text.)

Justification for Change

The rules of G.O. 95 and G.O. 128 differ only in their area of application, that is, overhead and underground systems, respectively. Therefore, the more inclusive language of G.O. 128 allowing for experimental development of new equipment and new or alternate materials and processes should also be available in G.O. 95.

State-of-the-art advances in synthetic products, such as fiber optic communication circuits, nylon and other synthetic fiber cable and line products, and fiberglass poles and crossarms, are examples of materials not now authorized or even addressed in either G.O. 95 or G.O 128. Such products often present advantages of cost, ease of handling, strength, and increased resistance to age and weather. Controlled experimental use is a practical means of establishing the visibility of alternate materials and construction methods.

Item 2 – G.O. 95

Rule – 37 Table 1 – Minimum Clearance of Wires Above Railroads, Thoroughfares, Buildings, Ground, Water Surfaces, Etc.

Rule Purpose, Content

This rule is tabulation of the basic minimum clearance of wires above or near various surfaces. These clearances are often modified by special circumstances, identified by footnotes that refer to other rules of the general order.

Proposed Rule Change

It is recommended that Table 1 conditions be expanded to include clearances between wires and water surfaces and contiguous areas. This would add Cases 11 and 12 to Table 1 along with footnotes (tt) through (xx). See Appendix B, Item 2. Clearances are not to be reduced because of temperature and loading.

Justification for Change

Table 1 presently applies to wires above railroad tracks, thoroughfares, and ground. However, water surface and shore areas are not addressed. Due to expansion of power and sail boating, it has become necessary to define these clearance situations and establish minimum safe values.

Clearances have been developed which are comparable to those used by most other states where the National Electrical Safety Code (NESC) has been adopted. The proposed clearances meet and often exceed the NESC standards.

Item 3 – G.O. 95

Rule – 38 Table 2 – Minimum Clearance of Wires from Other Wires

Rule Purpose, Content

This rule is a tabulation of the various minimum clearances between wires, including vertical separation of circuits of different functions on the same pole.

Proposed Rule Change

It is recommended that the Table 2 clearance situations be expanded to include vertical clearances between conductors in the adjoining midspans for circuits supported on the same pole. Vertical separation at midspan between communication conductors usually in a lower position and electric supply lines above will then equal clearances required at the pole.

This change will be accomplished by adding the phrase, "and adjoining midspans" to the nature of clearance in Table 2described as Vertical separation between conductors … on the same pole". The table 2 title will also be revised accordingly. Footnote "(pp)" for Cases 8 and 9, Columns C and D, will also be added.

Finally, by footnote, the tabulated value of 48-inch separation between electric secondary voltage lines and the communication circuits below them will be allowed to be reduced to 36 inches at midspan when the electric circuit consists of insulated, abrasion-resistant multiple conductor cable having a grounded metal sheath or supported by a bare neutral conductor. See Appendix B, Item 3, for text of changes.

Justification for Change

The rules presently are indefinite about vertical clearance between electric and communications lines at midspan, although vertical clearances are specified at the pole. Engineering standards adopted by most utility companies have included clearances between communication and electric circuits at midspan. These standards sometimes differ from company to company. Workers installing midspan service drops can be exposed to both an electrically charged conductor and a nearby grounded communication messenger. Accidental contact with both could result in electric shock and injury. Therefore, a clearance sufficient to make such contact less likely is necessary.

Over the years, the staff has recommended that the same separation required at the pole be carried along into the adjoining spans. The major utilities generally agree and include the provision in their construction standards. The rule change makes a uniform standard.

A slight modification was recommended by the workshop representatives. They request, and the staff supports a reduction of the required 48-inch separation at midspan between electric secondary conductors and the communication circuits below to 36 inches whenever the electric circuit consists of insulated, abrasion-resistant multiple conductor cable having a grounded metallic sheath or supported by a bare neutral conductor. When such electric cable is used the danger of electric shock is greatly reduced due to the insulating properties of the cable thus justifying the reduced separation.

Item 4- G.O. 95

Rule 49.2 - C2, Crossarms – Strength and
Rule 49.3 - C3, Pins and Conductor Fastenings – Strength

Rule Propose, Content

Rule 49.2-C2 pertains to strength requirements for crossarms. It is addresses methods for meeting vertical as well as longitudinal loading. For example, crossarms supporting electric supply lines "where longitudinal loads are normally balanced … shall have sufficient strength to withstand a load, applied in the direction of the conductors at the outer pin position, of 700 pounds with a safety factor of not less than unity." A requirement for withstanding a load of 400 pounds is specified for communication lines.

For longitudinal loads normally unbalanced, crossarms must have sufficient strength to meet applied loads, generally utilizing a safety factor of 2. In addition, at unbalanced corners and at dead ends, the rule now requires double crossarms so that conductors can be attached to two insulators to prevent slipping.

Rule 49.3-C2 concerns strength requirements for pins and conductor fastenings, and applies to balanced and unbalanced longitudinal loads. For unbalanced loads conductors are required to be tied to two insulators to prevent slipping of the conductor under the maximum working tensions with a safety factor of 2.

Proposed Rule Change

Both of these rules need changes to allow use of a single crossarm for unbalanced loads only if steel insulator pins of sufficient strength are used and the conductors are secured with prefabricated ties. See Appendix B, Item 4 for text of rules.

Justification for Change

This change reflects state-of-the-art advances in pin strength (steel versus wood) and in conductor ties (prefabricated versus hand formed). Steel Pins have greater cantilever strength than wood pins; prefabricated conductor ties have greater strength and conductor grip than hand-formed ties. The proposed changes will permit use of improved materials and simplified construction methods.

Item 5 – G.O. 95

Rule 52.7-C - Hardware – Separation from Bond Wires and Ground Wires

Rule Purpose, Content

This rule establishes a minimum clearance of 1-½ inches between bond wires and ground wires metal pins, bolts and other hardware on wood crossarms except where the hardware is intended to be connected to the bond or ground wires.

Proposed Rule Change

It is proposed that the scope of this rule be extended to include attachments on the pole surface. Presently hardware clearance from bond and ground wires is specified only when mounted on crossarms. This change can be made by simply adding the words "and wood poles" after the word "crossarms" in the rule see Appendix B, Item 5.

Justification for Change

Increasingly modern line construction utilizes an armless vertical or triangular conductor arrangement directly mounted on wood poles. The safety considerations inherent in the 1-½-inch clearance requirement are as relevant on the surface of wood poles as on wood crossarms.

Item 6 – G.O. 95

Rule 52.7-D - Hardware - Separation from Metal Pins and Dead-End Hardware
Rule 54.7-A4 - Climbing and Working Space - Allowable Climbing Space Obstructions
Rule 22.2-F - Protective Covering, Suitable - Bolt Covers

Rule Purpose, Content

Rule 52.7 addresses the general subject of hardware. Rule 52.7-D specifies a clearance of not less than 1-½ inches between a variety of pole or crossarm mounted hardware and metal pins and dead-end hardware. Certain exceptions to the clearance requirements are also specified, as are electrical interconnections of certain bolts and hardware to establish a common potential.

Rule 54.7 addresses the general subject of climbing and working space. Rule 54.7-A4 pertains to allowable climbing space obstructions. One allowable obstruction is bolts used for the attachment of dead-end hardware of a circuit located below a pole-top circuit, if these bolts are covered by non-conducting material when they project into the climbing space.

Proposed Rule Change

AN exception to the hardware clearance requirements is made for bolts and dead-end hardware associated with a pole top circuit of more than 7,500 volts (second paragraph of Rule 52.7-D). There is also a requirement that such hardware within the climbing space be covered by non-conducting material.

However, these requirements also appear in Rule 54.7-A4 which relates to climbing space obstruction. Therefore, the second paragraph of Rule 52.7-D is redundant and should be deleted.

The fourth paragraph of Rule 54.7-A4 should be replaced with three new paragraphs as shown in Appendix B, Item 6.

Finally, it is proposed that a definition rule be added to Rule 22.2, Protective Covering, Suitable, see Appendix B, item 6.

Justification for Changes

Paragraph 2 of Rule 52.7-D should be deleted because it is redundant and unrelated to separation between metal pins and dead-end hardware.

The deleted material is contained in the revised paragraphs 4, 5 and 6 of Rule 54.7-A4. Also the exceptions to the need for covering such bolts in the climbing space when they are on dead-end circuits of 0-750 volts or pole top circuits of more than 7,500 volts are included in the revised Rule 54.7-A4.

Item 7 – GO. 95

Rule 54.7-A4 - Climbing and Working Space - Allowable Climbing Space Obstructions

Rule Purpose, Content

Rule 54.7-A4 identifies certain obstructions that may be allowed within any 4-foot vertical section of the climbing space for electrical supply lines. These obstructions include vertical conductors, ground wires, guys, etc. Certain restrictions limit such obstructions either by number or by combination.

A comparable Rule 84.7-E contains similar provisions for communication lines. Other rules, 54.10-F3 applicable to low voltage multiconductor cable with bare neutral, 0-750 volts, and 54.11-G, applicable to insulators in vertical and horizontal position without crossarms, more than 750 volts, allow similar climbing space obstructions. Finally, Decision 82-03-020; dated March 2, 1982, which granted PG&E a deviation to Rule 54.9-F regarding climbing space where extended rack construction is utilized, lists allowable climbing space obstructions.

Proposed Rule Change

It is proposed that the text of Rules 54.7-A4, 84.7-E, 54.10-F3, 54.11-G of G.O. 95, and PG&E's deviation to Rule 54.9-F be amended to include two guys as obstructions allowed within a 4-foot section of the climbing space. These rules now restrict obstructions to one guy plus one other allowed obstruction. To limit the physical obstruction presented by two guys, a restriction is proposed: Two guys are allowed in the climbing space, "provided they are separated at the pole by a vertical distance of not more than 18 inches." See Appendix B, Item 7, for text changes.

Justification for Change

Electric and communication utilities often need to expand the capacity of their lines to accommodate increased loads. The added conductors and cables add weight and lateral loading and require added anchor or head guys, particularly at corners or dead-end poles.

Under present rules, an added guy, if located in the climbing space, would have to be at least 4 feet vertically from a guy already in place. It is often difficult to find space to place a second guy under that restriction. Also, to balance an added load the best location for a second guy might be less than 4

feet from the first. The added flexibility will reduce costs and facilitate good design.

Item 8 – G.O. 95

Rule 54.11 – Post Insulators in Vertical and Horizontal Position without Crossarms, More than 750 Volts
Rule 20.10 – Post Insulator (Definition)

Rule Purpose, Content

Rule 54.11 provides construction details, restrictions and exceptions regarding "armless" construction.

Proposed Rule Change

The practice of attaching insulators directly to the pole in a variety of arrangements is being utilized due to it simplicity and efficiency.

Certain minor revisions are recommended to clarify the intent of the rule. Presently it refers mostly to "post type" insulator with a recent (1978) addition, Section H, that refers to "pin type" insulators. That rule 54.11-H, Triangular Configuration With Pin Type Insulators, should be deleted because the distinction as to type of insulator is not need in Rule 54.11.

A confusing distinction exists in Rule 54.11. Horizontal insulators are often attached to the pole on metal brackets. Some operators interpret that to be illegal because such opposing brackets, or a continuous bracket, they believe should be defined as a crossarm and be prohibited.

It is therefore proposed that all references to "post" insulators in the rule be deleted. In the title of Rule 54.11, it is proposed to substitute "Without the Use of Wood Crossarm" for "Without Crossarms," and delete "Post."

It is proposed that Rule 20.10 – Post Insulator be deleted. Appropriate corrections in other rules will need to be made as shown in Appendix B, Item 8.

Justification for Change

The purpose of this change is to clarify the rule regarding insulators used in armless construction. The rule presently refers to "post" insulators although other types of insulators are also in use in similar construction. Pin type insulators are also referred to in the rule.

"Pin type insulators are frequently used for armless construction because they are less costly, lighter, and adaptable to performing hot-line

techniques. "Post" type insulators are primarily utilized to support large conductors, and to support uneven forces where from line angles. Other types of insulators are also used with armless construction depending upon design factors required by terrain and other special needs.

The designations "post" and "pin" should be removed from the rule because they are often interchangeable.

Item 9 – G.O. 95

Rule 54.10-F2 - Low Voltage Multiconductor Cable With Bare Neutral, 0-750 Volts - Climbing Space - Dimensions

Rule Purpose, Content

Rule 54.10-F2 provides a climbing space location for low voltage multiconductor cable with bare neutral, 0-750 volts. When a transformer is mounted in line with primary conductors the climbing space location changes.

Proposed Rule Change

It is recommended that the second sentence of this rule be amended by adding "or similar apparatus" after "transformers". Also, it is recommended that a final phrase "or on one side of the pole" be added. See Appendix B, Item 9.

Justification for Change

All of Rule 54.10 provides requirements for low voltage multiconductor cable with a bare neutral. Generally, rules for such cable are less stringent than for regular separated conductors since the conductors are covered by an abrasion resistant insulation. IT is thus less hazardous and can be treated more leniently.

The proposed changes will allow apparatus other than transformers to be mounted on pole utilizing multiconductor cable. Equipment such as regulators, line boosters, re-closers and capacitors are examples.

Also, there is no reason to restrict the climbing space to one quadrant, thus the provision that it can be on one side of the pole is added.

Item 10 –G.O 95

Rule 83.4 - Bonding (Proposed New Rule)

Rule Proposed, Content

Although it has not been a requirement of G.O. 95, the bonding together of separate communication messengers has been a common practice by most telephone utilities and, recently, cable TV companies. This proposed new rule describes the method for bonding messenger together even if of the same ownership.

Proposed Rule

Where separate communication messengers, or guys, or both, of the same or different ownership, are attached to the same pole, and they are in proximity to electric supply circuits of various kinds they shall be bonded together at frequent intervals. See Appendix B, Item 10, for the text of the proposed rule.

Justification for Rule

Bonding of separate communication messenger or guy systems can provide another path to ground if either becomes accidentally electrically charged. Bonding equalizes differences of static electric potential which might accumulate on the separate systems.

Until recent years, joint pole line systems typically included only one communication utility, a telephone company, along with the electric utility. However, with the advent of cable TV, mutual bonding between it and the telephone system has become somewhat difficult. Where the telephone company controls the cable TV's presence on the pole (e.g. rental agreement for cable TV's pole attachment), the telephone utility's contract usually, but not always, includes a requirement for mutual bonding.

Where the pole system is solely owned by the electric utility, there has also been difficulty. There the electric company rents space to other operators as needed. It has been reluctant, or has refused to set and enforce standards on mutual bonding between cable TV and telephone systems. This new rule will solve problems related to mutual bonding.

Item 11 – G.O. 95

Rules 54.6-E and 84.6-E - Risers

Rule Proposed, Content

These rules specify the protective covering on poles for encasing risers of wires or underground cables.

Proposed Rule Change

The rules presently require that riser covering shall be of securely grounded iron or steel pipe, or plastic U-shaped moulding or plastic pipe. Such plastic pipe is required to be of the material specified in Rule 22.2-C, designated as EPC-80-PVC, with a minimum nominal pipe size of 2-½ inches.

The change proposed is to allow a minimum nominal pipe size of 1 inch, instead of the 2-½ inches now required, contingent upon retaining the equivalent impact strength of larger size pipe. Thus, the second sentence of the second paragraph of Rule 54.6-E and the last sentence of the first paragraph of Rule 84.6-E should be replaced by the following:

> "Such plastic pipe shall be of material as specified in Rule 22.2-C with a minimum nominal pipe size of 1 inch and with a minimum impact strength equal to 2-½"
> nominal EPC-80-PVC plastic pipe."

Justification for Change, Modification

The proposed change allows smaller sizes in plastic pipe used to cover risers provided the smaller pipe shall have the minimum impact strength of 2-½ -inch nominal EPC-80-PVC pipe.

Item 12 – G.O. 95

Rule 54.4-D7 - Dead Ended in Horizontal Configuration

Rule Purpose, Content

Lines dead ended in horizontal configuration at voltages 0-7,500 and more than 7,500 are covered in Rule 54.4-D7a and b respectively.

The rules require special treatment of the center conductor of a 3-wire circuit. If a transformer or other apparatus is to be installed with lines dead ended in horizontal configuration, the center conductor must be set over from the pole center line by as much as 18" and the dead-end insulator support must be extended to keep the conductor away from the pole by as much as 36".

The rules require special treatment of the center conductor of a 3-wire circuit. If transformer or other apparatus is to be installed with lines dead ended in horizontal configuration, the center conductor must be set over from the pole center line by as much as 18" and the dead-end insulator support must be extended to keep the conductor away from the pole by as much as 36".

Dead ending in two directions with no buck arm present or corner construction with a buck arm under the present rules is restricted and requires the extended dead ends and offset center conductors.

With present day construction equipment and techniques, Rules 54.4-D7a and b are considered by utility experts to be excessively restrictive and archaic. The staff concurs.

Propose Rule Change

Rule 54.4-D7a and b are recommended to be deleted from the general order. Also Figures 13 and 14 of Appendix G of G.O. 95 should be deleted. Rules 54.4-D8a and b contain cross references to 54.4-D7 that should be removed. See Appendix B, Item 12.

Justification for Change

The installation of a transformer on a pole with dead and in horizontal configuration can, under the present rules, require setting the center conductor out onto the arm and installing a head guy to balance the stress on the arm. If service is to be maintained during these changes the work must be hot line techniques, exposing workers to risks associated with that.

If a buck arm is present the transformer may have to be located at least a span away. A pole might have to be interest under hot line techniques to carry the transformer.

The added work involved for any of that should not be necessary because with state-of-the-art techniques transformers can safely be set without most of the requirements of Rule 54.4-D7. Truck-mounted booms are used instead of the manual hoist and frame rigging once used. Even in off-road areas and with a buck arm present, an insulated gin pole can be mounted on the line or corner pole and the transformer hoisted safely into place without deenergizing the line.

If the provisions of Rule 54.7, Climbing and Working Space, are observed in other aspects of dead ends in horizontal configuration safety to workers is assured. Overall safety is enhanced by simplified construction without the present restrictions.

Item 13 – G.O. 128

Rule 43.3 - Clearances and Depths
(Buried Communication Cables and Conductors)

Rule Purpose, Content

This rule applies to buried communication cables and conductors. New sub-rules are proposed to be added that will allow communication cables and conductors to be treated similarly to electric supply cables and conductors (Rules 33.4C & D) as to specific depths and also exceptions to those depths.

Proposed Rule Change

It is recommended that this rule be changed so that certain depth requirements will not be in all cases the same as those for duct systems but instead as specified by new sub-rules 43.3-C and 43.3-D which will be entitled DEPTHS, and EXCEPTIONS, respectively. These two new sub-rules will only address as separate DEPTH situations the installation of underground communication cables under these surface situations, (1) sidewalks, parkways and private property, and (2) thoroughfares. Also, the EXCEPTIONS will allow lesser depths for these cables when "suitable mechanical protection is employed." The several authorized methods, or their equivalents, by which such mechanical protection can be obtained are furnished within the proposed new sub-rules.

Justification for Change

These proposed changes will correct an inconsistency present in G.O. 128, by enabling the same modification of certain depth requirements for communication cables when mechanically protected that currently exists for underground electric supply cables. It can also be argued that rules for communication lines can be provided more liberal treatment than supply lines because the hazard of electric shock is not involved. Even so, these rules still must provide adequate protection for communication circuitry so that a proper level of service reliability can be realized.

Item 14 – G.O. 95

Rule 41.4-C2, DEPTHS

Rule Purpose, Content

This Rule presently allows reduced depths of cover for ducts provided additional top protection is installed, and it has sufficient strength to protect the system from traffic.

Proposed Rule Change

It is proposed to define "sufficient strength" by adding, "The sufficient strength requirements shall be deemed to have been met in paved thoroughfares where the width of the trench is 6 inches or less and a concrete slurry backfill provided of a thickness at least equal to the thickness of the pavement."

Justification for Change

The intent of this revision is to permit less than 18 inches cover utilizing the earth saw or rock wheel method. This method is widely used in the rehabilitation of distribution systems and reduces construction time resulting in cost savings and better public relations. A depth of less than 18 inches should significantly reduce damage to existing substructures. The rock wheel/earth saw method with slurry backfill results in a trench less than 6 inches in width which is the key factor in protecting the system from injury by traffic.

Item 15 – G.O. 95

Various Rules, Other References in G.O. 95

Rule Purpose, Content

Various rules, tables and figures

Proposed Rule Change

Various corrections as shown in Appendix B, Item 15

Justification for Change

Typographical, punctuation and minor editing errors identified in March 1981 Edition of General Order should be corrected. They have been picked up by the utilities and by the staff in the past six years.

RESOLUTION E-3076
March 9, 1988

APPENDIX B

CHANGES IN TEXT

Appendix B contains the changes in text to be made in G.O. 95 and G.O. 128 as indicated.

Item 1- G.O. 95

Rule 15. EXEMPTIONS OR MODIFICATIONS

Delete text of present rule and substitute the following:

"15.1 Changes and Special Installations

If, in a particular case or a special type of construction, exemption from or modification of any of the requirements herein is desired, the Commission will consider an application for such exemption or modification when accompanied by a full statement of conditions existing and the reasons why such exemption or modification is asked and is believed to be justifiable. It is to be understood that, unless otherwise ordered, any exemption or modification so granted shall be limited to the particular case or special type of construction covered by the application.

15.2 Experimental Installations

It is the intent of this rule to assist in advancements or changes in the art without mitigation of safety. For this purpose, experimental installations which deviate from one or more of these rules may be made provided: Precautions are taken to secure safety to property and to persons engaged in the construction, maintenance, and operation of overhead systems, and to the public in general; and a full statement of the conditions involved in such experimental installation is filed with the Commission not less than 15 days prior to experimental modification of facilities or construction of any experimental facilities. Where such experimental modification or construction would result in clearances or protection other than provided by these rules,

a copy of such statement shall concurrently be mailed to all utilities, local agencies or persons likely to be affected by such installation.

15.3 Notification

For the purpose of keeping these rules up to date and reflecting the latest state of the art, the Commission shall, at appropriate times, advise interested parties of exemptions or modifications granted and notifications received under the provisions of Rules 15.1 and 15.2."

Item – G.O. 95

Rule 37

Add the following paragraph after paragrapgh3:

"The clearances specified in Table 1, Cases 11, 12 and 13, shall in no case be reduced below the tabular values because of temperatures and loading as specified in Rule 43."

Item 2 – GO 95, APPENDIX B

Table 1
In title delete "and"; after "Ground", add "or Water Surfaces".

No	Case	A Span wires (etc.)	B Comm. Conductors (etc)	C Trolley (etc.)	D Supply Conductors of 0-750 volts (etc.)	E Supply Conductors 750-22.5kV (etc.)	E Supply Conductors 22.5-300 kV (etc.)	F Supply Conductors 300 – 550 kV (etc.)
11	Water areas not suitable for sailboating (tt) (uu) (ww) (xx)	15′	15′	---	15′	17′	25′	25′ (kk)
12	Water areas suitable for sailboating, surface area of: (tt) (vv) (ww) (xx)							
	(a) Less Than 20 acrea	18′	18′	---	18′	20′	27′	27′ (kk)
	(b) 20 to 200 acres	26′	26′	---	26′	28′	35′	35′ (kk)
	(c) Over 200 to 2,000 acres	32′	32′	---	32′	34′	41′	41′ (kk)
	(d) Over 2,000 acres	38′	38′	---	38′	40′	47′	47′ (kk)

(tt) Where a federal agency or surrogate thereof has issued a crossing permit, clearances of that permit shall govern.

(uu) Or Where sailboating is prohibited and where other boating activities are allowed

(vv) Clearance above contiguous ground shall be 5 feet greater than in cases 11 or 12 for the type of water area served for boat launch facilities and for area contiguous thereto, that are posted, designated or specifically prepared for rigging of sailboats or other watercraft.

(ww) For controlled impoundments, the surface areas and corresponding clearances shall be based upon the high water level. for other waters, the surface area shall be that enclosed by its annual flood level. the clearance over rivers, streams and canals shall be based upon the largest surface areas of any one–mile long segment which includes the crossing. the clearance over a canal, river or stream normally used to provide access for sailboats to a larger body of water shall be the same as that required for the larger body of water

(xx) Water areas are lakes, ponds, reservoirs, tidal waters, rivers, streams and canals without surface obstructions

Table 2

Basic Minimum Allowable Clearance of Wires from Other Wires at Crossings, in Midspans and at Supports

(Letter references Denote Modifications of Minimum Clearances Referred to in Notes Following this Table)

All Clearances Are in Inches

Case No.	Nature of Clearance and Class of Voltage of wire, cable or conductor concerned	Other Wire, cable or conductor concerned										
					Supply conductor (including supply cables)							
		A Span wires, guys and messengers	B Trolley contact conductors 0-750 volts	C Communication conductors (including open wire, cables and service drops)	D 0-750 volts (including service drops and trolley feeders (a))	E 750-7,500 Volts	F 7,500-20,000 volts	G 20,000-35,000 volts	H 35,000-75,000 volts	I 75,000-150,000 volts	J 150,000 - 300,000 volts	K 300,000 - 550,000 volts
	Clearance between wires, cables, and conductors not supported on the same poles, vertically at crossings in spans, and radially where collinear or approaching crossing											
1	Span wires, guys and messengers (b)	18 (c)	48 (d, e)	24 (e)	24 (e)	36 (f)	36	72	72	78	78(gg)	138(hh)
2	Trolley contact conductors 0-750 volts	48 (d, e)	----------	48 (d)	48 (d, h)	48	72	96	96	96	96 (gg)	156(hh)
3	Communication conductors	24 (e)	48 (d)	24	48 (i)	48 (dd)	72	96	96	96	96 (gg)	156(hh)
4	Supply conductors, service drops and trolley feeders 0-750 volts	24 (e)	48 (d, h)	48 (i)	24	48	48	96 (oo)	96	96	96 (gg)	156(hh)
5	Supply conductors, 750-7500 volts	36 (f)	48	48 (dd)	48	48 (h)	72	96(oo)	96	96	96 (gg)	156(hh)
6	Supply conductors 7500-20,000 volts	36	72	72	48	72	72	96(oo)	96	96	96 (gg)	156(hh)
7	Supply conductors, more than 20,000 volts	72(g)	96(g)	96(g)	96(g) (oo)	96(g) (oo)	96(g) (oo)	96(g) (oo)	96 (g)	96	96 (gg)	156(hh)
	Vertical separation between conductors and / or cables on separate crossarms or other supports at different levels (excepting on related line and buck arms on the same pole and in adjoining Midspans)											

8	Communication conductors and service drops	---------- ---	---------- -	12 (j)	48 (k, l, m, n, pp)	48 (k)	72 (m, n)	72(m)	72	78	87 (gg)	147(hh)
9	Supply Conductors, service drops and trolley feeders 0-750 volts	---------- ---	---------- -	48 (k, l, m, n, pp)	24 (h, k, m, o)	48 (k, m, p)	48 (k, m, q)	72(m) (nn)	72	78	87 (gg)	147(hh)
10	Supply conductors, 750-7500 volts	---------- ---	---------- -	48 (k)	48 (k, m, p)	48 (m, o, r, ee)	48 (m, q)	48(q)	48(q)	60(ff)	90 (gg)	150(hh)
11	Supply conductors 7500-20,000 volts	---------- ---	---------- -	72 (m, n)	48 (k, m, q)	48 (m, q)	48 (m, o, q, r, ee)	48(q)	48(q)	60(ff)	90 (gg)	150(hh)
12	Supply conductors 20,000-~~68,000~~ 75,000 volts	---------- ---	---------- -	72 (m)	72 (m)	48 (m, q)	48 (m, q)	48(o, q)	48(o, q)	60(ff)	90 (gg)	150(hh)
13	Supply conductors, more than ~~68,000~~ 75,000 volts	---------- ---	---------- -	72	72	60 (q)	60 (q)	60(q)	60(q)	60(ff)	90 (gg)	150(hh)
	Vertical arms above or below conductors on related line arms and buck arms.											
14	Line arms above or below related buck arms (s, t)	---------- ---	---------- -	6	12 (u)	18 (u)	18 (u)	24	48	60(ff)	90 (gg)	150(hh)
	Horizontal separation of conductors on same crossarm											
15	Pin spacings of longitudinal conductors, vertical conductors and service drops (v, w)	---------- ---	---------- -	3(x)	11 ½ (h, x)	11 ½ (x)	17 ½ (x)	24 (x)	48	60(ff)	90 (gg)	150(hh)
	Radial separation of conductors on same crossarm, pole or structure											
	Incidental pole wiring											
16	Conductors, tap or lead wires of different circuits (v, y, z)	---------- ---	---------- -	3 (x)	11 ½ (h, x)	11 ½ (x)	17 ½ (x)	24 (x)	48	60(ff)	90 (gg)	150(hh)
17	Conductors, tap or lead wires of same circuits (v, z, aa)	---------- ---	---------- -	3	3	6	6	12	24	60(ff)	90 (gg)	150(hh)
	Radial separation between guys and conductors		---------- -									
18	Guys passing conductors supported on other poles (excluding poles of same circuit), and guys approximately parallel to conductors supported on the same poles	---------- ---	---------- -	3 (bb)	12	18	18	30	36	36 (ff)	78 (gg)	138(hh)
19	Guys and spans wires passing	(ee)		3	3	6	9	12	18	24	48 (ll)	86 (jj)

	conductors supported on the same poles **Post-insulator-Vertical clearance between conductors**											
20	Vertical Clearance between conductors of the same circuit on Horizontal post insulators	-	-	-	-	24	24	30	36 or 48 (ii) (mm)	48 (mm)	48(mm)	48(mm)

(a)	The clearances in Column D are also applicable to supply cables of any voltage under certain conditions	57.4
(b)	Clearances for guys and span wires apply vertically at crossings; see Case 18 for radial clearances from conductors. 1. Supply guys and span wires from conductors 2. Supply guys and span wires from guys and span wires 3. Communication guys and span wires from conductors 4. Communication guys and span wires from guys and span wires	56.4-C 56.4-D1 86.4-C 86.4-D1
(c)	Not applicable between messengers or span wires of the same system. 1. Supply messengers 2. Trolley span wires 3. Communication messengers	57.4-E 77.4-D 87.4-G
(d)	Protection required on guys, span wires, messengers, and cables where within trolley throw 1. Supply Guys and Span wires 2. Supply Messengers and Cables 3. Communication guys and span wires 4. Communication messengers	56.4-B2 57.4-B2 86.4-B2 87.4-B2
(e)	Not applicable to certain conductors supported on trolley span wires. 1. Trolley contact and feeder conductors 2. Trolley feeder conductors 3. Trolley system communication conductors 4. Foreign conductors	74.4-G 78.1 78.2 78.3
(f)	Increased clearance required over trolley contact conductors of 750-7500 volts	74.4-G2
(g)	Shall be increased for conductors of more than 75,000 volts. As required by Table 2 Columns I, J, and K	
(h)	May be reduced for certain conductors of Class T circuits of the same system	74.4-C

(i)	May be reduced for service drops under special conditions. 1. Supply service drops and communication line conductors 2. Supply service drops and communication service drops 3. Communication service drops and supply line conductors 4. Communication service drops and supply service drops	54.8-C1a 54.8-C4 84.8-D1a 84.8-D4
(j)	May be reduced or shall be increased for certain communication conductors or cables. 1. Open wire conductors, attached to poles, within 3 feet of topmost conductor 2. Line conductors of police or fire-alarm circuits and service drops from other communication circuits. 3. Cables and messengers attached to poles	84.4-C1a 84.8-D1b 87.4-C3
(k)	Special clearances for 0-750 volt conductors in rack configuration and messengers and cables attached to poles. 1. Supply conductors of 0-750 volts in rack configuration 2. Supply cables and messengers attached to poles 3. Communication cables and messengers attached to poles 4. On Jointly used poles	54.9 57.4-F 87.4-C3 92.1
(l)	May be reduced for service drops, and police or fire-alarm conductors, under special conditions. 1. Supply service drops and communication line conductors 2. Supply service drops on clearance arms 3. Supply service drops on pole-top extensions 4. Supply service drops and communication service drops 5. Communication service drops and police, fire-alarm or supply line conductors 6. Communication service drops on clearance arms 7. Communication service drops on pole-top extensions 8. Communication service drops and supply service drops 9. Police or fire-alarm conductors	54.8-C1b 54.8-C2 54.8-C3 54.8-C4 84.8-D1b 84.8-D2 84.8-D3 84.8-D4 92.2

(m)	May be reduced for lead wires 1. Supply lead wires above supply conductors 2. Supply drip loops above communication conductors	 54.4-C6 92.1-F3
(n)	May be reduced for supply conductors and private communication conductors of the same ownership	89.2-B
(o)	May be reduced or increased for triangular or vertical configuration or for pole-top construction. 1. Triangular or vertical configuration on crossarms 2. Dead-ended on pole in vertical configuration 3. Conductors of 0-7500 volts in triangular configuration at top of pole 4. Conductors of more than 7500 volts at top of pole	 54.4-C1c 54.4-C4 54.4-D8a 54.4-D8b
(p)	May be reduced for supply service drops of 0-750 volts	54.8-C6
(q)	Shall be increased between circuits where conductors of more than 7500 volts are at pole top.	54.4-D8b
(r)	May be reduced under special conditions 1. Supply conductors of 750-7500 volts 2. Supply conductors of 7500-20,000 volts	 54.4-C1a 54.4-C1b
(s)	Does not apply where conductors do not cross. 1. Supply conductors of different phase polarity 2. Communication conductors	 54.4-C2a 84.4-C1a
(t)	Shall not be applied consecutively both above and below the same supply conductors	54.4-2a
(u)	Shall be increased where conductors of different classifications are supported on the same crossarms. 1. Supply conductors of 0-750 volts and conductors of 7500-20,000 volts 2. Supply conductors of 0-750 volts and conductors of 750-7500 volts	 32.4-A2 32.4-A3
(v)	Not applicable to certain kinds of conductors. 1. Supply conductors of same phase or polarity 2. Insulated supply conductors in multiple-conductor cables 3. Communication insulated conductors or multiple-conductor cables	 54.4-C3c 57.4-C 87.4-C1

(w)	Shall apply radially to conductors on brackets attached to crossarms. 1. Supply conductors 2. Communication conductors	54.4-C3b 84.8-C1b
(x)	Shall be increased between conductors of different classifications supported on the same crossarm. 1. Supply conductors of different voltage classification 2. Supply circuits of 0-750 volts and communication circuits 3. Supply circuits and private communication circuits.	32.4-A 32.4-B 89.2-A
(y)	Special clearances for unprotected supply conductors from one level to another level	54.6-A 58.2-B3 92.1-F5
(z)	Not applicable to the following: 1. Clearances between conductors at different levels specified in Cases 8 to 13 inclusive. 2. Supply lateral conductors, suitably protected 3. Supply vertical runs, suitably protected 4. Supply risers, suitably protected 5. Communication Conductors	54.6-C 54.6-D 54.6-E 87.4-C1
(aa)	Not applicable between cables and their supporting messengers. 1. Supply 2. Communication	57.4-D 87.4-F
(bb)	May be reduced for communication guys and communication conductors supported on the same poles 1. Supply 2. Communication	56.4-C 86.4-C
(cc)	Clearance required between guys. 1. Supply guys, crossing 2. Supply guys, approximately parallel 3. Communication guys, crossing 4. Communication guys, approximately parallel	56.4-D2 56.4-D3 86.4-D2 86.4-D3
(dd)	Shall be increased where within 6 feet of a pole	103.5
(ee)	May be decreased in partial underground distribution	54.4-C4c
(ff)	shall be increased by 0.40 inches per kV in excess of 75 kV	
(gg)	shall be increased by 0.40 inches per kV in excess of 150 kV	
(hh)	shall be increased by 0.40 inches per kV in excess of 300 kV	
(ii)	shall be increased by 0.25 inches per kV in excess of 150 kV	

(jj)	shall be increased by 0.25 inches per kV in excess of 300 kV	
(kk)	proposed clearances to submitted to the CPUC prior to construction for circuits in excess of 550 kV	
(ll)	36-inch clearance applies 35 kV to 68kV 48-inch clearance applies over 68 kV	
(mm)	vertical clearance shall be increased by ½ inch for each kilovolt over 68 kV	
(nn)	The vertical separation between supply conductors and service drops Of 0-750 volts and 20,000-22,500-volt conductors may be reduced to 48 inches.	
(oo)	May be reduced to 72 inches for conductors of 20,000-22,500 volts.	
(pp)	May be reduced to 36 inches vertically at midspan only when the supply conductors consist of abrasion resistant cable with a grounded metallic sheath or neutral–supported cable as specified in Rules 57 and 54.10 .	

Item 4- G.O. 95

Rule 49.2-C2, delete (2) and substitute the following:

(2) Longitudinal Loads Normally Unbalanced: Crossarms subjected to unbalanced longitudinal loads shall have sufficient strength to meet the strength requirements with safety factors at least equal to those specified in Rule 44 .

At unbalanced corners and dead ends in Grades "A", "B" or "C" construction, where conductor tension is held by cantilever strength of pin–type insulators and pins, double crossarms shall be used to permit conductor fastenings at two insulators to prevent slipping. In lieu of double crossarms and double insulators, single crossarms may be used with single insulators and steel pins and prefabricated conductor ties.

For conductor tensions up to 2,000 pounds per conductor, double wood crossarms fitted with spacing devices at each end will be considered as meeting the strength requirements of Rules 47.4 and 47.5 .

Rule 49.3-C2, delete (2) and substitute the following:

(2) Longitudinal Loads Normally Unbalanced : At unbalanced corners and dead ends in Grades "A", "B" or "C" construction, where conductor tension is held by cantilever strength of pin–type insulators and pins, double insulators and wood pins or single insulators and steel pins shall be used. Each line conductor shall be tied or fastened to both insulators, or the single insulator, to prevent slipping of the conductor under maximum working tension with a safety factor of 2 for the temperature and loading conditions specified in Rule 43.

At changes in grade of construction and at end supports in Grades "A" or "B" construction where the conductors are not dead–ended and are supported on pin–type insulators, double insulators and pins with tie wires, or equivalent fastenings, will be considered as meeting the strength requirements of Rules 47.4 and 47.5 for conductor tensions up to 2,000 pounds per conductor.

Item 5 – G.O 95

Rule 52.7-C

After “crossarm” add “and wood poles”

Item 6 – G.O. 95

Rule 52.7-D, delete second paragraph

Rule 54.7-A4 delete forth paragraph and insert after the third paragraph the following three paragraphs:

> "Bolts bonded to or used for the attachment of dead-end hardware of a circuit of any voltage in horizontal (wood crossarm) configuration may project into the climbing space provided they are covered with a suitable non-conducting material as specified in Rule 22.2-F. If such bolts are bonded, a positive electrical contact shall be made.
>
> "The covering of bolts, required by this rule , shall not apply to:
>
> (1) Bolts associated with circuits of 0 to 750 volts at any level on a pole or structure.
>
> (2) Bolts associated with circuits of more than 7,500 volts when located at the top level of a pole.
>
> "No part of any guy contacting or connected to a metal pin or part of dead-end hardware, shall be located in the climbing space."

Add Rule 22.2-F

"F BOLT COVERS made of non-conducting shield or covering shield or covering having the insulating efficiency and mechanical strength of impregnated fiber not less than 5/16 of an inch thick."

Item 7 – G.O. 95

Rule 54.7 – A4, paragraph 2, line 4 delete "one guy" and add "two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches)"

Rule 84.7-E, paragraph 1, line 5 delete "one guy" and add "two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches)"

Rule 54.10-F3, line 6 delete "one guy" and add "two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches)"

Rule 54.11-G, paragraph 2, line 4 delete "one guy" and add "two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches)"

PG&E Deviation, Decision 82-03-020, dated March 2, 1982, Rule 54.9-F, paragraph (c) line 6 delete "one guy" and add "two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches)"

Item 8 – G.O. 95

Rule 20.10, delete entire rule.

Rule 38, Table 2, Case 20, handing delete "Post" and substitute "Vertical and Horizontal." Case 20, delete "post."

Rule 54.7-A, second sentence, delete "post" and "utilized" and add "used without wood crossarms" after "are."

Rule 54.11, in the title delete "Post" and add "the Use of Wood" between "Without" and "Crossarms."

Rule 54.11-A, first paragraph, delete "Post." First and second subparagraphs change "A" to "An" and delete "post." Second subparagraph add "a" ahead of "vertical."

Rule 54.11-B1, line 3, change "54.5-D2" to "54.4-D2"; line 4 delete "post".

Rule 54.11-B2, line 2 delete "on post insulators"; lines 4 and 5, delete "on post insulators." Lines 5 and 6, delete "by post insulators." Paragraph 2, delete "on post insulator."

Rule 54.11-C delete "on post insulators."

Rule 54.11-D delete "on post insulators."

Rule 54.11-E delete "on post insulators."

Rule 54.11-G delete "Post-type"; delete "their attaching brackets" and substitute "attachments".

Rule 54.11-H delete entire rule.

Item 9 – G.O. 95

Rule 54.10-F2, second sentence, after "transformers" add "or similar apparatus" and after "quadrant" add "or on one side of the pole."

Item 10- G.O. 95

Add after Rule 83.3

"Rule 83.4 - Bonding

Where separate communication messengers, or guys, or both, of the same or different ownership, are attached tot the same pole, and they are in proximity to electric supply circuits (see Rule 21.3-D), railway signal circuits or Class T electric railway or trolley circuits, such messengers, or guys, or both, shall be bonded together at frequent intervals (See Rule 83.4-A). For purpose of this rule, communication messengers and guys are those which support Major Class C circuits (see Rule 20.5) and those Minor Class C Circuits which are used for television transmission.

"Where bonding is required, the bond wire or bond strap shall have a conductivity of not less than No. 6 AWG copper wire, and shall be securely attached to the messenger or guy. Such a bond wire or bond strap may be attached tot eh surface of a pole or to the underside of a crossarm using metal staples, but shall in no case be attached to the top surface of any crossarm. Bond wires or bond straps placed in the climbing space shall be covered by a suitable protective covering (see Rule 22.2).

"Communication systems owned by electric utilities are exempt from these requirements."

"A. MESSENGERS ON THE SAME POLE

(1) Bonds are required between separate communication messengers or guys, attached above or below electric supply circuits, railway signal circuits or Class T electric railroad or trolley circuits on same pole line system, at all dead-end poles and at intervals not to exceed 1,500 feet.

(2) Bonds between separate communication messengers on the same pole line system are required at the first pole on either side of the location where such messengers cross over or under electric supply circuits, railway signal circuits or Class T electric railway or trolley circuits.

(3) Bonds are not required between communication messengers or guys which are attached to the same pole by a common bolt.

B MESSENGERS OF DIFFERENT POLE LINE SYSTEMS

Bonding is required between communication messengers or guys, or both, where the pole line systems intersect at a common pole."

Item 11 – G.O. 95

Rule 54.6-E, second paragraph, delete second sentence and add "Such plastic pipe shall be of material as specified in Rule 22.2-C with a minimum nominal pipe size of 1 inch and with a minimum impact strength equal to 2-½" nominal EPC-80-PVC plastic pipe."

Rule 84.6-E, second paragraph, delete second sentence and add "Such plastic pipe shall be of material as specified in Rule 22.2-C with a minimum nominal pipe size of 1 inch and with a minimum impact strength equal to 2-½" nominal EPC-80-PVC plastic pipe."

Item 12 – G.O. 95

Rule 54.4-D7, delete entire rule. Add the following on Page 116 of G.O. 95:

"(7) Note: Rule 54.4-D7 was deleted March 9, 1988 by Resolution No.-3076. Subsequent Rules 54.4-D8 and 9 are not renumbered. This space is intentionally left blank.

Add the following on Page 117 of G.O. 95:

"This space is intentionally left blank."

Rule 54.4-B8a, first paragraph, next to last line, delete all after "conductors."

Rule 54.4-B8b, next to last line, delete all after "optional."

Appendix G of G.O. 95, delete Figures 13 and 14, and add, This page intentionally left blank."

Index (page 392) Dead Ending Supply Conductors, delete 4th line, "Horizontal Configuration --- 54.4-D7 --- 116"

Table 1, (page 50), note dd, special clearance --- delete 3rd line,
"2. Conductors dead-ended in horizontal configuration --- 54.4-D7 --- 116."

Renumber "3." To " 2. Conductors in pole top construction --- 54.4-D8 --- 117"

Item 13 – G.O. 128

Rule 43.3 - Clearances and Depths

Add the following Sub-rules:

C. Depths

Communication cables shall be installed at a minimum depth below the surface under which they are located as follows except as provided in Rule 43.3–D:

(1) Sidewalks, Parkways and Private Property: 12 inches

(2) Thoroughfares: 18 inches

D. EXCEPTIONS

(1) Mechanical Protection: Lesser depth than those listed in Rule 43.3–C may be used where suitable mechanical protection is employed. Suitable mechanical protection shall consist of the following or their equivalents:

(a) Steel conduit or plastic pipe made of unplasticised polyvinyl chloride having the properties and dimensions specified in Type II, High Impact, Normal Chemical Resistance in United States Commercial Standard No. CS 207–60 with a minimum wall thickness of 0.15 inch, or

(b) A layer of concrete at least 3 inches in thickness above the cable.

(2) Terminations, Splices or Other Points of Access: Lesser depths than those listed in Rule 43.3–C are permitted where cables and conductors rise for terminations or splices or where access is otherwise required.

Item 14 - G.O. 128

Rule 41.4-C2

Revise the text to read as follows:

(2) Thoroughfares: Communication duct systems in thoroughfares shall be installed with not less than 18 inches of cover. Where it is not practicable to obtain such cover it may be reduced provided the duct material itself, or additional top protection installed has sufficient strength to protect the system from injury by traffic. The sufficient strength requirement shall be deemed to have been met in paved thoroughfares where the width of the trench is 6 inches or less and a concrete slurry backfill provided of a thickness at least equal to the thickness of the pavement.

Item 15 – G.O. 95

G.O. 95 Typographical, Editing Corrections

	Page	Error or Problem
(1)	1 (top of title page)	Date March 1980" under title should be "March 1981"
(2)	32	Rule 22.2-E "Reference to "Figure 81-A", convert to "Figure 82."
(3)	49, 50	Footnotes to Table 1, Rule 37 (j) 2. Correct Rule 56.4-A page number from 153 to 152 (k) 1. Correct Rule 56.4-A1 page number from 153 to 152. (q) 4. Correct Rule 84.8-C3a page number, from 235 to 234. (q) 5. Correct Rule 84.8-C3b page number, from 235 to 234. (r) 3. Correct Rule 86.4-F page number, from 243 to 242. (u) 6. Add to Rules reference 87.4-D5 – at page 249. (aa) 2. Correct Rule 54.8-F page number, from 140 to 139.
(4)	55	"Footnote" to Table 2, Rule 38. (x) 3. Correct Rule 89.2-A Page number, from 252 to 251. (y) 2. Correct Rule 58.2-B3, page number from 167 to 166.
(5)	67	Table 5, footnote (b). Correct 05.1-1963 to 05.1-1979
(6)	73	Table 6, Depths in Rock Correct: "Total Pole Length (feet)" 30-change 5 to 3 80-change 6-½ to 6
(7)	115	Last sentence of Rule 54.4-D2, correct reference "App, G Figure 88" to App. G, Figure 89
(8)	228	Rule 84.6-D, second paragraph; correct reference from "App. G, Figure 86" to app. G, Figure 87
(9)	244	Title of Rule 86.6-C. Change to: "Guys Exposed to Supply Conductors of 22,500 Volts of More."

(10)	257	Rule 91.3-B, last sentence; correct spelling "interefere" to interfere
(11)	259	Rule 92.1-A Add colon after each 3 categories: Racks Above: Unguarded racks below: Guarded racks below:
(12)	259	Rule 92.1-B. Add colon after each of 3 categories: Cables or messengers above: Unguarded cables or messengers below: Guarded cables or messengers below:
(13)	259	Rule 92.1-B: add word "grounded" between "Unguarded" and cables" in second heading.
(14)	Insert facing 318	Correct publishing date, from "January, 1969" to march 1981.
(15)	350	Figure 39, add Rule 84.8-B2b, under title.
(16)	234	Rule 84.8-B2b, add "see Appendix G, Fig 39."
(17)	377	Figure 84. Delete upper dimension "V" shown between bottom of drip loop and 0-750v conductor level above.
(18)	157	Rule 56.6-D first subparagraph, third line, change "22,500" to "35,500"
(19)	45	Rule 33.3-A, Change Lighting arrestors" to "lighting arresters"
(20)	174	Rule 58.3-C3, fifth paragraph, second sub-paragraph, first line, change "windings" to "winding".
(21)	32	Rule 22.2-A, change "Fig 82" to "Fig 83".
(22)	248	Rule 87.4-C3, second paragraph. Last line, change "Fig. 84" to "Fig. 85".
(23)	224	Rule 84.4-D1, last line, change "Fig. 84" to "Fig. 85".
(24)	31	Rule 21.10, change "Fig. 87" to "Fig. 88".
(25)	4	Table 15, page reference, change "237" to "236"
(26)	4	Table 16, page reference, change "247" to "246"
(27)	113	Rule 54.4-C4c, first sub-paragraph change "Fig. 88" to "Fig. 89".
(28)	382	Figure 89, add to title reference: add Rule 54.4-C4c".
(29)	388	Climbing Space, Allowable Obstruction, change page "131" to "130"
(30)	148	Rule 54.11-B(1) Clearance, third line, change "54.4-D2" to "54.4-D2".
(31)	394	Index, Grounding, Requirements for –

		continued, 11th line, Transformer Cases, add "58.3-C3" and page "173".
(32)	299	Appendix D, Guys at the end of the last sentence, change "Fig. 85" to "Fig. 86".
(33)	90	Section Contents, Section V, delete the entry for Rule 54.11-H.
(34)	21	Section Contents, Section II delete the entry for Rule 20.10.
(35)	386	Index, Bonds (or Bonding) 10th line, change "on Post Insulator Construction" to "Vertical Circuits Bonded Together".
(36)	388	Index, Climbing Space, 8th line, change "on Post Insulator Construction" to "Vertical Circuits Bonded Together".
(37)	389	Index, Conductor or (Conductors), 2nd line, change the entry to "arrangement Without Wood Crossarms – Rule No. 54.11-B2 – page 148".
(38)	390	Index, Conductor Clearances, 24th line, change the entry to "On Insulators Without Wood Crossarms – Rule No. 54.11-E – page 148".
(39)	396	Index, Hardware, 1st line, change the entry to "Construction without Wood Crossarms".
(40)	396	Index, 18th and 19th lines, delete entry "Horizontal Post Insulator – Definition – Rule No. 54.11-A—page 147".
(41)	401	Index, 24th line, delete entry "pin Type Insulator – Rule No. 54.11-H – page 150".
(42)	402	Index, 25th line to 43rd line, delete headings "Post Insulator" and "post Insulator Position" and all sub-headings under them.
(43)	396	Index, Insulators, 3rd to 5th lines, delete the entries for "Pin Type (see Post Insulators)".
(44)	408	Index, Triangular Configuration of Configuration of Conductors, 3rd line, change "On Post Insulators" to "On Pole Mounted Insulators".
(45)	409	Index, Vertical Configuration, 3rd line, change "on post insulators" to "On Pole Mounted Insulators".
(46)	409	Index, Vertical Post Insulator, change the word "post" to "Mount".
(47)	390	Index, Conductor Insulators, delete sub-heading, "post Type (see Post Insulators)".
(48)	388	Index, Clearances, delete "post

		Insulator".
(49)	396	Index, add the following entry: Insulators Without the Use of Wood Crossarms Attachment – 54.11-B2 – 148 Bonding – 54.11-F3 – 149 Clearances – 54.11-B1- 148 54.11-E – 148 Climbing Space – 54.11-F –148 Conductor Arrangement – 54.11-B2-148 Conductor Spacing – Table 2 – 53 Case 20, -148 54.11-D Hardware – 54.11-B1 – 148 Horizontal Position – Definition – 54.11-A – 147 Hotline Methods – 54.11-F1a – 149 54.11-F2a –149 Triangular Configuration – 54.11-B – 148 Vertical Clearance Between Levels – Table 2, - 52 - 54.11-E, - 148 Vertical Position – Definition – 54.11-A – 147
(50)	48	Table 1, Case 10, Column B, delete "(OO)"
(51)	49, 50	References to Rules Modifying Minimum Clearances in Table 1, Ref (U)6, add "87.4-D5" page "249;" Ref. (ss) change "to" to "for."
(52)	138	Rule 54.8-D1, 3rd line, place "unattached" in parentheses and delete "shall clear;" 4th line delete comma after "poles;" 5th line delete semicolon and add "shall clear" after fixtures;" 6th line delete semicolon; 8th line after "extend" add "not less than."
(53)	144	Rule 54.10-B6, 2nd line place "unattached" in parentheses; 3rd line delete "shall clear" and comma after "pole;" 5th line delete semicolon after "fixtures;" 5th and 6th lines delete "a radial distance of 15 inches as specified in Table 1, Case 10, Column D" and substitute " … may have a clearance less than 36 inches specified in Table 1, Case 10, Column D, but shall have a clearance of not less than 15 inches, …"; 8th line after "extend" add "not less than."
(54)	163	Rule 57.4-H, 1st line, delete "passing

		unattached;" 2nd line substitute "passing (unattached);" 4th line delete semicolon; 4th, 5th and 6th lines delete "a radial distance of 15 inches as specified in Table 1 Case 10, Column D" and substitute "… may have a clearance of less than 36 inches specified in Table 1, Case 10, Column D, but shall have a clearance of not less than 15 inches, … "; 8th line after "extended" and "mot less than."
(55)	226	Rule 84.4-D, 2nd line place "unattached" in parentheses; 3rd line delete "to;" 4th line delete comma after "poles;" 6th line delete semicolon; 9th line after "extend" add "not less than."
(56)	238	Rule 84.8-E1, 3rrd line place "unattached" in parentheses and delete "shall clear;" 4th line delete comma after "poles;" 5th line delete semicolon and add "shall clear" after "fixtures;" 6th line delete semicolon; 8th line after "extend" add "not less than."
(57)	224	Rule 84.4-D1, last line change "Fig. 84" to "fig 85."
(58)	249	Rule 87.4-D5 change "Conductors" to "Cables or Messengers."

GO 95 - Strikeout and Underline section added August 15, 2002 by Raymond Fugere

Original Version

Rule 15

15 Exemptions or Modifications

If, in a particular case or a special type of construction, exemption from modifications of any of the requirements herein is desired, the Commission will consider an application for such exemption or modification when accompanied by a full statement of conditions existing and the reasons why such exemption or modification is asked and is believed to be justifiable. It is to be understood that, unless otherwise ordered, any exemption of modification so granted shall be limited to the particular case of the special type of construction covered by application.

Strikeout and Underline Version

Rule 15

15 Exemptions or Modifications

15.1 Changes and Special Installations

If, in a particular case or a special type of construction, exemption from or modification of any of the requirements herein is desired, the Commission will consider an application for such exemption or modification when accompanied by a full statement of conditions existing and the reasons why such exemption or modification is asked and is believed to be justifiable. It is to be understood that, unless otherwise ordered, any exemption or modification so granted shall be limited to the particular case or special type of construction covered by the application.

15.2 Experimental Installations

It is the intent of this rule to assist in advancements or changes in the art without mitigation of safety. For this purpose, experimental installations which deviate from one or more of these rules may be made provided: Precautions are taken to secure safety to property and to persons engaged in the construction, maintenance, and operation of overhead systems, and to the public in general; and a full statement of the conditions involved in such experimental installation is filed with the Commission not less than 15 days prior to experimental modification of facilities or construction of any experimental facilities. Where such experimental modification or construction would result in clearances or protection other than provided by these rules, a copy of such statement shall concurrently be mailed to all utilities, local agencies or persons likely to be affected by such installation.

15.3 Notification

For the purpose of keeping these rules up to date and reflecting the latest state of the art, the Commission shall, at appropriate times, advise interested parties of exemptions or modifications granted and notifications received under the provisions of Rules 15.1 and 15.2."

Final Version

Rule 15

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Original Version

Rule 20.10

20.10 **Post Insulators** means a horizontal or vertical self-supporting insulator that provide suitable insulation for the voltage involved and is mounted with attaching hardware on the pole or structure to support a single conductor (Refer to Rule 20.8 for definition of conductor).

Strikeout and Underline Version
Rule 20.10

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Final Version
Rule 20.10

20.10 Rule Deleted

Original Version
Rule 22.2-F

22.2-F New Rule

Strikeout and Underline Version
Rule 22.2-F

22.2-F <u>BOLT COVERS made of non-conducting shield or covering shield or covering having the insulating efficiency and mechanical strength of impregnated fiber not less than 5/16 of an inch thick.</u>

Final Version
Rule 22.2-F

22.2-F BOLT COVERS made of non-conducting shield or covering shield or covering having the insulating efficiency and mechanical strength of impregnated fiber not less than 5/16 of an inch thick.

Original Version
Rule 37

37 Minimum Clearances of Wires Above Railroads, Thoroughfares, Buildings, Etc.

Clearance between overhead conductors, guys, messengers or trolley span wires and tops of rails, surfaces of thoroughfares or other generally accessible areas across, along or above which any of the former pass; also clearances between conductors, guys, structures, or other objects, shall not be less than those set forth in Table 1, at a Temperature of 60°F and no wind.

The clearance specified in Table 1, Case 1, shall in no case be reduced more than 5% below the tabular values because of temperature and loading as specified in Rule 43. The clearances specified in Table 1, Cases 2 to 10 inclusive, shall in no case be reduced more than 10% below the tabular values because of temperature and loading as specified in Rule 43.

Where supply conductors are supported by suspension insulators at crossings over railroads which transport freight cars, the initial clearances shall be sufficient to prevent reduction to clearances less than 95% of the clearances specified in Table 1, Case 1 through the breaking of a conductor in either of the adjoining spans.

Where conductors, dead ends, and metal pins are concerned in any clearance specified in these rules, all clearances of less than 5 inches shall be applicable from surface of conductors (not including tie wires), dead ends, and metal pins, except clearances between surface of crossarm and conductors supported on pins and insulators (referred to in Table 1, Case 9) in which case the minimum clearance specified shall apply between center line of conductor and surface of crossarm or other line structure on which the conductor is supported.

All clearances of 5 inches or more shall be applicable from the center lines of conductors concerned.

Strikeout and Underline Version
Rule 37

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The clearances specified in Table 1, Cases 11, 12 and 13, shall in no case be reduced below the tabular values because of temperatures and loading as specified in Rule 43.

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All clearances of 5 inches or more shall be applicable from the center lines of conductors concerned.

Original Version

Table 1

Basic Minimum Allowable Vertical Clearance of Wire Above Railroads, Thoroughfares and Ground; Also clearances from Poles, Buildings, Structures or Other Objects(nn)
(Letter References Denote Modifications of Minimum Clearances as Referred to in Note Following this Table)

Case No	Nature of Clearance	Wire or Conductor Concerned						
		A Span wires other than trolley span wires), overhead guys and messengers	B Communication conductors (including open wire, cables and service drops), supply service drops of 0-750 volts	C Trolley Contact, feeder and span wires 0-5000 volts	D Supply conductors of 0-750 volts and supply cables treated as in Rule 57.8	E Supply Conductors and supply cables, 750-22,500 volts	F Supply Conductors and supply cables 22.5 – 300 kV	G (mm) Supply Conductors and supply cables more 300 - 550 kV
1	Crossing above tracks of railroads which transport or propose to transport freight cars (max height 15 ft 1in) where not operated by overhead contact wires (a) (b) (c) (d)	25 ft	25 ft	22 ft	25 ft	28 ft	34 ft	34 ft
2	Crossing or paralleling above tracks of railroads operated by overhead trolleys (b) (c) (d)	26 ft (e)	26 ft (e) (f) (g)	19 ft (h) (i)	27 ft (e) (g)	30 ft (g)	34 ft (g)	34 ft (g) (kk)
3	Crossing or along thoroughfares in Urban districts or crossings thoroughfares in rural districts (c) (d)	18 ft (j) (k) (ii)	18 ft (j) (l) (m) (ii)	19 ft (hh)	20 ft (ii)	25 ft (n) (o) (ii)	30 ft (o) (ii)	30 ft (o) (ii) (kk)
4	Above ground along thoroughfares in rural districts or across other areas capable of being transversed by vehicles or agricultural equipment.	15 ft (k)	15 ft (m) (n) (p)	19 ft	16 ft	25 ft (n) (o)	30 ft (o) (p)	30 ft. (o) (kk)
5	Vertical ground in areas accessible to pedestrians only.	7 ft	10 ft (m) (q)	19 ft	12 ft	17 ft	25 ft (o)	25 ft. (o) (kk)
6	Vertical clearance above buildings and bridges (or other structures which do not ordinarily support conductors and on which men can walk) whether attached or unattached.	8 ft (r)	8 ft (r)	8 ft	8 ft	12 ft	12 ft	20 ft (ll)
7	Horizontal clearance of conductor from buildings (except generating and substations),	----------	3 ft (u)	3 ft	3 ft (u) (v)	6 ft (v)	6 ft (v)	15 ft (v)

	bridges or other structures (upon which men may work) where such conductor is not attached thereto. (a) (t)							
8	Distance of conductor from center line of pole, wheter attached or unattached (w) (x) (y)	----------	15 in (a) (aa)	15 in (aa) (bb) (cc)	15 in (o) (aa) (dd)	15 or 18 in (o) (dd) (ee) (jj)	18 in (dd) (ee) (jj)	Not Applicable
9	Distance of conductor from surface of pole, crossarm or other overhead line structure upon which it is supported, providing it complies with Case 8 above (x) (ee)	----------	3 in (aa) (ff)	3 in (aa) (cc) (gg)	3 in (aa) (dd) (gg)	3 in (dd) (gg)	¼ pin spacing shown in Table 2 Case 15 (dd)	½ pin spacing shown in Table 2 Case 15 (dd)
10	Radial centerline clearance of conductor or cable (unattached) from non-climbable street lighting or traffic signal poles or standards, including mastarms, brackets and lighting fixtures.	----------	1 ft (oo) (u) (rr) (ss)	15 in. (bb) (cc)	3 ft (oo)	6 ft (pp)	10 ft (qq)	10 ft (ll)

(a)	Shall not be reduced more than 5% because of temperature or loading 1. Supply Lines 2. Communication Lines	37 54.4-B1 84.4-B1
(b)	Shall be increased for supply conductors on Suspension insulators, under certain conditions	37
(c)	Special clearances are provided for traffic signal equipment	58.1-C
(d)	Special clearances are provided for street lighting equipment	58.2-B
(e)	Based on trolley pole throw of 26 feet. May be reduced where suitably protected. 1. Supply Guys 2. Supply cables and messengers 3. Communication Guys 4. Communication cables and messengers	 56.4-B2 57.4-B2 86.4-B2 87.4-B2
(f)	May be reduced depending on height of trolley contact conductors. 1. Supply Service Drop 2. Communication service drops	 54.8-C5 84.8-D5
(g)	May be reduced and shall be increased depending on trolley throw 1. Supply conductors (except service drops) 2. Communication conductors (except service drops)	 54.4-B2 84.4-B2
(h)	Shall be increase where freight cars are transported. 1. Trolley contact and feeder conductors 2. Trolley span wires	 74.4-B1 77.4-A
(i)	May be reduced for trolley contact and span wires in subways, tunnels and under bridges 1. Trolley contact conductors 2. Trolley span wires	 74.4-E 77.4-A
(j)	May be reduced at crossings over private thoroughfares and entrances to private property and over private property. 1. Supply Service drops 2. Supply Guys 3. Communication service drops 4. Communication guys	 54.8-B2 56.4-A 84.8-C2 86.4-A
(k)	May be reduced along thoroughfares where not normally accessible to vehicles. 1. Supply Guys 2. Communication Guys	 56.4-A1 86.4-A1
(l)	May be reduced where within 12 feet of curb line of public thoroughfares 1. Supply Service drops 2. Communication service drops	 54.8-B1 84.8-C1
(m)	May be reduced for railways signal cables under special	84.4-A4

	conditions	
(n)	May be reduced in rural districts 1. Supply conductors, 750- 20,000 volts, crossing roads or driveways 2. Supply conductors, 750-2000 volts, above agricultural areas and along roads 3. Communication conductors along roads	 54.4-A2a 54.4-A2b 84.4-A2
(o)	May be reduced for transformer, regulator or capacitor leads. 1. Transformer Leads 2. Regulator or Capacitor Leads	 58.3-B 58.4-B
(p)	May be reduced across arid or mountainous areas 1. Supply Conductors of more than 750- 22,500 Volts 2. Communication conductors	 54.4-A1 84.4-A1
(q)	Shall be increased or may be reduced under special conditions. 1. Increased for supply service drops on industrial or commercial premises 2. Supply service drops on residential premises 3. Communication conductors 4. Increased for Communication service drops on industrial or commercial premises 5. Communication service drops on residential premises	 54.8-B3a 54.8-B3b 84.4-A3 84.8-C3a 84.8-C3b
(r)	May be reduced above roofs of buildings under special conditions 1. Supply overhead guys 2. Supply service drops 3. Communication overhead guys 4. Communication conductors and cables 5. Communication service drops	 56.4-G 54.8-B4 86.4-F 84.4-E 84.8-C4
(s)	Also applies at fire escapes, etc. 1. Supply Conductors 2. Supply service drops on industrial or commercial premises 3. Supply service drops on residential premises 4. Communication Conductor	 54.4-H1 54.8-B4a 54.8-B4b 84.4-E
(t)	Special Clearances where attached to buildings, bridges or other structures 1. Supply conductors of 750-750- 22,500 volts 2. Trolley Contact Conductors 3. Communication Conductors	 54.4-H2 74.4-E 84.4-F
(u)	Reduced clearances permitted under special conditions 1. Supply service drops on industrial or commercial premises 2. Supply cables, grounded 3. Communication cables beside buildings, etc.	 54.8-B4a 57.4-G 84.4-E

	4. Communication conductors under bridges, etc. 5. Communication service drops. 6. Communication cables passing non-climbable streetlight poles, etc	84.4-F 84.8-C4 84.4-D4a
(v)	May be reduced under special conditions. 1. Supply conductors of 750-7500 volts 2. Supply transformer lead and bus wires where guarded	 54.4-H1 58.3-B2
(w)	May be reduced at angles in lines and transportation points 1. Supply conductors 2. Communication Conductors	 54.4-D1 84.4-D5
(x)	May be reduced for suitably protected lateral or vertical runs. 1. Supply bond wires 2. Supply ground wires 3. Supply lateral conductors 4. Supply vertical pins 5. Supply risers 6. Communication Ground Wires 7. Communication lateral conductors 8. Communication vertical runs 9. Communication risers	 53.4 54.6-B 54.6-C 54.6-D 54.6-E 84.6-B 84.6-C 84.6-D 84.6-E
(y)	Increased clearances for certain conductors 1. Unattached conductors on colinear lines and crossing lines 2. Unattached supply conductors 3. Supply Service drops on clearance crossarms 4. Supply Service drops on pole top extensions 5. Unattached Supply service drops 6. Communication lines, collinear, conflicting or crossing rs passing supply poles and unattached thereto 8. Communication service drops on clearance crossarms 9. Communication service drops on pole top extensions 10. Unattached Communication service drops	 32.3 54.4D3 54.8-C2 54.8-C3 54.8-D 84.4-D3 84.4-D4 84.8-D2 84.8-D3 84.8-E
(z)	Special provisions for police and fire alarm conductors require increased clearances	 92.2
(aa)	May be reduced under special provisions. 1. Supply conductors of 0-750 volts in rack configuration 2. Supply service drops from racks 3. Supply cables and messengers attached to poles 4. Communication conductors on communication poles 5. Communication conductors on crossarms 6. Communication conductors attached to poles 7. Communication service drops attached to poles 8. Communication cables and messengers 9. Supply or communication cables and messengers	 54.4-D5 54.8-F 57.4-F 84.4-D 84.4-D1 84.4-D2 84.8-B 87.4-D

	on jointly used poles 10. Communication service drops on pole top extensions	92.1-B 92.1-C
(bb)	May be reduced for Class T conductors of not more than 750 volts and of the same potential and polarity	74.4-D
(cc)	Not applicable to trolley span wires	77.4-E
(dd)	Special clearances for pole-top and dead-end construction 1. Conductors dead-ended in vertical configuration on poles 2. Conductors dead-ended in horizontal configuration 3. Conductors in pole-top construction	 54.4-C4 54.4-D7 54.4-D8
(ee)	Clearance requirements for certain voltage classifications	54.4-D2
(ff)	Not applicable to communication conductors	84.4-D
(gg)	Clearance from crossarms may be reduced for certain conductors 1. Suitably insulated leads to protected runs 2. Leads of 0-5000 volts to equipment 3. Leads of 0-5000 volts to cutouts or switches	 54.4-E 54.4-E 58.5-C
(hh)	Reduced clearance permitted from temporary fixtures and lighting circuits 0-300 volts	78.3A(1)
(ii)	Special Clearances Required Above Public and Private Swimming Pools: 1. Supply line conductors 2. Supply service drops 3. Communication line conductors 4. Communication service drops 5. Supply guys, span wires 6. Communication guys	 54.4–A4 54.8–B5 84.4–A5 84.8–C5 56.4–A3 86.4–A3
(jj)	May be decreased in partial underground distribution	54.4-D2
(kk)	Shall be increased by 0.025 ft. per kV in excess of 300 kV.	
(ll)	Shall be increased by 0.04 ft. per kV in excess of 300 kV.	
(mm)	proposed clearances to be submitted tot the CPUC prior to construction for circuits in excess of 550 kV.	
(nn)	Voltage shown in the table shall mean line – to – ground voltage for direct current (DC) systems.	
(oo)	May be reduced for grounded or multi-conductor cables. 1. Grounded cables 2. Multi-Conductor cables	 57.4-H 54.10-B6
(pp)	May be reduced to 4 feet for voltages below 7,500 volts	54.4-D3
(qq)	May be reduced to 6 feet for voltages below 75 kV	
(rr)	May be reduced for supply service drops	54.8-D1
(ss)	May be reduced to communication service drops	84.4-E1

Strikeout and Underline Version

Table 1

Basic Minimum Allowable Vertical Clearance of Wire Above Railroads, Thoroughfares ,~~and~~ Ground or Water Surface; Also clearances from Poles, Buildings, Structures or Other Objects(nn)

(Letter References Denote Modifications of Minimum Clearances as Referred to in Note Following this Table)

Case No	Nature of Clearance	Wire or Conductor Concerned						
		A Span wires other than trolley span wires), overhead guys and messengers	B Communication conductors (including open wire, cables and service drops), supply service drops of 0-750 volts	C Trolley Contact, feeder and span wires 0-5000 volts	D Supply conductors of 0-750 volts and supply cables treated as in Rule 57.8	E Supply Conductors and supply cables, 750-22,500 volts	F Supply Conductors and supply cables 22.5 – 300 kV	G (mm) Supply Conductors and supply cables more 300 - 550 kV
1	Crossing above tracks of railroads which transport or propose to transport freight cars (max height 15 ft 1in) where not operated by overhead contact wires (a) (b) (c) (d)	25 ft	25 ft	22 ft	25 ft	28 ft	34 ft	34 ft
2	Crossing or paralleling above tracks of railroads operated by overhead trolleys (b) (c) (d)	26 ft (e)	26 ft (e) (f) (g)	19 ft (h) (i)	27 ft (e) (g)	30 ft (g)	34 ft (g)	34 ft (g) (kk)
3	Crossing or along thoroughfares in Urban districts or crossings thoroughfares in rural districts (c) (d)	18 ft (j) (k) (ii)	18 ft (j) (l) (m) (ii)	19 ft (hh)	20 ft (ii)	25 ft (n) (o) (ii)	30 ft (o) (ii)	30 ft (o) (ii) (kk)
4	Above ground along thoroughfares in rural districts or across other areas capable of being transversed by vehicles or agricultural equipment.	15 ft (k)	15 ft (m) (n) (p)	19 ft	16 ft	25 ft (n) (o)	30 ft (o) (p)	30 ft. (o) (kk)
5	Vertical ground in areas accessible to pedestrians only.	7 ft	10 ft (m) (q)	19 ft	12 ft	17 ft	25 ft (o)	25 ft. (o) (kk)
6	Vertical clearance above buildings and bridges (or other structures which do not ordinarily support conductors and on which men can walk) whether attached or unattached.	8 ft (r)	8 ft (r)	8 ft	8 ft	12 ft	12 ft	20 ft (ll)
7	Horizontal clearance of conductor from buildings (except	----------	3 ft (u)	3 ft	3 ft (u) (v)	6 ft (v)	6 ft (v)	15 ft (v)

	generating and substations), bridges or other structures (upon which men may work) where such conductor is not attached thereto. (a) (t)							
8	Distance of conductor from center line of pole, wheter attached or unattached (w) (x) (y)	----------	15 in (a) (aa)	15 in (aa) (bb) (cc)	15 in (o) (aa) (dd)	15 or 18 in (o) (dd) (ee) (jj)	18 in (dd) (ee) (jj)	Not Applicable
9	Distance of conductor from surface of pole, crossarm or other overhead line structure upon which it is supported, providing it complies with Case 8 above (x) (ee)	----------	3 in (aa) (ff)	3 in (aa) (cc) (gg)	3 in (aa) (dd) (gg)	3 in (dd) (gg)	¼ pin spacing shown in Table 2 Case 15 (dd)	½ pin spacing shown in Table 2 Case 15 (dd)
10	Radial centerline clearance of conductor or cable (unattached) from non-climbable street lighting or traffic signal poles or standards, including mastarms, brackets and lighting fixtures.	----------	1 ft (oo) (u) (rr) (ss)	15 in. (bb) (cc)	3 ft (oo)	6 ft (pp)	10 ft (qq)	10 ft (ll)
11	Water areas not suitable for sailboating (tt) (uu) (ww) (xx)	15′	15′	---	15′	17′	25′	25′ (kk)
12	Water areas suitable for sailboating, surface area of: (tt) (vv) (ww) (xx) (a) Less Than 20 acrea (b) 20 to 200 acres (c) Over 200 to 2,000 acres (d) Over 2,000 acres	 18′ 26′ 32′ 38′	 18′ 26′ 32′ 38′	 --- --- --- ---	 18′ 26′ 32′ 38′	 20′ 28′ 34′ 40′	 27′ 35′ 41′ 47′	 27′ (kk) 35′ (kk) 41′ (kk) 47′ (kk)

(a)	Shall not be reduced more than 5% because of temperature or loading 1. Supply Lines 2. Communication Lines	37 54.4-B1 84.4-B1
(b)	Shall be increased for supply conductors on Suspension insulators, under certain conditions	37
(c)	Special clearances are provided for traffic signal equipment	58.1-C
(d)	Special clearances are provided for street lighting equipment	58.2-B
(e)	Based on trolley pole throw of 26 feet. May be reduced where suitably protected. 1. Supply Guys 2. Supply cables and messengers 3. Communication Guys 4. Communication cables and messengers	 56.4-B2 57.4-B2 86.4-B2 87.4-B2
(f)	May be reduced depending on height of trolley contact conductors. 1. Supply Service Drop 2. Communication service drops	 54.8-C5 84.8-D5
(g)	May be reduced and shall be increased depending on trolley throw 1. Supply conductors (except service drops) 2. Communication conductors (except service drops)	 54.4-B2 84.4-B2
(h)	Shall be increase where freight cars are transported. 1. Trolley contact and feeder conductors 2. Trolley span wires	 74.4-B1 77.4-A
(i)	May be reduced for trolley contact and span wires in subways, tunnels and under bridges 1. Trolley contact conductors 2. Trolley span wires	 74.4-E 77.4-A
(j)	May be reduced at crossings over private thoroughfares and entrances to private property and over private property. 1. Supply Service drops 2. Supply Guys 3. Communication service drops 4. Communication guys	 54.8-B2 56.4-A 84.8-C2 86.4-A
(k)	May be reduced along thoroughfares where not normally accessible to vehicles. 1. Supply Guys 2. Communication Guys	 56.4-A1 86.4-A1
(l)	May be reduced where within 12 feet of curb line of public thoroughfares 1. Supply Service drops 2. Communication service drops	 54.8-B1 84.8-C1
(m)	May be reduced for railways signal cables under special	84.4-A4

	conditions	
(n)	May be reduced in rural districts 1. Supply conductors, 750- 20,000 volts, crossing roads or driveways 2. Supply conductors, 750-2000 volts, above agricultural areas and along roads 3. Communication conductors along roads	 54.4-A2a 54.4-A2b 84.4-A2
(o)	May be reduced for transformer, regulator or capacitor leads. 1. Transformer Leads 2. Regulator or Capacitor Leads	 58.3-B 58.4-B
(p)	May be reduced across arid or mountainous areas 1. Supply Conductors of more than 750- 22,500 Volts 2. Communication conductors	 54.4-A1 84.4-A1
(q)	Shall be increased or may be reduced under special conditions. 1. Increased for supply service drops on industrial or commercial premises 2. Supply service drops on residential premises 3. Communication conductors 4. Increased for Communication service drops on industrial or commercial premises 5. Communication service drops on residential premises	 54.8-B3a 54.8-B3b 84.4-A3 84.8-C3a 84.8-C3b
(r)	May be reduced above roofs of buildings under special conditions 1. Supply overhead guys 2. Supply service drops 3. Communication overhead guys 4. Communication conductors and cables 5. Communication service drops	 56.4-G 54.8-B4 86.4-F 84.4-E 84.8-C4
(s)	Also applies at fire escapes, etc. 1. Supply Conductors 2. Supply service drops on industrial or commercial premises 3. Supply service drops on residential premises 4. Communication Conductor	 54.4-H1 54.8-B4a 54.8-B4b 84.4-E
(t)	Special Clearances where attached to buildings, bridges or other structures 1. Supply conductors of 750-750- 22,500 volts 2. Trolley Contact Conductors 3. Communication Conductors	 54.4-H2 74.4-E 84.4-F
(u)	Reduced clearances permitted under special conditions 1. Supply service drops on industrial or commercial premises 2. Supply cables, grounded 3. Communication cables beside buildings, etc.	 54.8-B4a 57.4-G 84.4-E

	4. Communication conductors under bridges, etc. 5. Communication service drops. 6. Communication cables passing non-climbable streetlight poles, etc	84.4-F 84.8-C4 84.4-D4a
(v)	May be reduced under special conditions. 1. Supply conductors of 750-7500 volts 2. Supply transformer lead and bus wires where guarded	 54.4-H1 58.3-B2
(w)	May be reduced at angles in lines and transportation points 1. Supply conductors 2. Communication Conductors	 54.4-D1 84.4-D5
(x)	May be reduced for suitably protected lateral or vertical runs. 1. Supply bond wires 2. Supply ground wires 3. Supply lateral conductors 4. Supply vertical pins 5. Supply risers 6. Communication Ground Wires 7. Communication lateral conductors 8. Communication vertical runs 9. Communication risers	 53.4 54.6-B 54.6-C 54.6-D 54.6-E 84.6-B 84.6-C 84.6-D 84.6-E
(y)	Increased clearances for certain conductors 1. Unattached conductors on colinear lines and crossing lines 2. Unattached supply conductors 3. Supply Service drops on clearance crossarms 4. Supply Service drops on pole top extensions 5. Unattached Supply service drops 6. Communication lines, collinear, conflicting or crossing rs passing supply poles and unattached thereto 8. Communication service drops on clearance crossarms 9. Communication service drops on pole top extensions 10. Unattached Communication service drops	 32.3 54.4D3 54.8-C2 54.8-C3 54.8-D 84.4-D3 84.4-D4 84.8-D2 84.8-D3 84.8-E
(z)	Special provisions for police and fire alarm conductors require increased clearances	 92.2
(aa)	May be reduced under special provisions. 1. Supply conductors of 0-750 volts in rack configuration 2. Supply service drops from racks 3. Supply cables and messengers attached to poles 4. Communication conductors on communication poles 5. Communication conductors on crossarms 6. Communication conductors attached to poles 7. Communication service drops attached to poles 8. Communication cables and messengers 9. Supply or communication cables and messengers	 54.4-D5 54.8-F 57.4-F 84.4-D 84.4-D1 84.4-D2 84.8-B 87.4-D

	on jointly used poles 10. Communication service drops on pole top extensions	92.1-B 92.1-C
(bb)	May be reduced for Class T conductors of not more than 750 volts and of the same potential and polarity	74.4-D
(cc)	Not applicable to trolley span wires	77.4-E
(dd)	Special clearances for pole-top and dead-end construction 1. Conductors dead-ended in vertical configuration on poles 2. ~~Conductors dead-ended in horizontal configuration~~ ~~3~~. Conductors in pole-top construction	 54.4-C4 ~~54.4-D7~~ 54.4-D8
(ee)	Clearance requirements for certain voltage classifications	54.4-D2
(ff)	Not applicable to communication conductors	84.4-D
(gg)	Clearance from crossarms may be reduced for certain conductors 1. Suitably insulated leads to protected runs 2. Leads of 0-5000 volts to equipment 3. Leads of 0-5000 volts to cutouts or switches	 54.4-E 54.4-E 58.5-C
(hh)	Reduced clearance permitted from temporary fixtures and lighting circuits 0-300 volts	78.3A(1)
(ii)	Special Clearances Required Above Public and Private Swimming Pools: 1. Supply line conductors 2. Supply service drops 3. Communication line conductors 4. Communication service drops 5. Supply guys, span wires 6. Communication guys	 54.4–A4 54.8–B5 84.4–A5 84.8–C5 56.4–A3 86.4–A3
(jj)	May be decreased in partial underground distribution	54.4-D2
(kk)	Shall be increased by 0.025 ft. per kV in excess of 300 kV.	
(ll)	Shall be increased by 0.04 ft. per kV in excess of 300 kV.	
(mm)	proposed clearances to be submitted tot the CPUC prior to construction for circuits in excess of 550 kV.	
(nn)	Voltage shown in the table shall mean line – to – ground voltage for direct current (DC) systems.	
(oo)	May be reduced for grounded or multi-conductor cables. 1. Grounded cables 2. Multi-Conductor cables	 57.4-H 54.10-B6
(pp)	May be reduced to 4 feet for voltages below 7,500 volts	54.4-D3
(qq)	May be reduced to 6 feet for voltages below 75 kV	
(rr)	May be reduced for supply service drops	54.8-D1
(ss)	May be reduced to communication service drops	84.4-E1

(tt)	Where a federal agency or surrogate thereof has issued a crossing permit, clearances of that permit shall govern.	
(uu)	Or Where sailboating is prohibited and where other boating activities are allowed	
(vv)	Clearance above contiguous ground shall be 5 feet greater than in cases 11 or 12 for the type of water area served for boat launch facilities and for area contiguous thereto, that are posted, designated or specifically prepared for rigging of sailboats or other watercraft.	
(ww)	For controlled impoundments, the surface areas and corresponding clearances shall be based upon the high water level. for other waters, the surface area shall be that enclosed by its annual flood level. the clearance over rivers, streams and canals shall be based upon the largest surface areas of any one–mile long segment which includes the crossing. the clearance over a canal, river or stream normally used to provide access for sailboats to a larger body of water shall be the same as that required for the larger body of water	
(xx)	Water areas are lakes, ponds, reservoirs, tidal waters, rivers, streams and canals without surface obstructions	

Final Version

Table 1

Basic Minimum Allowable Vertical Clearance of Wire Above Railroads, Thoroughfares , Ground or Water Surface; Also clearances from Poles, Buildings, Structures or Other Objects(nn)
(Letter References Denote Modifications of Minimum Clearances as Referred to in Note Following this Table)

Case No	Nature of Clearance	Wire or Conductor Concerned						
		A Span wires other than trolley span wires), overhead guys and messengers	B Communication conductors (including open wire, cables and service drops), supply service drops of 0-750 volts	C Trolley Contact, feeder and span wires 0-5000 volts	D Supply conductors of 0-750 volts and supply cables treated as in Rule 57.8	E Supply Conductors and supply cables, 750-22,500 volts	F Supply Conductors and supply cables 22.5 – 300 kV	G (mm) Supply Conductors and supply cables more 300 - 550 kV
1	Crossing above tracks of railroads which transport or propose to transport freight cars (max height 15 ft 1in) where not operated by overhead contact wires (a) (b) (c) (d)	25 ft	25 ft	22 ft	25 ft	28 ft	34 ft	34 ft
2	Crossing or paralleling above tracks of railroads operated by overhead trolleys (b) (c) (d)	26 ft (e)	26 ft (e) (f) (g)	19 ft (h) (i)	27 ft (e) (g)	30 ft (g)	34 ft (g)	34 ft (g) (kk)
3	Crossing or along thoroughfares in Urban districts or crossings thoroughfares in rural districts (c) (d)	18 ft (j) (k) (ii)	18 ft (j) (l) (m) (ii)	19 ft (hh)	20 ft (ii)	25 ft (n) (o) (ii)	30 ft (o) (ii)	30 ft (o) (ii) (kk)
4	Above ground along thoroughfares in rural districts or across other areas capable of being transversed by vehicles or agricultural equipment.	15 ft (k)	15 ft (m) (n) (p)	19 ft	16 ft	25 ft (n) (o)	30 ft (o) (p)	30 ft. (o) (kk)
5	Vertical ground in areas accessible to pedestrians only.	7 ft	10 ft (m) (q)	19 ft	12 ft	17 ft	25 ft (o)	25 ft. (o) (kk)
6	Vertical clearance above buildings and bridges (or other structures which do not ordinarily support conductors and on which men can walk) whether attached or unattached.	8 ft (r)	8 ft (r)	8 ft	8 ft	12 ft	12 ft	20 ft (ll)
7	Horizontal clearance of conductor from buildings (except generating and substations),	----------	3 ft (u)	3 ft	3 ft (u) (v)	6 ft (v)	6 ft (v)	15 ft (v)

	bridges or other structures (upon which men may work) where such conductor is not attached thereto. (a) (t)							
8	Distance of conductor from center line of pole, wheter attached or unattached (w) (x) (y)	----------	15 in (a) (aa)	15 in (aa) (bb) (cc)	15 in (o) (aa) (dd)	15 or 18 in (o) (dd) (ee) (jj)	18 in (dd) (ee) (jj)	Not Applicable
9	Distance of conductor from surface of pole, crossarm or other overhead line structure upon which it is supported, providing it complies with Case 8 above (x) (ee)	----------	3 in (aa) (ff)	3 in (aa) (cc) (gg)	3 in (aa) (dd) (gg)	3 in (dd) (gg)	¼ pin spacing shown in Table 2 Case 15 (dd)	½ pin spacing shown in Table 2 Case 15 (dd)
10	Radial centerline clearance of conductor or cable (unattached) from non-climbable street lighting or traffic signal poles or standards, including mastarms, brackets and lighting fixtures.	----------	1 ft (oo) (u) (rr) (ss)	15 in. (bb) (cc)	3 ft (oo)	6 ft (pp)	10 ft (qq)	10 ft (ll)
11	Water areas not suitable for sailboating (tt) (uu) (ww) (xx)	15′	15′	---	15′	17′	25′	25′ (kk)
12	Water areas suitable for sailboating, surface area of: (tt) (vv) (ww) (xx) (a) Less Than 20 acrea (b) 20 to 200 acres (c) Over 200 to 2,000 acres (d) Over 2,000 acres	 18′ 26′ 32′ 38′	 18′ 26′ 32′ 38′	 --- --- --- ---	 18′ 26′ 32′ 38′	 20′ 28′ 34′ 40′	 27′ 35′ 41′ 47′	 27′ (kk) 35′ (kk) 41′ (kk) 47′ (kk)

(a)	Shall not be reduced more than 5% because of temperature or loading 1. Supply Lines 2. Communication Lines	37 54.4-B1 84.4-B1
(b)	Shall be increased for supply conductors on Suspension insulators, under certain conditions	37
(c)	Special clearances are provided for traffic signal equipment	58.1-C
(d)	Special clearances are provided for street lighting equipment	58.2-B
(e)	Based on trolley pole throw of 26 feet. May be reduced where suitably protected. 1. Supply Guys 2. Supply cables and messengers 3. Communication Guys 4. Communication cables and messengers	 56.4-B2 57.4-B2 86.4-B2 87.4-B2
(f)	May be reduced depending on height of trolley contact conductors. 1. Supply Service Drop 2. Communication service drops	 54.8-C5 84.8-D5
(g)	May be reduced and shall be increased depending on trolley throw 1. Supply conductors (except service drops) 2. Communication conductors (except service drops)	 54.4-B2 84.4-B2
(h)	Shall be increase where freight cars are transported. 1. Trolley contact and feeder conductors 2. Trolley span wires	 74.4-B1 77.4-A
(i)	May be reduced for trolley contact and span wires in subways, tunnels and under bridges 1. Trolley contact conductors 2. Trolley span wires	 74.4-E 77.4-A
(j)	May be reduced at crossings over private thoroughfares and entrances to private property and over private property. 1. Supply Service drops 2. Supply Guys 3. Communication service drops 4. Communication guys	 54.8-B2 56.4-A 84.8-C2 86.4-A
(k)	May be reduced along thoroughfares where not normally accessible to vehicles. 1. Supply Guys 2. Communication Guys	 56.4-A1 86.4-A1
(l)	May be reduced where within 12 feet of curb line of public thoroughfares 1. Supply Service drops 2. Communication service drops	 54.8-B1 84.8-C1
(m)	May be reduced for railways signal cables under special	84.4-A4

	conditions	
(n)	May be reduced in rural districts 1. Supply conductors, 750- 20,000 volts, crossing roads or driveways 2. Supply conductors, 750-2000 volts, above agricultural areas and along roads 3. Communication conductors along roads	 54.4-A2a 54.4-A2b 84.4-A2
(o)	May be reduced for transformer, regulator or capacitor leads. 1. Transformer Leads 2. Regulator or Capacitor Leads	 58.3-B 58.4-B
(p)	May be reduced across arid or mountainous areas 1. Supply Conductors of more than 750- 22,500 Volts 2. Communication conductors	 54.4-A1 84.4-A1
(q)	Shall be increased or may be reduced under special conditions. 1. Increased for supply service drops on industrial or commercial premises 2. Supply service drops on residential premises 3. Communication conductors 4. Increased for Communication service drops on industrial or commercial premises 5. Communication service drops on residential premises	 54.8-B3a 54.8-B3b 84.4-A3 84.8-C3a 84.8-C3b
(r)	May be reduced above roofs of buildings under special conditions 1. Supply overhead guys 2. Supply service drops 3. Communication overhead guys 4. Communication conductors and cables 5. Communication service drops	 56.4-G 54.8-B4 86.4-F 84.4-E 84.8-C4
(s)	Also applies at fire escapes, etc. 1. Supply Conductors 2. Supply service drops on industrial or commercial premises 3. Supply service drops on residential premises 4. Communication Conductor	 54.4-H1 54.8-B4a 54.8-B4b 84.4-E
(t)	Special Clearances where attached to buildings, bridges or other structures 1. Supply conductors of 750-750- 22,500 volts 2. Trolley Contact Conductors 3. Communication Conductors	 54.4-H2 74.4-E 84.4-F
(u)	Reduced clearances permitted under special conditions 1. Supply service drops on industrial or commercial premises 2. Supply cables, grounded 3. Communication cables beside buildings, etc.	 54.8-B4a 57.4-G 84.4-E

	4. Communication conductors under bridges, etc. 5. Communication service drops. 6. Communication cables passing non-climbable streetlight poles, etc	84.4-F 84.8-C4 84.4-D4a
(v)	May be reduced under special conditions. 1. Supply conductors of 750-7500 volts 2. Supply transformer lead and bus wires where guarded	 54.4-H1 58.3-B2
(w)	May be reduced at angles in lines and transportation points 1. Supply conductors 2. Communication Conductors	 54.4-D1 84.4-D5
(x)	May be reduced for suitably protected lateral or vertical runs. 1. Supply bond wires 2. Supply ground wires 3. Supply lateral conductors 4. Supply vertical pins 5. Supply risers 6. Communication Ground Wires 7. Communication lateral conductors 8. Communication vertical runs 9. Communication risers	 53.4 54.6-B 54.6-C 54.6-D 54.6-E 84.6-B 84.6-C 84.6-D 84.6-E
(y)	Increased clearances for certain conductors 1. Unattached conductors on colinear lines and crossing lines 2. Unattached supply conductors 3. Supply Service drops on clearance crossarms 4. Supply Service drops on pole top extensions 5. Unattached Supply service drops 6. Communication lines, collinear, conflicting or crossing rs passing supply poles and unattached thereto 8. Communication service drops on clearance crossarms 9. Communication service drops on pole top extensions 10. Unattached Communication service drops	 32.3 54.4D3 54.8-C2 54.8-C3 54.8-D 84.4-D3 84.4-D4 84.8-D2 84.8-D3 84.8-E
(z)	Special provisions for police and fire alarm conductors require increased clearances	 92.2
(aa)	May be reduced under special provisions. 1. Supply conductors of 0-750 volts in rack configuration 2. Supply service drops from racks 3. Supply cables and messengers attached to poles 4. Communication conductors on communication poles 5. Communication conductors on crossarms 6. Communication conductors attached to poles 7. Communication service drops attached to poles 8. Communication cables and messengers 9. Supply or communication cables and messengers	 54.4-D5 54.8-F 57.4-F 84.4-D 84.4-D1 84.4-D2 84.8-B 87.4-D

	on jointly used poles 10. Communication service drops on pole top extensions	92.1-B 92.1-C
(bb)	May be reduced for Class T conductors of not more than 750 volts and of the same potential and polarity	74.4-D
(cc)	Not applicable to trolley span wires	77.4-E
(dd)	Special clearances for pole-top and dead-end construction 1. Conductors dead-ended in vertical configuration on poles 2. Conductors in pole-top construction	 54.4-C4 54.4-D8
(ee)	Clearance requirements for certain voltage classifications	54.4-D2
(ff)	Not applicable to communication conductors	84.4-D
(gg)	Clearance from crossarms may be reduced for certain conductors 1. Suitably insulated leads to protected runs 2. Leads of 0-5000 volts to equipment 3. Leads of 0-5000 volts to cutouts or switches	 54.4-E 54.4-E 58.5-C
(hh)	Reduced clearance permitted from temporary fixtures and lighting circuits 0-300 volts	78.3A(1)
(ii)	Special Clearances Required Above Public and Private Swimming Pools: 1. Supply line conductors 2. Supply service drops 3. Communication line conductors 4. Communication service drops 5. Supply guys, span wires 6. Communication guys	 54.4–A4 54.8–B5 84.4–A5 84.8–C5 56.4–A3 86.4–A3
(jj)	May be decreased in partial underground distribution	54.4-D2
(kk)	Shall be increased by 0.025 ft. per kV in excess of 300 kV.	
(ll)	Shall be increased by 0.04 ft. per kV in excess of 300 kV.	
(mm)	proposed clearances to be submitted tot the CPUC prior to construction for circuits in excess of 550 kV.	
(nn)	Voltage shown in the table shall mean line – to – ground voltage for direct current (DC) systems.	
(oo)	May be reduced for grounded or multi-conductor cables. 1. Grounded cables 2. Multi-Conductor cables	 57.4-H 54.10-B6
(pp)	May be reduced to 4 feet for voltages below 7,500 volts	54.4-D3
(qq)	May be reduced to 6 feet for voltages below 75 kV	
(rr)	May be reduced for supply service drops	54.8-D1
(ss)	May be reduced to communication service drops	84.4-E1

(tt)	Where a federal agency or surrogate thereof has issued a crossing permit, clearances of that permit shall govern.	
(uu)	Or Where sailboating is prohibited and where other boating activities are allowed	
(vv)	Clearance above contiguous ground shall be 5 feet greater than in cases 11 or 12 for the type of water area served for boat launch facilities and for area contiguous thereto, that are posted, designated or specifically prepared for rigging of sailboats or other watercraft.	
(ww)	For controlled impoundments, the surface areas and corresponding clearances shall be based upon the high water level. for other waters, the surface area shall be that enclosed by its annual flood level. the clearance over rivers, streams and canals shall be based upon the largest surface areas of any one–mile long segment which includes the crossing. the clearance over a canal, river or stream normally used to provide access for sailboats to a larger body of water shall be the same as that required for the larger body of water	
(xx)	Water areas are lakes, ponds, reservoirs, tidal waters, rivers, streams and canals without surface obstructions	

Original Version

Table 2

Basic Minimum Allowable Clearance of Wires from Other Wires at Crossings and at Supports

(Letter references Denote Modifications of Minimum Clearances Referred to in Notes Following this Table)

All Clearances Are in Inches

Case No.	Nature of Clearance and Class of Voltage of wire, cable or conductor concerned	Other Wire, cable or conductor concerned										
					Supply conductor (including supply cables)							
		A Span wires, guys and messengers	B Trolley contact conductors 0-750 volts	C Communication conductors (including open wire, cables and service drops)	D 0-750 volts (including service drops and trolley feeders (a))	E 750-7,500 Volts	F 7,500-20,000 volts	G 20,000-35,000 volts	H 35,000-75,000 volts	I 75,000-150,000 volts	J 150,000 - 300,000 volts	K 300,000 - 550,000 volts
	Clearance between wires, cables, and conductors not supported on the same poles, vertically at crossings in spans, and radially where collinear or approaching crossing											
1	Span wires, guys and messengers (b)	18 (c)	48 (d, e)	24 (e)	24 (e)	36 (f)	36	72	72	78	78(gg)	138(hh)
2	Trolley contact conductors 0-750 volts	48 (d, e)	----------	48 (d)	48 (d, h)	48	72	96	96	96	96 (gg)	156(hh)
3	Communication conductors	24 (e)	48 (d)	24	48 (i)	48 (dd)	72	96	96	96	96 (gg)	156(hh)
4	Supply conductors, service drops and trolley feeders 0-750 volts	24 (e)	48 (d, h)	48 (i)	24	48	48	96 (oo)	96	96	96 (gg)	156(hh)
5	Supply conductors, 750-7500 volts	36 (f)	48	48 (dd)	48	48 (h)	72	96(oo)	96	96	96 (gg)	156(hh)
6	Supply conductors 7500-20,000 volts	36	72	72	48	72	72	96(oo)	96	96	96 (gg)	156(hh)
7	Supply conductors, more than 20,000 volts	72(g)	96(g)	96(g)	96(g) (oo)	96(g) (oo)	96(g) (oo)	96(g) (oo)	96 (g)	96	96 (gg)	156(hh)
	Vertical separation between conductors and / or cables on separate crossarms or other supports at different levels (excepting on related line and buck arms on the											

	same pole)											
8	Communication conductors and service drops	---------- ---	---------- -	12 (j)	48 (k, l, m, n)	48 (k)	72 (m, n)	72(m)	72	78	87 (gg)	147(hh)
9	Supply Conductors, service drops and trolley feeders 0-750 volts	---------- ---	---------- -	48 (k, l, m, n)	24 (h, k, m, o)	48 (k, m, p)	48 (k, m, q)	72(m) (nn)	72	78	87 (gg)	147(hh)
10	Supply conductors, 750-7500 volts	---------- ---	---------- -	48 (k)	48 (k, m, p)	48 (m, o, r, ee)	48 (m, q)	48(q)	48(q)	60(ff)	90 (gg)	150(hh)
11	Supply conductors 7500-20,000 volts	---------- ---	---------- -	72 (m, n)	48 (k, m, q)	48 (m, q)	48 (m, o, q, r, ee)	48(q)	48(q)	60(ff)	90 (gg)	150(hh)
12	Supply conductors 20,000-~~68,000~~ 75,000 volts	---------- ---	---------- -	72 (m)	72 (m)	48 (m, q)	48 (m, q)	48(o, q)	48(o, q)	60(ff)	90 (gg)	150(hh)
13	Supply conductors, more than ~~68,000~~ 75,000 volts	---------- ---	---------- -	72	72	60 (q)	60 (q)	60(q)	60(q)	60(ff)	90 (gg)	150(hh)
	Vertical arms above or below conductors on related line arms and buck arms.											
14	Line arms above or below related buck arms (s, t)	---------- ---	---------- -	6	12 (u)	18 (u)	18 (u)	24	48	60(ff)	90 (gg)	150(hh)
	Horizontal separation of conductors on same crossarm											
15	Pin spacings of longitudinal conductors, vertical conductors and service drops (v, w)	---------- ---	---------- -	3(x)	11 ½ (h, x)	11 ½ (x)	17 ½ (x)	24 (x)	48	60(ff)	90 (gg)	150(hh)
	Radial separation of conductors on same crossarm, pole or structure											
	Incidental pole wiring											
16	Conductors, tap or lead wires of different circuits (v, y, z)	---------- ---	---------- -	3 (x)	11 ½ (h, x)	11 ½ (x)	17 ½ (x)	24 (x)	48	60(ff)	90 (gg)	150(hh)
17	Conductors, tap or lead wires of same circuits (v, z, aa)	---------- ---	---------- -	3	3	6	6	12	24	60(ff)	90 (gg)	150(hh)
	Radial separation between guys and conductors		---------- -									
18	Guys passing conductors supported on other poles (excluding poles of same circuit), and guys approximately parallel to conductors supported on the same poles	---------- ---	---------- -	3 (bb)	12	18	18	30	36	36 (ff)	78 (gg)	138(hh)

19	Guys and spans wires passing conductors supported on the same poles **Post-insulator-Vertical clearance between conductors**	(ee)		3	3	6	9	12	18	24	48 (ll)	86 (jj)
20	Vertical Clearance between conductors of the same circuit on Horizontal post insulators	-	-	-	-	24	24	30	36 or 48 (ii) (mm)	48 (mm)	48(mm)	48(mm)

(a)	The clearances in Column D are also applicable to supply cables of any voltage under certain conditions	57.4
(b)	Clearances for guys and span wires apply vertically at crossings; see Case 18 for radial clearances from conductors. 1. Supply guys and span wires from conductors 2. Supply guys and span wires from guys and span wires 3. Communication guys and span wires from conductors 4. Communication guys and span wires from guys and span wires	56.4-C 56.4-D1 86.4-C 86.4-D1
(c)	Not applicable between messengers or span wires of the same system. 1. Supply messengers 2. Trolley span wires 3. Communication messengers	57.4-E 77.4-D 87.4-G
(d)	Protection required on guys, span wires, messengers, and cables where within trolley throw 1. Supply Guys and Span wires 2. Supply Messengers and Cables 3. Communication guys and span wires 4. Communication messengers	56.4-B2 57.4-B2 86.4-B2 87.4-B2
(e)	Not applicable to certain conductors supported on trolley span wires. 1. Trolley contact and feeder conductors 2. Trolley feeder conductors 3. Trolley system communication conductors 4. Foreign conductors	74.4-G 78.1 78.2 78.3
(f)	Increased clearance required over trolley contact conductors of 750-7500 volts	74.4-G2
(g)	Shall be increased for conductors of more than 75,000 volts. As required by Table 2 Columns I, J, and K	
(h)	May be reduced for certain conductors of Class T circuits of the same system	74.4-C

(i)	May be reduced for service drops under special conditions. 1. Supply service drops and communication line conductors 2. Supply service drops and communication service drops 3. Communication service drops and supply line conductors 4. Communication service drops and supply service drops	54.8-C1a 54.8-C4 84.8-D1a 84.8-D4
(j)	May be reduced or shall be increased for certain communication conductors or cables. 1. Open wire conductors, attached to poles, within 3 feet of topmost conductor 2. Line conductors of police or fire-alarm circuits and service drops from other communication circuits. 3. Cables and messengers attached to poles	84.4-C1a 84.8-D1b 87.4-C3
(k)	Special clearances for 0-750 volt conductors in rack configuration and messengers and cables attached to poles. 1. Supply conductors of 0-750 volts in rack configuration 2. Supply cables and messengers attached to poles 3. Communication cables and messengers attached to poles 4. On Jointly used poles	54.9 57.4-F 87.4-C3 92.1
(l)	May be reduced for service drops, and police or fire-alarm conductors, under special conditions. 1. Supply service drops and communication line conductors 2. Supply service drops on clearance arms 3. Supply service drops on pole-top extensions 4. Supply service drops and communication service drops 5. Communication service drops and police, fire-alarm or supply line conductors 6. Communication service drops on clearance arms 7. Communication service drops on pole-top extensions 8. Communication service drops and supply service drops 9. Police or fire-alarm conductors	54.8-C1b 54.8-C2 54.8-C3 54.8-C4 84.8-D1b 84.8-D2 84.8-D3 84.8-D4 92.2

(m)	May be reduced for lead wires 1. Supply lead wires above supply conductors 2. Supply drip loops above communication conductors	 54.4-C6 92.1-F3
(n)	May be reduced for supply conductors and private communication conductors of the same ownership	89.2-B
(o)	May be reduced or increased for triangular or vertical configuration or for pole-top construction. 1. Triangular or vertical configuration on crossarms 2. Dead-ended on pole in vertical configuration 3. Conductors of 0-7500 volts in triangular configuration at top of pole 4. Conductors of more than 7500 volts at top of pole	 54.4-C1c 54.4-C4 54.4-D8a 54.4-D8b
(p)	May be reduced for supply service drops of 0-750 volts	54.8-C6
(q)	Shall be increased between circuits where conductors of more than 7500 volts are at pole top.	54.4-D8b
(r)	May be reduced under special conditions 1. Supply conductors of 750-7500 volts 2. Supply conductors of 7500-20,000 volts	 54.4-C1a 54.4-C1b
(s)	Does not apply where conductors do not cross. 1. Supply conductors of different phase polarity 2. Communication conductors	 54.4-C2a 84.4-C1a
(t)	Shall not be applied consecutively both above and below the same supply conductors	54.4-2a
(u)	Shall be increased where conductors of different classifications are supported on the same crossarms. 1. Supply conductors of 0-750 volts and conductors of 7500-20,000 volts 2. Supply conductors of 0-750 volts and conductors of 750-7500 volts	 32.4-A2 32.4-A3
(v)	Not applicable to certain kinds of conductors. 1. Supply conductors of same phase or polarity 2. Insulated supply conductors in multiple-conductor cables 3. Communication insulated conductors or multiple-conductor cables	 54.4-C3c 57.4-C 87.4-C1

(w)	Shall apply radially to conductors on brackets attached to crossarms. 1. Supply conductors 2. Communication conductors	54.4-C3b 84.8-C1b
(x)	Shall be increased between conductors of different classifications supported on the same crossarm. 1. Supply conductors of different voltage classification 2. Supply circuits of 0-750 volts and communication circuits 3. Supply circuits and private communication circuits.	32.4-A 32.4-B 89.2-A
(y)	Special clearances for unprotected supply conductors from one level to another level	54.6-A 58.2-B3 92.1-F5
(z)	Not applicable to the following: 1. Clearances between conductors at different levels specified in Cases 8 to 13 inclusive. 2. Supply lateral conductors, suitably protected 3. Supply vertical runs, suitably protected 4. Supply risers, suitably protected 5. Communication Conductors	54.6-C 54.6-D 54.6-E 87.4-C1
(aa)	Not applicable between cables and their supporting messengers. 1. Supply 2. Communication	57.4-D 87.4-F
(bb)	May be reduced for communication guys and communication conductors supported on the same poles 1. Supply 2. Communication	56.4-C 86.4-C
(cc)	Clearance required between guys. 1. Supply guys, crossing 2. Supply guys, approximately parallel 3. Communication guys, crossing 4. Communication guys, approximately parallel	56.4-D2 56.4-D3 86.4-D2 86.4-D3
(dd)	Shall be increased where within 6 feet of a pole	103.5
(ee)	May be decreased in partial underground distribution	54.4-C4c
(ff)	shall be increased by 0.40 inches per kV in excess of 75 kV	
(gg)	shall be increased by 0.40 inches per kV in excess of 150 kV	
(hh)	shall be increased by 0.40 inches per kV in excess of 300 kV	
(ii)	shall be increased by 0.25 inches per kV in excess of 150 kV	

(jj)	shall be increased by 0.25 inches per kV in excess of 300 kV	
(kk)	proposed clearances to submitted to the CPUC prior to construction for circuits in excess of 550 kV	
(ll)	36-inch clearance applies 35 kV to 68kV 48-inch clearance applies over 68 kV	
(mm)	vertical clearance shall be increased by ½ inch for each kilovolt over 68 kV	
(nn)	The vertical separation between supply conductors and service drops Of 0-750 volts and 20,000-22,500-volt conductors may be reduced to 48 inches.	
(oo)	May be reduced to 72 inches for conductors of 20,000-22,500 volts.	

Strikeout and Underline

Table 2

Basic Minimum Allowable Clearance of Wires from Other Wires at Crossings, in Midspans and at Supports

(Letter references Denote Modifications of Minimum Clearances Referred to in Notes Following this Table)

All Clearances Are in Inches

Case No.	Nature of Clearance and Class of Voltage of wire, cable or conductor concerned	Other Wire, cable or conductor concerned										
					Supply conductor (including supply cables)							
		A Span wires, guys and messengers	B Trolley contact conductors 0-750 volts	C Communication conductors (including open wire, cables and service drops)	D 0-750 volts (including service drops and trolley feeders (a))	E 750-7,500 Volts	F 7,500-20,000 volts	G 20,000-35,000 volts	H 35,000-75,000 volts	I 75,000-150,000 volts	J 150,000 - 300,000 volts	K 300,000 - 550,000 volts
	Clearance between wires, cables, and conductors not supported on the same poles, vertically at crossings in spans, and radially where collinear or approaching crossing											
1	Span wires, guys and messengers (b)	18 (c)	48 (d, e)	24 (e)	24 (e)	36 (f)	36	72	72	78	78(gg)	138(hh)
2	Trolley contact conductors 0-750 volts	48 (d, e)	----------	48 (d)	48 (d, h)	48	72	96	96	96	96 (gg)	156(hh)
3	Communication conductors	24 (e)	48 (d)	24	48 (i)	48 (dd)	72	96	96	96	96 (gg)	156(hh)
4	Supply conductors, service drops and trolley feeders 0-750 volts	24 (e)	48 (d, h)	48 (i)	24	48	48	96 (oo)	96	96	96 (gg)	156(hh)
5	Supply conductors, 750-7500 volts	36 (f)	48	48 (dd)	48	48 (h)	72	96(oo)	96	96	96 (gg)	156(hh)
6	Supply conductors 7500-20,000 volts	36	72	72	48	72	72	96(oo)	96	96	96 (gg)	156(hh)
7	Supply conductors, more than 20,000 volts	72(g)	96(g)	96(g)	96(g) (oo)	96(g) (oo)	96(g) (oo)	96(g) (oo)	96 (g)	96	96 (gg)	156(hh)
	Vertical separation between conductors and / or cables on separate crossarms or other supports at different levels (excepting on related line and buck arms on the											

	same pole <u>and in adjoining Midspans</u>)											
8	Communication conductors and service drops	---------- ---	---------- -	12 (j)	48 (k, l, m, n, <u>pp</u>)	48 (k)	72 (m, n)	72(m)	72	78	87 (gg)	147(hh)
9	Supply Conductors, service drops and trolley feeders 0-750 volts	---------- ---	---------- -	48 (k, l, m, n, <u>pp</u>)	24 (h, k, m, o)	48 (k, m, p)	48 (k, m, q)	72(m) (nn)	72	78	87 (gg)	147(hh)
10	Supply conductors, 750-7500 volts	---------- ---	---------- -	48 (k)	48 (k, m, p)	48 (m, o, r, ee)	48 (m, q)	48(q)	48(q)	60(ff)	90 (gg)	150(hh)
11	Supply conductors 7500-20,000 volts	---------- ---	---------- -	72 (m, n)	48 (k, m, q)	48 (m, q)	48 (m, o, q, r, ee)	48(q)	48(q)	60(ff)	90 (gg)	150(hh)
12	Supply conductors 20,000-~~68,000~~ <u>75,000</u> volts	---------- ---	---------- -	72 (m)	72 (m)	48 (m, q)	48 (m, q)	48(o, q)	48(o, q)	60(ff)	90 (gg)	150(hh)
13	Supply conductors, more than ~~68,000~~ <u>75,000</u> volts	---------- ---	---------- -	72	72	60 (q)	60 (q)	60(q)	60(q)	60(ff)	90 (gg)	150(hh)
	Vertical arms above or below conductors on related line arms and buck arms.											
14	Line arms above or below related buck arms (s, t)	---------- ---	---------- -	6	12 (u)	18 (u)	18 (u)	24	48	60(ff)	90 (gg)	150(hh)
	Horizontal separation of conductors on same crossarm											
15	Pin spacings of longitudinal conductors, vertical conductors and service drops (v, w)	---------- ---	---------- -	3(x)	11 ½ (h, x)	11 ½ (x)	17 ½ (x)	24 (x)	48	60(ff)	90 (gg)	150(hh)
	Radial separation of conductors on same crossarm, pole or structure											
	Incidental pole wiring											
16	Conductors, tap or lead wires of different circuits (v, y, z)	---------- ---	---------- -	3 (x)	11 ½ (h, x)	11 ½ (x)	17 ½ (x)	24 (x)	48	60(ff)	90 (gg)	150(hh)
17	Conductors, tap or lead wires of same circuits (v, z, aa)	---------- ---	---------- -	3	3	6	6	12	24	60(ff)	90 (gg)	150(hh)
	Radial separation between guys and conductors		---------- -									
18	Guys passing conductors supported on other poles (excluding poles of same circuit), and guys approximately parallel to conductors supported on the	---------- ---	---------- -	3 (bb)	12	18	18	30	36	36 (ff)	78 (gg)	138(hh)

	same poles											
19	Guys and spans wires passing conductors supported on the same poles	(ee)		3	3	6	9	12	18	24	48 (ll)	86 (jj)
	~~**Post**~~ **<u>Vertical and Horizontal</u> insulator- Vertical clearance between conductors**											
20	Vertical Clearance between conductors of the same circuit on Horizontal ~~post~~ insulators	-	-	-	-	24	24	30	36 or 48 (ii) (mm)	48 (mm)	48(mm)	48(mm)

(a)	The clearances in Column D are also applicable to supply cables of any voltage under certain conditions	57.4
(b)	Clearances for guys and span wires apply vertically at crossings; see Case 18 for radial clearances from conductors. 1. Supply guys and span wires from conductors 2. Supply guys and span wires from guys and span wires 3. Communication guys and span wires from conductors 4. Communication guys and span wires from guys and span wires	56.4-C 56.4-D1 86.4-C 86.4-D1
(c)	Not applicable between messengers or span wires of the same system. 1. Supply messengers 2. Trolley span wires 3. Communication messengers	57.4-E 77.4-D 87.4-G
(d)	Protection required on guys, span wires, messengers, and cables where within trolley throw 1. Supply Guys and Span wires 2. Supply Messengers and Cables 3. Communication guys and span wires 4. Communication messengers	56.4-B2 57.4-B2 86.4-B2 87.4-B2
(e)	Not applicable to certain conductors supported on trolley span wires. 1. Trolley contact and feeder conductors 2. Trolley feeder conductors 3. Trolley system communication conductors 4. Foreign conductors	74.4-G 78.1 78.2 78.3
(f)	Increased clearance required over trolley contact conductors of 750-7500 volts	74.4-G2
(g)	Shall be increased for conductors of more than 75,000 volts. As required by Table 2 Columns I, J, and K	
(h)	May be reduced for certain conductors of Class T circuits of the same system	74.4-C

(i)	May be reduced for service drops under special conditions. 1. Supply service drops and communication line conductors 2. Supply service drops and communication service drops 3. Communication service drops and supply line conductors 4. Communication service drops and supply service drops	54.8-C1a 54.8-C4 84.8-D1a 84.8-D4
(j)	May be reduced or shall be increased for certain communication conductors or cables. 1. Open wire conductors, attached to poles, within 3 feet of topmost conductor 2. Line conductors of police or fire-alarm circuits and service drops from other communication circuits. 3. Cables and messengers attached to poles	84.4-C1a 84.8-D1b 87.4-C3
(k)	Special clearances for 0-750 volt conductors in rack configuration and messengers and cables attached to poles. 1. Supply conductors of 0-750 volts in rack configuration 2. Supply cables and messengers attached to poles 3. Communication cables and messengers attached to poles 4. On Jointly used poles	54.9 57.4-F 87.4-C3 92.1
(l)	May be reduced for service drops, and police or fire-alarm conductors, under special conditions. 1. Supply service drops and communication line conductors 2. Supply service drops on clearance arms 3. Supply service drops on pole-top extensions 4. Supply service drops and communication service drops 5. Communication service drops and police, fire-alarm or supply line conductors 6. Communication service drops on clearance arms 7. Communication service drops on pole-top extensions 8. Communication service drops and supply service drops 9. Police or fire-alarm conductors	54.8-C1b 54.8-C2 54.8-C3 54.8-C4 84.8-D1b 84.8-D2 84.8-D3 84.8-D4 92.2

(m)	May be reduced for lead wires 1. Supply lead wires above supply conductors 2. Supply drip loops above communication conductors	 54.4-C6 92.1-F3
(n)	May be reduced for supply conductors and private communication conductors of the same ownership	89.2-B
(o)	May be reduced or increased for triangular or vertical configuration or for pole-top construction. 1. Triangular or vertical configuration on crossarms 2. Dead-ended on pole in vertical configuration 3. Conductors of 0-7500 volts in triangular configuration at top of pole 4. Conductors of more than 7500 volts at top of pole	 54.4-C1c 54.4-C4 54.4-D8a 54.4-D8b
(p)	May be reduced for supply service drops of 0-750 volts	54.8-C6
(q)	Shall be increased between circuits where conductors of more than 7500 volts are at pole top.	54.4-D8b
(r)	May be reduced under special conditions 1. Supply conductors of 750-7500 volts 2. Supply conductors of 7500-20,000 volts	 54.4-C1a 54.4-C1b
(s)	Does not apply where conductors do not cross. 1. Supply conductors of different phase polarity 2. Communication conductors	 54.4-C2a 84.4-C1a
(t)	Shall not be applied consecutively both above and below the same supply conductors	54.4-2a
(u)	Shall be increased where conductors of different classifications are supported on the same crossarms. 1. Supply conductors of 0-750 volts and conductors of 7500-20,000 volts 2. Supply conductors of 0-750 volts and conductors of 750-7500 volts	 32.4-A2 32.4-A3
(v)	Not applicable to certain kinds of conductors. 1. Supply conductors of same phase or polarity 2. Insulated supply conductors in multiple-conductor cables 3. Communication insulated conductors or multiple-conductor cables	 54.4-C3c 57.4-C 87.4-C1

(w)	Shall apply radially to conductors on brackets attached to crossarms. 1. Supply conductors 2. Communication conductors	54.4-C3b 84.8-C1b
(x)	Shall be increased between conductors of different classifications supported on the same crossarm. 1. Supply conductors of different voltage classification 2. Supply circuits of 0-750 volts and communication circuits 3. Supply circuits and private communication circuits.	32.4-A 32.4-B 89.2-A
(y)	Special clearances for unprotected supply conductors from one level to another level	54.6-A 58.2-B3 92.1-F5
(z)	Not applicable to the following: 1. Clearances between conductors at different levels specified in Cases 8 to 13 inclusive. 2. Supply lateral conductors, suitably protected 3. Supply vertical runs, suitably protected 4. Supply risers, suitably protected 5. Communication Conductors	54.6-C 54.6-D 54.6-E 87.4-C1
(aa)	Not applicable between cables and their supporting messengers. 1. Supply 2. Communication	57.4-D 87.4-F
(bb)	May be reduced for communication guys and communication conductors supported on the same poles 1. Supply 2. Communication	56.4-C 86.4-C
(cc)	Clearance required between guys. 1. Supply guys, crossing 2. Supply guys, approximately parallel 3. Communication guys, crossing 4. Communication guys, approximately parallel	56.4-D2 56.4-D3 86.4-D2 86.4-D3
(dd)	Shall be increased where within 6 feet of a pole	103.5
(ee)	May be decreased in partial underground distribution	54.4-C4c
(ff)	shall be increased by 0.40 inches per kV in excess of 75 kV	
(gg)	shall be increased by 0.40 inches per kV in excess of 150 kV	
(hh)	shall be increased by 0.40 inches per kV in excess of 300 kV	
(ii)	shall be increased by 0.25 inches per kV in excess of 150 kV	

(jj)	shall be increased by 0.25 inches per kV in excess of 300 kV	
(kk)	proposed clearances to submitted to the CPUC prior to construction for circuits in excess of 550 kV	
(ll)	36-inch clearance applies 35 kV to 68kV 48-inch clearance applies over 68 kV	
(mm)	vertical clearance shall be increased by ½ inch for each kilovolt over 68 kV	
(nn)	The vertical separation between supply conductors and service drops Of 0-750 volts and 20,000-22,500-volt conductors may be reduced to 48 inches.	
(oo)	May be reduced to 72 inches for conductors of 20,000-22,500 volts.	
(pp)	May be reduced to 36 inches vertically at midspan only when the supply conductors consist of abrasion resistant cable with a grounded metallic sheath or neutral–supported cable as specified in Rules 57 and 54.10 .	

Final Version

Table 2

Basic Minimum Allowable Clearance of Wires from Other Wires at Crossings, in Midspans and at Supports

(Letter references Denote Modifications of Minimum Clearances Referred to in Notes Following this Table)

All Clearances Are in Inches

Case No.	Nature of Clearance and Class of Voltage of wire, cable or conductor concerned	Other Wire, cable or conductor concerned										
					Supply conductor (including supply cables)							
		A Span wires, guys and messengers	B Trolley contact conductors 0-750 volts	C Communication conductors (including open wire, cables and service drops)	D 0-750 volts (including service drops and trolley feeders (a))	E 750-7,500 Volts	F 7,500-20,000 volts	G 20,000-35,000 volts	H 35,000-75,000 volts	I 75,000-150,000 volts	J 150,000 - 300,000 volts	K 300,000 - 550,000 volts
	Clearance between wires, cables, and conductors not supported on the same poles, vertically at crossings in spans, and radially where collinear or approaching crossing											
1	Span wires, guys and messengers (b)	18 (c)	48 (d, e)	24 (e)	24 (e)	36 (f)	36	72	72	78	78(gg)	138(hh)
2	Trolley contact conductors 0-750 volts	48 (d, e)	----------	48 (d)	48 (d, h)	48	72	96	96	96	96 (gg)	156(hh)
3	Communication conductors	24 (e)	48 (d)	24	48 (i)	48 (dd)	72	96	96	96	96 (gg)	156(hh)
4	Supply conductors, service drops and trolley feeders 0-750 volts	24 (e)	48 (d, h)	48 (i)	24	48	48	96 (oo)	96	96	96 (gg)	156(hh)
5	Supply conductors, 750-7500 volts	36 (f)	48	48 (dd)	48	48 (h)	72	96(oo)	96	96	96 (gg)	156(hh)
6	Supply conductors 7500-20,000 volts	36	72	72	48	72	72	96(oo)	96	96	96 (gg)	156(hh)
7	Supply conductors, more than 20,000 volts	72(g)	96(g)	96(g)	96(g) (oo)	96(g) (oo)	96(g) (oo)	96(g) (oo)	96 (g)	96	96 (gg)	156(hh)
	Vertical separation between conductors and / or cables on separate crossarms or other supports at different levels (excepting on related line and buck arms on the											

	same pole and in adjoining Midspans)											
8	Communication conductors and service drops	--- -	--- -	12 (j)	48 (k, l, m, n, pp)	48 (k)	72 (m, n)	72(m)	72	78	87 (gg)	147(hh)
9	Supply Conductors, service drops and trolley feeders 0-750 volts	--- -	--- -	48 (k, l, m, n, pp)	24 (h, k, m, o)	48 (k, m, p)	48 (k, m, q)	72(m) (nn)	72	78	87 (gg)	147(hh)
10	Supply conductors, 750-7500 volts	--- -	--- -	48 (k)	48 (k, m, p)	48 (m, o, r, ee)	48 (m, q)	48(q)	48(q)	60(ff)	90 (gg)	150(hh)
11	Supply conductors 7500-20,000 volts	--- -	--- -	72 (m, n)	48 (k, m, q)	48 (m, q)	48 (m, o, q, r, ee)	48(q)	48(q)	60(ff)	90 (gg)	150(hh)
12	Supply conductors 20,000-~~68,000~~ 75,000 volts	--- -	--- -	72 (m)	72 (m)	48 (m, q)	48 (m, q)	48(o, q)	48(o, q)	60(ff)	90 (gg)	150(hh)
13	Supply conductors, more than ~~68,000~~ 75,000 volts	--- -	--- -	72	72	60 (q)	60 (q)	60(q)	60(q)	60(ff)	90 (gg)	150(hh)
	Vertical arms above or below conductors on related line arms and buck arms.											
14	Line arms above or below related buck arms (s, t)	--- -	--- -	6	12 (u)	18 (u)	18 (u)	24	48	60(ff)	90 (gg)	150(hh)
	Horizontal separation of conductors on same crossarm											
15	Pin spacings of longitudinal conductors, vertical conductors and service drops (v, w)	--- -	--- -	3(x)	11 ½ (h, x)	11 ½ (x)	17 ½ (x)	24 (x)	48	60(ff)	90 (gg)	150(hh)
	Radial separation of conductors on same crossarm, pole or structure Incidental pole wiring											
16	Conductors, tap or lead wires of different circuits (v, y, z)	--- -	--- -	3 (x)	11 ½ (h, x)	11 ½ (x)	17 ½ (x)	24 (x)	48	60(ff)	90 (gg)	150(hh)
17	Conductors, tap or lead wires of same circuits (v, z, aa)	--- -	--- -	3	3	6	6	12	24	60(ff)	90 (gg)	150(hh)
	Radial separation between guys and conductors		--- -									
18	Guys passing conductors supported on other poles (excluding poles of same circuit), and guys approximately parallel to conductors supported on the	--- -	--- -	3 (bb)	12	18	18	30	36	36 (ff)	78 (gg)	138(hh)

	same poles											
19	Guys and spans wires passing conductors supported on the same poles	(ee)		3	3	6	9	12	18	24	48 (ll)	86 (jj)
	Vertical and Horizontal insulator-Vertical clearance between conductors											
20	Vertical Clearance between conductors of the same circuit on Horizontal ~~post~~ insulators	-	-	-	-	24	24	30	36 or 48 (ii) (mm)	48 (mm)	48(mm)	48(mm)

(a)	The clearances in Column D are also applicable to supply cables of any voltage under certain conditions	57.4
(b)	Clearances for guys and span wires apply vertically at crossings; see Case 18 for radial clearances from conductors. 1. Supply guys and span wires from conductors 2. Supply guys and span wires from guys and span wires 3. Communication guys and span wires from conductors 4. Communication guys and span wires from guys and span wires	56.4-C 56.4-D1 86.4-C 86.4-D1
(c)	Not applicable between messengers or span wires of the same system. 1. Supply messengers 2. Trolley span wires 3. Communication messengers	57.4-E 77.4-D 87.4-G
(d)	Protection required on guys, span wires, messengers, and cables where within trolley throw 1. Supply Guys and Span wires 2. Supply Messengers and Cables 3. Communication guys and span wires 4. Communication messengers	56.4-B2 57.4-B2 86.4-B2 87.4-B2
(e)	Not applicable to certain conductors supported on trolley span wires. 1. Trolley contact and feeder conductors 2. Trolley feeder conductors 3. Trolley system communication conductors 4. Foreign conductors	74.4-G 78.1 78.2 78.3
(f)	Increased clearance required over trolley contact conductors of 750-7500 volts	74.4-G2
(g)	Shall be increased for conductors of more than 75,000 volts. As required by Table 2 Columns I, J, and K	
(h)	May be reduced for certain conductors of Class T circuits of the same system	74.4-C

(i)	May be reduced for service drops under special conditions. 1. Supply service drops and communication line conductors 2. Supply service drops and communication service drops 3. Communication service drops and supply line conductors 4. Communication service drops and supply service drops	54.8-C1a 54.8-C4 84.8-D1a 84.8-D4
(j)	May be reduced or shall be increased for certain communication conductors or cables. 1. Open wire conductors, attached to poles, within 3 feet of topmost conductor 2. Line conductors of police or fire-alarm circuits and service drops from other communication circuits. 3. Cables and messengers attached to poles	84.4-C1a 84.8-D1b 87.4-C3
(k)	Special clearances for 0-750 volt conductors in rack configuration and messengers and cables attached to poles. 1. Supply conductors of 0-750 volts in rack configuration 2. Supply cables and messengers attached to poles 3. Communication cables and messengers attached to poles 4. On Jointly used poles	54.9 57.4-F 87.4-C3 92.1
(l)	May be reduced for service drops, and police or fire-alarm conductors, under special conditions. 1. Supply service drops and communication line conductors 2. Supply service drops on clearance arms 3. Supply service drops on pole-top extensions 4. Supply service drops and communication service drops 5. Communication service drops and police, fire-alarm or supply line conductors 6. Communication service drops on clearance arms 7. Communication service drops on pole-top extensions 8. Communication service drops and supply service drops 9. Police or fire-alarm conductors	54.8-C1b 54.8-C2 54.8-C3 54.8-C4 84.8-D1b 84.8-D2 84.8-D3 84.8-D4 92.2

(m)	May be reduced for lead wires 1. Supply lead wires above supply conductors 2. Supply drip loops above communication conductors	 54.4-C6 92.1-F3
(n)	May be reduced for supply conductors and private communication conductors of the same ownership	89.2-B
(o)	May be reduced or increased for triangular or vertical configuration or for pole-top construction. 1. Triangular or vertical configuration on crossarms 2. Dead-ended on pole in vertical configuration 3. Conductors of 0-7500 volts in triangular configuration at top of pole 4. Conductors of more than 7500 volts at top of pole	 54.4-C1c 54.4-C4 54.4-D8a 54.4-D8b
(p)	May be reduced for supply service drops of 0-750 volts	54.8-C6
(q)	Shall be increased between circuits where conductors of more than 7500 volts are at pole top.	54.4-D8b
(r)	May be reduced under special conditions 1. Supply conductors of 750-7500 volts 2. Supply conductors of 7500-20,000 volts	 54.4-C1a 54.4-C1b
(s)	Does not apply where conductors do not cross. 1. Supply conductors of different phase polarity 2. Communication conductors	 54.4-C2a 84.4-C1a
(t)	Shall not be applied consecutively both above and below the same supply conductors	54.4-2a
(u)	Shall be increased where conductors of different classifications are supported on the same crossarms. 1. Supply conductors of 0-750 volts and conductors of 7500-20,000 volts 2. Supply conductors of 0-750 volts and conductors of 750-7500 volts	 32.4-A2 32.4-A3
(v)	Not applicable to certain kinds of conductors. 1. Supply conductors of same phase or polarity 2. Insulated supply conductors in multiple-conductor cables 3. Communication insulated conductors or multiple-conductor cables	 54.4-C3c 57.4-C 87.4-C1

(w)	Shall apply radially to conductors on brackets attached to crossarms. 1. Supply conductors 2. Communication conductors	54.4-C3b 84.8-C1b
(x)	Shall be increased between conductors of different classifications supported on the same crossarm. 1. Supply conductors of different voltage classification 2. Supply circuits of 0-750 volts and communication circuits 3. Supply circuits and private communication circuits.	32.4-A 32.4-B 89.2-A
(y)	Special clearances for unprotected supply conductors from one level to another level	54.6-A 58.2-B3 92.1-F5
(z)	Not applicable to the following: 1. Clearances between conductors at different levels specified in Cases 8 to 13 inclusive. 2. Supply lateral conductors, suitably protected 3. Supply vertical runs, suitably protected 4. Supply risers, suitably protected 5. Communication Conductors	54.6-C 54.6-D 54.6-E 87.4-C1
(aa)	Not applicable between cables and their supporting messengers. 1. Supply 2. Communication	57.4-D 87.4-F
(bb)	May be reduced for communication guys and communication conductors supported on the same poles 1. Supply 2. Communication	56.4-C 86.4-C
(cc)	Clearance required between guys. 1. Supply guys, crossing 2. Supply guys, approximately parallel 3. Communication guys, crossing 4. Communication guys, approximately parallel	56.4-D2 56.4-D3 86.4-D2 86.4-D3
(dd)	Shall be increased where within 6 feet of a pole	103.5
(ee)	May be decreased in partial underground distribution	54.4-C4c
(ff)	shall be increased by 0.40 inches per kV in excess of 75 kV	
(gg)	shall be increased by 0.40 inches per kV in excess of 150 kV	
(hh)	shall be increased by 0.40 inches per kV in excess of 300 kV	
(ii)	shall be increased by 0.25 inches per kV in excess of 150 kV	

(jj)	shall be increased by 0.25 inches per kV in excess of 300 kV	
(kk)	proposed clearances to submitted to the CPUC prior to construction for circuits in excess of 550 kV	
(ll)	36-inch clearance applies 35 kV to 68kV 48-inch clearance applies over 68 kV	
(mm)	vertical clearance shall be increased by ½ inch for each kilovolt over 68 kV	
(nn)	The vertical separation between supply conductors and service drops Of 0-750 volts and 20,000-22,500-volt conductors may be reduced to 48 inches.	
(oo)	May be reduced to 72 inches for conductors of 20,000-22,500 volts.	
(pp)	May be reduced to 36 inches vertically at midspan only when the supply conductors consist of abrasion resistant cable with a grounded metallic sheath or neutral–supported cable as specified in Rules 57 and 54.10 .	

Original Version
Rule 49.2-C2

49.2-C2 Longitudinal Loads Normally Unbalanced: Where crossarms are subjected to unbalanced longitudinal loads they shall have sufficient strength to meet the strength requirements with safety factors at least equal to those specified in Rule 44.

At unbalanced corners and dead ends, in Grades "A," "B" or "C" construction, where conductors are supported on pins and insulators, double crossarms shall be used to permit conductor fastenings at two insulators and thus retard slipping.

For conductors tensions up to 2000 pounds per conductor, double pins with double wood crossarms fitted with spacing devices at each end will be considered as meeting the strength requirements of Rules 47.4 and 47.5.

Strikeout and Underline Version
Rule 49.2-C2

49.2-C2 Longitudinal Loads Normally Unbalanced: ~~Where~~ Crossarms subjected to unbalanced longitudinal loads shall have sufficient strength to meet the strength requirements with safety factors at least equal to those specified in Rule 44 .

At unbalanced corners and dead ends in Grades "A", "B" or "C" construction, where conductor ~~are supported on pins and~~ tension is held by cantilever strength of pin–type insulators and pins, double crossarms shall be used to permit conductor fastenings at two insulators to prevent slipping. In lieu of double crossarms and double insulators, single crossarms may be used with single insulators and steel pins and prefabricated conductor ties.

For conductor tensions up to 2,000 pounds per conductor, ~~double pins with~~ double wood crossarms fitted with spacing devices at each end will be considered as meeting the strength requirements of Rules 47.4 and 47.5.

Final Version
Rule 49.2-C3

49.2-C2 Longitudinal Loads Normally Unbalanced: Crossarms subjected to unbalanced longitudinal loads shall have sufficient strength to meet the strength requirements with safety factors at least equal to those specified in Rule 44 .

At unbalanced corners and dead ends in Grades "A", "B" or "C" construction, where conductor tension is held by cantilever strength of pin–type insulators and pins, double crossarms shall be used to permit conductor fastenings at two insulators to prevent slipping. In lieu of double crossarms and double insulators, single crossarms may be used with single insulators and steel pins and prefabricated conductor ties.

For conductor tensions up to 2,000 pounds per conductor, double wood crossarms fitted with spacing devices at each end will be considered as meeting the strength requirements of Rules 47.4 and 47.5 .

Original Version
Rule 49.3-C2

49.3-C2 Longitudinal Loads Normally Unbalanced: At unbalanced corners and dead ends in Grades "A", "B" or "C" construction, where the conductor tensions are held by cantilever strength in pin-type insulators and pins, double pins and insulators shall be used and each line conductor shall be tied or fastened to both insulators so as to prevent slipping of the conductor under the maximum working tensions with a safety factor of 2 under the temperature and loading conditions specified in Rule 43.

At changes in grade of construction and at end supports in Grades "A" or "B" construction where the conductors are not dead-ended and are supported on pin-type insulators, double insulators and pins with wires, or equivalent fastenings, will be considered as meeting the strength requirements of Rule 47.4 and 47.5 for conductor tensions up to 2000 pounds per conductor.

Strikeout and Underline Version
Rule 49.3-C2

49.3-C2 Longitudinal Loads Normally Unbalanced: At unbalanced corners and dead ends in Grades "A", "B" or "C" construction, where the conductor tensions are held by cantilever strength in pin-type insulators and pins, double pins~~,~~ ~~and~~ insulators and wood pins or single insulators and steel pins shall be used ~~and~~ eEach line conductor shall be tied or fastened to both insulators so as to prevent slipping of the conductor under the maximum working tensions with a safety factor of 2 under the temperature and loading conditions specified in Rule 43.

At changes in grade of construction and at end supports in Grades "A" or "B" construction where the conductors are not dead-ended and are supported on pin-type insulators, double insulators and pins with wires, or equivalent fastenings, will be considered as meeting the strength requirements of Rule 47.4 and 47.5 for conductor tensions up to 2000 pounds per conductor.

Final Version
Rule 49.3-C2

49.3-C2 Longitudinal Loads Normally Unbalanced: At unbalanced corners and dead ends in Grades "A", "B" or "C" construction, where the conductor tensions are held by cantilever strength in pin-type insulators and pins, double pins, insulators and wood pins or single insulators and steel pins shall be used. Each line conductor shall be tied or fastened to both insulators so as to prevent slipping of the conductor under the maximum working tensions with a safety factor of 2 under the temperature and loading conditions specified in Rule 43.

At changes in grade of construction and at end supports in Grades "A" or "B" construction where the conductors are not dead-ended and are supported on pin-type insulators, double insulators and pins with wires, or equivalent fastenings, will be considered as meeting the strength requirements of Rule 47.4 and 47.5 for conductor tensions up to 2000 pounds per conductor.

Original Version
Rule 52.7-C

52.7-C Separation from Bond Wires and Ground Wires

Bond wires and ground wires shall have a clearance of not less than 1 ½ inches from metal pins, bolts, and other hardware on wood crossarms except where the hardware is intended to be connected to the bond or ground wires, and in being so connected does not violate other rules of this Order, in which case suitable electrical contact shall be made.

Strikeout and Underline Version
Rule 52.7-C

52.7-C Separation from Bond Wires and Ground Wires

Bond wires and ground wires shall have a clearance of not less than 1 ½ inches from metal pins, bolts, and other hardware on wood crossarms and wood poles except where the hardware is intended to be connected to the bond or ground wires, and in being so connected does not violate other rules of this Order, in which case suitable electrical contact shall be made.

Final Version
Rule 52.7-C

52.7-C Separation from Bond Wires and Ground Wires

Bond wires and ground wires shall have a clearance of not less than 1 ½ inches from metal pins, bolts, and other hardware on wood crossarms and wood poles except where the hardware is intended to be connected to the bond or ground wires, and in being so connected does not violate other rules of this Order, in which case suitable electrical contact shall be made.

Original Version

Rule 52.7-D

52.7 Hardware

D Separation from Metal Pins and Dead-end Hardware

Through bolts, metal signs, conduits, metal braces, mounting bolts and hardware for cutouts or other apparatus, metal street light fixtures, metal pole top extensions and metal arm extensions supported by or attached to the surface of wood poles and wood crossarms shall have a clearance of not less than 1 ½ inches from metal pins and dead-end hardware. Bolts and hardware of line equipment and bolts and hardware of insulators, all of which are associated with the same circuit and on the same crossarm, may be metallically interconnected provided a positive electric contact is made.

"This rule need not be applied to through bolts and dead-end hardware of a single circuit of more than 7,500 volts constructed at the top of a pole in any configuration. On a related buckarm portions of through bolts and dead-end hardware in the climbing space which do not conform with the rule must be covered with a suitable non-conducting material having an insulation value equal to the insulation value of the insulators on the associated circuit.

Guys and space bolts shall have a clearance of not less than 1 ½ inches from metal pins and dead-end hardware unless contact is intended, in which case a positive electrical contact shall be made. Any guy contacting or connected to a metal pin or part of dead- end hardware shall not be placed in the climbing space. No part of any guy may be nearer than 1 ½ inches to any through bolt which is metallically interconnected to dead-end hardware.

Strikeout and Underline Version

Rule 52.7-D

52.7 Hardware

D Separation from Metal Pins and Dead-end Hardware

Through bolts, metal signs, conduits, metal braces, mounting bolts and hardware for cutouts or other apparatus, metal street light fixtures, metal pole top extensions and metal arm extensions supported by or attached to the surface of wood poles and wood crossarms shall have a clearance of not less than 1 ½ inches from metal pins and dead-end hardware. Bolts and hardware of line equipment and bolts and hardware of insulators, all of which are associated with the same circuit and on the same crossarm, may be metallically interconnected provided a positive electric contact is made.

~~"This rule need not be applied to through bolts and dead-end hardware of a single circuit of more than 7,500 volts constructed at the top of a pole in any configuration. On a related buckarm portions of through bolts and dead-end hardware in the climbing space which do not conform with the rule must be covered with a suitable non-conducting material having an insulation value equal to the insulation value of the insulators on the associated circuit.~~

Guys and space bolts shall have a clearance of not less than 1 ½ inches from metal pins and dead-end hardware unless contact is intended, in which case a positive electrical contact shall be made. Any guy contacting or connected to a metal pin or part of dead- end hardware shall not be placed in the climbing space. No part of any guy may be nearer than 1 ½ inches to any through bolt which is metallically interconnected to dead-end hardware.

Final Version
Rule 52.7-D

52.7 Hardware

D Separation from Metal Pins and Dead-end Hardware

Through bolts, metal signs, conduits, metal braces, mounting bolts and hardware for cutouts or other apparatus, metal street light fixtures, metal pole top extensions and metal arm extensions supported by or attached to the surface of wood poles and wood crossarms shall have a clearance of not less than 1 ½ inches from metal pins and dead-end hardware. Bolts and hardware of line equipment and bolts and hardware of insulators, all of which are associated with the same circuit and on the same crossarm, may be metallically interconnected provided a positive electric contact is made.

Guys and space bolts shall have a clearance of not less than 1 ½ inches from metal pins and dead-end hardware unless contact is intended, in which case a positive electrical contact shall be made. Any guy contacting or connected to a metal pin or part of dead- end hardware shall not be placed in the climbing space. No part of any guy may be nearer than 1 ½ inches to any through bolt which is metallically interconnected to dead-end hardware.

Original Version
Rule 54.7-A

54.7-A Climbing Space

A Climbing Space

Climbing space, measured from centerline of pole, shall be provided on one side or in one quadrant of all poles or structures, with dimensions as specified in Rules 54.7-A1, 54.7-A2 and 54.7-A3. For climbing space dimensions where post insulators are utilized see Rule 54.11-F.

The climbing space shall be maintained in the same position for a distance of not less than 4 feet vertically both above and below each conductor level through which it passes. Compliance with this requirement necessitates that the position of the climbing space shall not be changed through conductor levels which are less than 4 feet apart. Where the vertical distance between consecutive conductor levels is 4 feet or more, and less than 8 feet the position of the climbing space through such consecutive levels may be shifted not more than one-quarter of the distance around the pole. Where a conductor is installed at the top of a pole under the provisions of Rule 54.4-D8, the climbing space shall extend up to the level of such pole-top conductor but need not be provided through and above such level.

Allowable obstruction of these climbing spaces, where necessary, are specified in Rule 54.7-A4

This Rule 54.7-A need not apply to non-climbable metal poles in partial underground distribution, provided the regular written operating rules of the utility concerned specify that all work on conductors and equipment supported by such poles shall be performed only from aerial lifts and (1) in the case of primary conductors, shall be done with live-line tools after installing adequate insulating and protective devices or barriers in order to (a) prevent accidental contact by the workman with the energized conductors other than the conductor being worked on and (b) to minimize the possibility of simultaneous contact of the metal parts of live-line tools with the grounded pole and the energized conductor and (2) in the case of secondary

conductors shall be done after suitably covering all energized primary conductors with adequate insulating and protective devices or barriers.

1 Dimensions Where Crossarms are Not Involved:

Climbing space through the levels of conductors deadended on poles in vertical configuration shall be a square of the horizontal dimensions tabulated below; and one side of such climbing space shall be bounded by the vertical plane of the dead-ended conductors with the centerline of pole bisecting such side (see App. G, Fig, 15)

Voltage of Conductors	Dimensions of Square
750-7500 volts	30inches
7500-46,000 volts	36 inches
More than 46,000 volts	36 inches plus ½ inch Per kV in excess Of 46kV.

For climbing space dimensions for low voltage rack construction see Rule 54.9-F.

2 Dimensions Where Line Arms Only Are Involved:

The climbing space through levels where line arms without related buck arms are present on poles or structures shall be on one side or face of the pole, with the center line of pole approximately midway on one side of the climbing space (see App. G Fig. 16), and shall have the following dimensions:

For conductors of 0-7500 volts, the climbing space shall be not less than 30 inches square except that for combination arm construction the climbing space shall be not less than 36 inches square. (see Rule 54.8-E for additional requirements where service drops from combination line arms are involved.)

For conductors of 750-46,000 volts the climbing space shall not be less than 36 inches square.

For conductors of more than 46,000 volts the climbing space shall be a square the sides of which shall be not less than 36 inches plus ½ inch per kV in excess of 46 kV.

The above dimensions may be reduced not more than 2 percent because of line angles.

The climbing space required by this rule may be shifted laterally not more than 5 inches under the condition that (a) the mid-point of the side of the climbing space coinciding with the center line of, the pole shall be not more than 5 inches from the center line of the pole, and (b) that full climbing space dimensions shall be maintained, but without the use of the 2% reduction where the shift is more than 2 inches.

3 Dimensions Where Buck Arms Are Involved: The climbing space where line arms and related buck arms are involved on pole or structures shall be in a quadrant and shall have at least the dimensions, determined according to voltage classification as given below. These dimensions are based on the minimum clearance from center line of pole (Table 1, Case 8) and minimum pin spacings (Table 2, Case 15) for the voltages involved, with the pin position numbered outward from the pole on the climbing side.

Where metal back braces are used they shall be considered as one of the arms of double arm construction.

a) For Conductors of 0-750 Volts: Where single line arm and buck arm construction is involved and the climbing space is left open opposite the single arm, the No. 1 pin Position shall be left vacant in the single arm. (See App G, Fig 18.)

Where double line arm and double buck arm construction is involved, the No. 1 pin position

shall be left vacant in each arm. (see App. G, Fig. 19)

b) For conductors of More than 750 Volts: Where single arm and single buck arm construction is involved and the climbing space is left open on the opposite side of the pole from the arms, the No. 1 pin position shall be left vacant in both line arm and buck arm (see App. G, Fig. 20). As an alternative, where the conductors are of 750-7500 volts, the No. 1 and No. 2 pin positions in one arm may be left vacant provided the arms involved are in top positions on the pole.

Where double line arm and single buck arm, or vice versa, construction is involved and the climbing space is left open on the side of the pole opposite the single arm, the No. 1 pin position shall be left vacant in both line arm and buck arm (see App. G, Fig. 21). AS an alternative, where the conductors are of 750-7500 volts the No. 1 and No. 2 pin positions may be left vacant in the single arm provided the arm involved are in top positions on the pole.

Where double line arm and double buck arm construction is involved the No. 1 pin position shall be left vacant in one double arm and the No. 1 and No. 2 pin positions shall be left vacant in the other double arm. (See App. G, Fig 22.)

Where a single circuit of more than 7,500 volts is in horizontal configuration at the top of the pole, climbing space has to be provided only up to and not through the top level and the No. 1 pin position need not be left vacant.

c) For Combination Arm Construction with Line Arm and Line Buck Arm or Service Buck Arm: (See Rule 54.8-E for additional requirements where service drops are involved.)

Where the vertical separation between conductor levels on line and buck arms is not less than 4 feet and the climbing space is in a 0-750 volt quadrant, the climbing space dimensions shall be not less than those prescribed in Rule 54.7-A3a for 0-750 volt conductors provided that the required vacant pin conductors provided that the required vacant pin spaces shall be in addition to the 36-inch horizontal conductor separation required in Rue 54.4-C2b. (See App. G, Figs 23, 24 and 25.)

Where the vertical separation between conductor levels on line and buck arms is not less than 4 feet and the climbing space is in a 750-7500 volt conductors provided that the required vacant volt conductors provided that the required vacant pin spaces shall be in addition to the 36-inch horizontal conductor separation required in Rule 54.4-C2b. (See App. G, Figs 26, 27 and 28.)

Where the vertical separation between conductor levels the vertical separation between conductor levels on line and buck arms is less than 4 feet such separation shall not be less than 2 feet and the climbing space dimensions, in any quadrant, shall be not less than those prescribed in Rule 54.7-A3b for 750-7500 volt conductors, provided that the required vacant pin spaces shall be in addition to the 42-inch horizontal conductor separation required in Rule 54.4-C2b. (See App. G Figs 29, 30 and 31.)

d) Alternatives: Where a single line arm or single buck arm is involved and it is impractical to locate the climbing space in the quadrant on the opposite side of the pole from the single arm, it may be located in another quadrant provided that any single arm or arms within the climbing space shall be treated as a double arm.

In applying the pin position spacings as prescribed in Rule 54.7 not less than the minimum spacings of Table 2, Case 15 shall be used. In the event the crossarms used are not bored for the minimum spacings, a spacing of conductors to give equivalent dimensions will be considered as meeting the requirements.

4 Allowable Climbing Space Obstructions: Crossarms and their supporting members are allowed in climbing spaces provided that, where buck arms are involved, any arms within climbing spaces are treated as double arms.

Suitably protected vertical conductors attached tot eh surfaces of poles, and guys, (except those guys contacting metal pins or dead-end hardware as specified in Rule 52.7-D) are allowed in climbing spaces provided that not more than one guy and one vertical riser, run, or ground wire are installed in any 4-foot vertical section of climbing space. The terminals or terminal fittings of risers or runs shall not be installed within climbing spaces.

Pin-type insulators which support line conductors of 20,000 volts or less may extend not more than one-half of their diameter into the climbing space. Dead-end or strain type insulators which support line conductors of 0-750 volts may extend not more than one-half of their diameter into the climbing space.

Space bolts used for the attachment of dead-end hardware of a circuit of any voltage located below a circuit at the top of the pole may project into the climbing space provided they are protected with a suitable insulating cover, having an insulating value equal to the insulators on the associated circuit, and further that the area of the climbing space on a horizontal plane is not reduced by more than 10%.

Modifications of these requirements for rack construction are specified in Rule 54.9-F.

Strikeout and Underline Version
Rule 54.7-A

54.7-A Climbing Space

A Climbing Space

Climbing space, measured from centerline of pole, shall be provided on one side or in one quadrant of all poles or structures, with dimensions as specified in Rules 54.7-A1, 54.7-A2 and 54.7-A3. For climbing space dimensions where post insulators are utilized see Rule 54.11-F.

The climbing space shall be maintained in the same position for a distance of not less than 4 feet vertically both above and below each conductor level through which it passes. Compliance with this requirement necessitates that the position of the climbing space shall not be changed through conductor levels which are less than 4 feet apart. Where the vertical distance between consecutive conductor levels is 4 feet or more, and less than 8 feet the position of the climbing space through such consecutive levels may be shifted not more than one-quarter of the distance around the pole. Where a conductor is installed at the top of a pole under the provisions of Rule 54.4-D8, the climbing space shall extend up to the level of such pole-top conductor but need not be provided through and above such level.

Allowable obstruction of these climbing spaces, where necessary, are specified in Rule 54.7-A4

~~This Rule 54.7-A need not apply to non-climbable metal poles in partial underground distribution, provided the regular written operating rules of the utility concerned specify that all work on conductors and equipment supported by such poles shall be performed only from aerial lifts and (1) in the case of primary conductors, shall be done with live-line tools after installing adequate insulating and protective devices or barriers in order to (a) prevent accidental contact by the workman with the energized conductors other than the conductor being worked on and (b) to minimize the possibility of simultaneous contact of the metal parts of live-line tools with the grounded pole and the energized conductor and (2) in the case of secondary~~

~~conductors shall be done after suitably covering all energized primary conductors with adequate insulating and protective devices or barriers.~~

Bolts bonded to or used for the attachment of dead-end hardware of a circuit of any voltage in horizontal (wood crossarm) configuration may project into the climbing space provided they are covered with a suitable non-conducting material as specified in Rule 22.2-F. If such bolts are bonded, a positive electrical contact shall be made.

The covering of bolts, required by this rule , shall not apply to:

(1) Bolts associated with circuits of 0 to 750 volts at any level on a pole or structure.

(2) Bolts associated with circuits of more than 7,500 volts when located at the top level of a pole.

"No part of any guy contacting or connected to a metal pin or part of dead-end hardware, shall be located in the climbing space."

1 Dimensions Where Crossarms are Not Involved:

Climbing space through the levels of conductors deadended on poles in vertical configuration shall be a square of the horizontal dimensions tabulated below; and one side of such climbing space shall be bounded by the vertical plane of the dead-ended conductors with the centerline of pole bisecting such side (see App. G, Fig, 15)

Voltage of Conductors	Dimensions of Square
750-7500 volts	30inches
7500-46,000 volts	36 inches
More than 46,000 volts	36 inches plus ½ inch Per kV in excess Of 46kV.

For climbing space dimensions for low voltage rack construction see Rule 54.9-F.

2 Dimensions Where Line Arms Only Are Involved:

The climbing space through levels where line arms without related buck arms are present on poles or structures shall be on one side or face of the pole, with the center line of pole approximately midway on one side of the climbing space (see App. G Fig. 16), and shall have the following dimensions:

For conductors of 0-7500 volts, the climbing space shall be not less than 30 inches square except that for combination arm construction the climbing space shall be not less than 36 inches square. (see Rule 54.8-E for additional requirements where service drops from combination line arms are involved.)

For conductors of 750-46,000 volts the climbing space shall not be less than 36 inches square.

For conductors of more than 46,000 volts the climbing space shall be a square the sides of which shall be not less than 36 inches plus ½ inch per kV in excess of 46 kV.

The above dimensions may be reduced not more than 2 percent because of line angles.

The climbing space required by this rule may be shifted laterally not more than 5 inches under the condition that (a) the mid-point of the side of the climbing space coinciding with the center line of, the pole shall be not more than 5 inches from the center line of the pole, and (b) that full climbing space dimensions shall be maintained, but without the use of the 2% reduction where the shift is more than 2 inches.

3 Dimensions Where Buck Arms Are Involved: The climbing space where line arms and related buck arms are involved on pole or structures shall be in a quadrant and shall have at least the dimensions, determined according to voltage classification as given below. These dimensions are based on the

minimum clearance from center line of pole (Table 1, Case 8) and minimum pin spacings (Table 2, Case 15) for the voltages involved, with the pin position numbered outward from the pole on the climbing side.

Where metal back braces are used they shall be considered as one of the arms of double arm construction.

a) For Conductors of 0-750 Volts: Where single line arm and buck arm construction is involved and the climbing space is left open opposite the single arm, the No. 1 pin Position shall be left vacant in the single arm. (See App G, Fig 18.)

Where double line arm and double buck arm construction is involved, the No. 1 pin position shall be left vacant in each arm. (see App. G, Fig. 19)

b) For conductors of More than 750 Volts: Where single arm and single buck arm construction is involved and the climbing space is left open on the opposite side of the pole from the arms, the No. 1 pin position shall be left vacant in both line arm and buck arm (see App. G, Fig. 20). As an alternative, where the conductors are of 750-7500 volts, the No. 1 and No. 2 pin positions in one arm may be left vacant provided the arms involved are in top positions on the pole.

Where double line arm and single buck arm, or vice versa, construction is involved and the climbing space is left open on the side of the pole opposite the single arm, the No. 1 pin position shall be left vacant in both line arm and buck arm (see App. G, Fig. 21). AS an alternative, where the conductors are of 750-7500 volts the No. 1 and No. 2 pin positions may be left vacant in the single arm provided

the arm involved are in top positions on the pole.

Where double line arm and double buck arm construction is involved the No. 1 pin position shall be left vacant in one double arm and the No. 1 and No. 2 pin positions shall be left vacant in the other double arm. (See App. G, Fig 22.)

Where a single circuit of more than 7,500 volts is in horizontal configuration at the top of the pole, climbing space has to be provided only up to and not through the top level and the No. 1 pin position need not be left vacant.

c) For Combination Arm Construction with Line Arm and Line Buck Arm or Service Buck Arm: (See Rule 54.8-E for additional requirements where service drops are involved.)

Where the vertical separation between conductor levels on line and buck arms is not less than 4 feet and the climbing space is in a 0-750 volt quadrant, the climbing space dimensions shall be not less than those prescribed in Rule 54.7-A3a for 0-750 volt conductors provided that the required vacant pin conductors provided that the required vacant pin spaces shall be in addition to the 36-inch horizontal conductor separation required in Rue 54.4-C2b. (See App. G, Figs 23, 24 and 25.)

Where the vertical separation between conductor levels on line and buck arms is not less than 4 feet and the climbing space is in a 750-7500 volt conductors provided that the required vacant volt conductors provided that the required vacant pin spaces shall be in addition to the 36-inch horizontal conductor separation required in Rule 54.4-C2b. (See App. G, Figs 26, 27 and 28.)

Where the vertical separation between conductor levels the vertical separation between conductor levels on line and buck arms is less than 4 feet such separation shall not be less than 2 feet and the climbing space dimensions, in any quadrant, shall be not less than those prescribed in Rule 54.7-A3b for 750-7500 volt conductors, provided that the required vacant pin spaces shall be in addition to the 42-inch horizontal conductor separation required in Rule 54.4-C2b. (See App. G Figs 29, 30 and 31.)

d) Alternatives: Where a single line arm or single buck arm is involved and it is impractical to locate the climbing space in the quadrant on the opposite side of the pole from the single arm, it may be located in another quadrant provided that any single arm or arms within the climbing space shall be treated as a double arm.

In applying the pin position spacings as prescribed in Rule 54.7 not less than the minimum spacings of Table 2, Case 15 shall be used. In the event the crossarms used are not bored for the minimum spacings, a spacing of conductors to give equivalent dimensions will be considered as meeting the requirements.

4 Allowable Climbing Space Obstructions: Crossarms and their supporting members are allowed in climbing spaces provided that, where buck arms are involved, any arms within climbing spaces are treated as double arms.

Suitably protected vertical conductors attached to the surfaces of poles, and guys, (except those guys contacting metal pins or dead-end hardware as specified in Rule 52.7-D) are allowed in climbing spaces provided that not more than ~~one guy~~ <u>two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches)</u> and one vertical riser, run, or ground wire are installed in any 4-foot vertical section of climbing space. The terminals or

terminal fittings of risers or runs shall not be installed within climbing spaces.

Pin-type insulators which support line conductors of 20,000 volts or less may extend not more than one-half of their diameter into the climbing space. Dead-end or strain type insulators which support line conductors of 0-750 volts may extend not more than one-half of their diameter into the climbing space.

Space bolts used for the attachment of dead-end hardware of a circuit of any voltage located below a circuit at the top of the pole may project into the climbing space provided they are protected with a suitable insulating cover, having an insulating value equal to the insulators on the associated circuit, and further that the area of the climbing space on a horizontal plane is not reduced by more than 10%.

Modifications of these requirements for rack construction are specified in Rule 54.9-F.

Final Version
Rule 54.7-A

54.7-A Climbing Space

A Climbing Space

Climbing space, measured from centerline of pole, shall be provided on one side or in one quadrant of all poles or structures, with dimensions as specified in Rules 54.7-A1, 54.7-A2 and 54.7-A3. For climbing space dimensions where post insulators are utilized see Rule 54.11-F.

The climbing space shall be maintained in the same position for a distance of not less than 4 feet vertically both above and below each conductor level through which it passes. Compliance with this requirement necessitates that the position of the climbing space shall not be changed through conductor levels which are less than 4 feet apart. Where the vertical distance between consecutive conductor levels is 4 feet or more, and less than 8 feet the position of the climbing space through such consecutive levels may be shifted not more than one-quarter of the distance around the pole. Where a conductor is installed at the top of a pole under the provisions of Rule 54.4-D8, the climbing space shall extend up to the level of such pole-top conductor but need not be provided through and above such level.

Allowable obstruction of these climbing spaces, where necessary, are specified in Rule 54.7-A4

Bolts bonded to or used for the attachment of dead-end hardware of a circuit of any voltage in horizontal (wood crossarm) configuration may project into the climbing space provided they are covered with a suitable non-conducting material as specified in Rule 22.2-F. If such bolts are bonded, a positive electrical contact shall be made.

The covering of bolts, required by this rule , shall not apply to:

(1) Bolts associated with circuits of 0 to 750 volts at any level on a pole or structure.

(2) Bolts associated with circuits of more than 7,500 volts when located at the top level of a pole.

"No part of any guy contacting or connected to a metal pin or part of dead-end hardware, shall be located in the climbing space."

1 Dimensions Where Crossarms are Not Involved:

Climbing space through the levels of conductors deadended on poles in vertical configuration shall be a square of the horizontal dimensions tabulated below; and one side of such climbing space shall be bounded by the vertical plane of the dead-ended conductors with the centerline of pole bisecting such side (see App. G, Fig, 15)

Voltage of Conductors	Dimensions of Square
750-7500 volts	30inches
7500-46,000 volts	36 inches
More than 46,000 volts	36 inches plus ½ inch Per kV in excess Of 46kV.

For climbing space dimensions for low voltage rack construction see Rule 54.9-F.

2 Dimensions Where Line Arms Only Are Involved:

The climbing space through levels where line arms without related buck arms are present on poles or structures shall be on one side or face of the pole, with the center line of pole approximately midway on one side of the climbing space (see App. G Fig. 16), and shall have the following dimensions:

For conductors of 0-7500 volts, the climbing space shall be not less than 30 inches square except that for combination arm construction the climbing space shall be not less than 36 inches square. (see Rule 54.8-E for additional requirements where service drops from combination line arms are involved.)

For conductors of 750-46,000 volts the climbing space shall not be less than 36 inches square.

For conductors of more than 46,000 volts the climbing space shall be a square the sides of which shall be not less than 36 inches plus ½ inch per kV in excess of 46 kV.

The above dimensions may be reduced not more than 2 percent because of line angles.

The climbing space required by this rule may be shifted laterally not more than 5 inches under the condition that (a) the mid-point of the side of the climbing space coinciding with the center line of, the pole shall be not more than 5 inches from the center line of the pole, and (b) that full climbing space dimensions shall be maintained, but without the use of the 2% reduction where the shift is more than 2 inches.

3 Dimensions Where Buck Arms Are Involved: The climbing space where line arms and related buck arms are involved on pole or structures shall be in a quadrant and shall have at least the dimensions, determined according to voltage classification as given below. These dimensions are based on the minimum clearance from center line of pole (Table 1, Case 8) and minimum pin spacings (Table 2, Case 15) for the voltages involved, with the pin position numbered outward from the pole on the climbing side.

Where metal back braces are used they shall be considered as one of the arms of double arm construction.

a) For Conductors of 0-750 Volts: Where single line arm and buck arm construction is involved and the climbing space is left open opposite the single arm, the No. 1 pin Position shall be left vacant in the single arm. (See App G, Fig 18.)

Where double line arm and double buck arm construction is involved, the No. 1 pin position shall be left vacant in each arm. (see App. G, Fig. 19)

b) For conductors of More than 750 Volts: Where single arm and single buck arm construction is involved and the climbing space is left open on the opposite side of the pole from the arms, the No. 1 pin position shall be left vacant in both line arm and buck arm (see App. G, Fig. 20). As an alternative, where the conductors are of 750-7500 volts, the No. 1 and No. 2 pin positions in one arm may be left vacant provided the arms involved are in top positions on the pole.

Where double line arm and single buck arm, or vice versa, construction is involved and the climbing space is left open on the side of the pole opposite the single arm, the No. 1 pin position shall be left vacant in both line arm and buck arm (see App. G, Fig. 21). AS an alternative, where the conductors are of 750-7500 volts the No. 1 and No. 2 pin positions may be left vacant in the single arm provided the arm involved are in top positions on the pole.

Where double line arm and double buck arm construction is involved the No. 1 pin position shall be left vacant in one double arm and the No. 1 and No. 2 pin positions shall be left vacant in the other double arm. (See App. G, Fig 22.)

Where a single circuit of more than 7,500 volts is in horizontal configuration at the top of the pole, climbing space has to be provided only up to and not through the top level and the No. 1 pin position need not be left vacant.

c) For Combination Arm Construction with Line Arm and Line Buck Arm or Service Buck Arm: (See Rule 54.8-E for additional requirements where service drops are involved.)

Where the vertical separation between conductor levels on line and buck arms is not less than 4 feet and the climbing space is in a 0-750 volt quadrant, the climbing space dimensions shall be not less than those prescribed in Rule 54.7-A3a for 0-750 volt conductors provided that the required vacant pin conductors provided that the required vacant pin spaces shall be in addition to the 36-inch horizontal conductor separation required in Rue 54.4-C2b. (See App. G, Figs 23, 24 and 25.)

Where the vertical separation between conductor levels on line and buck arms is not less than 4 feet and the climbing space is in a 750-7500 volt conductors provided that the required vacant volt conductors provided that the required vacant pin spaces shall be in addition to the 36-inch horizontal conductor separation required in Rule 54.4-C2b. (See App. G, Figs 26, 27 and 28.)

Where the vertical separation between conductor levels the vertical separation between conductor levels on line and buck arms is less than 4 feet such separation shall not be less than 2 feet and the climbing space dimensions, in any quadrant, shall be not less than those prescribed in Rule 54.7-A3b for 750-7500 volt conductors, provided that the required vacant pin spaces shall be in addition to the 42-inch horizontal conductor separation required in Rule 54.4-C2b. (See App. G Figs 29, 30 and 31.)

d) Alternatives: Where a single line arm or single buck arm is involved and it is impractical to locate the climbing space in the quadrant on the opposite side of the pole from the single

arm, it may be located in another quadrant provided that any single arm or arms within the climbing space shall be treated as a double arm.

In applying the pin position spacings as prescribed in Rule 54.7 not less than the minimum spacings of Table 2, Case 15 shall be used. In the event the crossarms used are not bored for the minimum spacings, a spacing of conductors to give equivalent dimensions will be considered as meeting the requirements.

4 Allowable Climbing Space Obstructions: Crossarms and their supporting members are allowed in climbing spaces provided that, where buck arms are involved, any arms within climbing spaces are treated as double arms.

Suitably protected vertical conductors attached to the surfaces of poles, and guys, (except those guys contacting metal pins or dead-end hardware as specified in Rule 52.7-D) are allowed in climbing spaces provided that not more than two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches) and one vertical riser, run, or ground wire are installed in any 4-foot vertical section of climbing space. The terminals or terminal fittings of risers or runs shall not be installed within climbing spaces.

Pin-type insulators which support line conductors of 20,000 volts or less may extend not more than one-half of their diameter into the climbing space. Dead-end or strain type insulators which support line conductors of 0-750 volts may extend not more than one-half of their diameter into the climbing space.

Space bolts used for the attachment of dead-end hardware of a circuit of any voltage located below a circuit at the top of the pole may project into the climbing space provided they are protected with a suitable insulating cover, having an insulating value equal to the insulators on the associated circuit, and

further that the area of the climbing space on a horizontal plane is not reduced by more than 10%.

Modifications of these requirements for rack construction are specified in Rule 54.9-F.

Original Version
Rule 54.8-D1

54.8-D(1) From Non-climbable Street Lighting or Traffic Signal Poles or Standards:

Supply service drops of 0 - 750 volts passing unattached shall clear non-climbable street lighting and traffic signal poles, or standards, including mastarms, brackets and lighting fixtures; a radial distance of 12 inches as specified in Table 1, Case 10, Column D; except when the conductors are mechanically protected from abrasion by materials specified in Rule 22.2. Such mechanical protection shall extend 15 inches in each direction along the cable from center line of pole standard, attaching mastarms or fixtures; whether passing above below or alongside. The conductors shall be installed in such a manner so as not to interfere with light distribution from lighting fixtures and shall not hamper workmen when changing lamps or maintaining equipment.

Strikeout and Underline Version
Rule 54.8-D1

54.8-D(1) From Non-climbable Street Lighting or Traffic Signal Poles or Standards:

Supply service drops of 0 - 750 volts passing (unattached) ~~shall clear~~ non-climbable street lighting and traffic signal poles~~,~~ or standards, including mastarms, brackets and lighting fixtures~~;~~ ~~a radial distance of 12 inches as specified in Table 1, Case 10, Column D;~~ may have a clearance less than 36 inches specified in Table 1, Case 10, Column D, but shall have a clearance of not less than 15 inches, except when the conductors are mechanically protected from abrasion by materials specified in Rule 22.2. Such mechanical protection shall extend not less than 15 inches in each direction along the cable from center line of pole standard, attaching mastarms or fixtures; whether passing above below or alongside. The conductors shall be installed in such a manner so as not to interfere with light distribution from lighting fixtures and shall not hamper workmen when changing lamps or maintaining equipment.

Final Version
Rule 54.8-D1

54.8-D(1) From Non-climbable Street Lighting or Traffic Signal Poles or Standards:

Supply service drops of 0 - 750 volts passing (unattached) non-climbable street lighting and traffic signal poles or standards, including mastarms, brackets and lighting fixtures may have a clearance less than 36 inches specified in Table 1, Case 10, Column D, but shall have a clearance of not less than 15 inches, except when the conductors are mechanically protected from abrasion by materials specified in Rule 22.2. Such mechanical protection shall extend not less than 15 inches in each direction along the cable from center line of pole standard, attaching mastarms or fixtures; whether passing above below or alongside. The conductors shall be installed in such a manner so as not to interfere with light distribution from lighting fixtures and shall not hamper workmen when changing lamps or maintaining equipment.

Original Version
Rule 54.10-B6

54.10-B(6) From Non-climbable Street Lighting or Traffic Signal Poles Standards:

Multi-conductor cables passing unattached shall clear non-climbable street lighting and traffic signal poles, or standards, including mastarms brackets, and lighting fixtures; a radial distance of 15 inches as specified in Table 1, Case 10, Column D; except when the conductors are mechanically protected from abrasion by materials specified in Rule 22.2. Such mechanical protection shall extend 15 inches in each direction along the cable from center line of pole, standard, attaching mastarms or fixture; whether passing above, below or alongside. The conductors shall be installed in such a manner so as not to interfere with light distribution from lighting fixtures and shall not hamper workmen changing lamps or maintaining equipment.

Strikeout and Underline Version
Rule 54.10-B6

54.10-B(6) From Non-climbable Street Lighting or Traffic Signal Poles Standards:

Multi-conductor cables passing (unattached) ~~shall clear~~ non-climbable street lighting and traffic signal poles~~,~~ or standards, including mastarms brackets, and lighting fixtures~~;~~ ~~a radial distance of 12 inches as specified in Table 1, Case 10, Column D;~~ may have a clearance less than 36 inches specified in Table 1, Case 10, Column D, but shall have a clearance of not less than 15 inches, except when the conductors are mechanically protected from abrasion by materials specified in Rule 22.2. Such mechanical protection shall extend not less than 15 inches in each direction along the cable from center line of pole standard, attaching mastarms or fixtures; whether passing above below or alongside. The conductors shall be installed in such a manner so as not to interfere with light distribution from lighting fixtures and shall not hamper workmen when changing lamps or maintaining equipment.

Strikeout and Underline Version
Rule 54.10-B6

54.10-B(6) From Non-climbable Street Lighting or Traffic Signal Poles Standards:

Multi-conductor cables passing (unattached) non- climbable street lighting and traffic signal poles~~,~~ or standards, including mastarms brackets, and lighting fixtures may have a clearance less than 36 inches specified in Table 1, Case 10, Column D, but shall have a clearance of not less than 15 inches, except when the conductors are mechanically protected from abrasion by materials specified in Rule 22.2. Such mechanical protection shall extend not less than 15 inches in each direction along the cable from center line of pole standard, attaching mastarms or fixtures; whether passing above below or alongside. The conductors shall be installed in such a manner so as not to interfere with light distribution from lighting fixtures and shall not hamper workmen when changing lamps or maintaining equipment.

Original Version
Rule 54.10-F

54.10F CLIMBING SPACE

(1) A climbing space shall be maintained through the level of conductors supported in bare neutral multiconductor cable construction and for a vertical distance of not less than 4 feet above and below such cable. The position of the climbing .space through the levels of conductors in such cable construction shall be related to climbing space for conductor levels above and below the cable in accordance with Rules 54.7 -A and 93. The depth of the climbing space shall be measured from the center line of the pole.

(2) The dimensions of the climbing space shall be 30 inches square, and shall be provided on one side of the pole with the extremities of such width equidistant from the center line of pole. On poles on which transformers are pole bolted in line with primary conductors, a 30inch square climbing space shall be provided.

(3) On poles with the messenger dead-ended and on corner poles, a 30-inch climbing space shall be provided in one quadrant or on one side of the pole. Suitably protected vertical runs or risers and ground wires attached to the surface of poles, and guys, are allowed in climbing spaces provided that no more than one guy or one vertical riser, run or ground wire are installed in any 4-foot vertical section of climbing space. The terminals or terminal fittings of risers or runs shall not be installed within climbing spaces.

Strikeout and Underline Version
Rule 54.10-F

54.10F CLIMBING SPACE

(1) A climbing space shall be maintained through the level of conductors supported in bare neutral multiconductor cable construction and for a vertical distance of not less than 4 feet above and below such cable. The position of the climbing .space through the levels of conductors in such cable construction shall be related to climbing space for conductor levels above and below the cable in accordance with Rules 54.7 -A and 93. The depth of the climbing space shall be measured from the center line of the pole.

(2) The dimensions of the climbing space shall be 30 inches square, and shall be provided on one side of the pole with the extremities of such width equidistant from the center line of pole. On poles on which transformers or similar apparatus are pole bolted in line with primary conductors, a 30inch square climbing space shall be provided in one quadrant or on one side of the pole.

(3) On poles with the messenger dead-ended and on corner poles, a 30-inch climbing space shall be provided in one quadrant or on one side of the pole. Suitably protected vertical runs or risers and ground wires attached to the surface of poles, and guys, are allowed in climbing spaces provided that no more than ~~one guy~~ two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches) or one vertical riser, run or ground wire are installed in any 4-foot vertical section of climbing space. The terminals or terminal fittings of risers or runs shall not be installed within climbing spaces.

Final Version
Rule 54.10-F

54.10F CLIMBING SPACE

(1) A climbing space shall be maintained through the level of conductors supported in bare neutral multiconductor cable construction and for a vertical distance of not less than 4 feet above and below such cable. The position of the climbing space through the levels of conductors in such cable construction shall be related to climbing space for conductor levels above and below the cable in accordance with Rules 54.7 -A and 93. The depth of the climbing space shall be measured from the center line of the pole.

(2) The dimensions of the climbing space shall be 30 inches square, and shall be provided on one side of the pole with the extremities of such width equidistant from the center line of pole. On poles on which transformers or similar apparatus are pole bolted in line with primary conductors, a 30inch square climbing space shall be provided in one quadrant or on one side of the pole.

(3) On poles with the messenger dead-ended and on corner poles, a 30-inch climbing space shall be provided in one quadrant or on one side of the pole. Suitably protected vertical runs or risers and ground wires attached to the surface of poles, and guys, are allowed in climbing spaces provided that no more than two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches) or one vertical riser, run or ground wire are installed in any 4-foot vertical section of climbing space. The terminals or terminal fittings of risers or runs shall not be installed within climbing spaces.

Original Version
Rule 54.11

54.11 Post insulators in vertical and horizontal position without crossarms; more than 750 volts.

A. GENERAL

Post insulators supporting conductors of more than 750 volts may be attached to poles in vertical or horizontal position, and, where so attached, the following rules shall apply.

A post insulator mounted directly on the side of a pole shall be considered as in a horizontal position.

A post insulator mounted directly at the top of the pole in a vertical position shall be considered as in vertical position.

B. POLE ARRANGEMENT AND CLEARANCES

(1) Clearances: Conductors and the hardware used to secure the conductor to the insulator shall have clearances from the centerline of the pole (as specified in Rule 54.4-D2) when supported on post insulators that are mounted in horizontal position. Conductors and the hardware used to secure the conductor to the insulator shall have clearance from the surface of the pole (as specified by Table 1, Case 9, Columns E and F) when mounted in a vertical position.

(2) Conductor Arrangement: Not more than one circuit over 750 volts shall be attached to any pole on post insulators in tri-angular configuration. Not more than four conductors of anyone circuit over 750 volts shall be attached to a pole on post insulators. The number of circuits attached to a pole by post insulators, except in triangular configuration, is not restricted (a circuit is in triangular configuration only when it consists of one phase on insulators mounted vertically at the top of the pole and other phases on insulators mounted horizontally on opposite sides of the pole).

Conductors on post insulators over 750 volts shall not be attached to more than three sides (there being four sides) of any pole at the same level of any circuit group. Climbing

space in con- junction with these attachments shall be maintained as specified by Rule 54.11F.

C. CONDUCTOR MATERIAL

All conductors of the same circuit on post insulators in the same vertical plane shall be of the same material.

D. CONDUCTOR SPACING

The vertical separation between conductors of the same circuit supported on post insulators in the same vertical plane shall be not less than spacing as indicated in Table 2, Case 20, Columns E, F, G, H and I.

E. VERTICAL CLEARANCES BETWEEN CONDUCTOR LEVELS

A vertical clearance of not less than that specified in Table 2, Case 8 through 13, shall be maintained between the lowest conductor supported on post insulator of a circuit group and the conductors supported on the same pole of the next lower circuit group.

F. CLIMBING SPACE

(1) One Vertical Circuit at Pole Top: For a single circuit at the top of the pole, the climbing space shall be maintained to the lowest conductor on the climbing side of the pole and workmen shall not go above the lowest conductor level,

EXCEPT:

(a) When Conductors Are Moved Out From Pole by accepted "hotline" techniques, or

(b) When the Pole Top Circuit Is De-energized and grounded, the climbing space shall be maintained to the top conductor of the circuit and the climbing space shall not be less than 30 inches square.

(2) Two Vertical Circuits at Pole Top: When two vertical circuits are installed at the top of pole, the climbing space shall be maintained to the lowest conductor level of those circuits on

the climbing side of the pole and workmen shall not go above such lowest conductor level,

EXCEPT:

(a) When Conductors Are Moved Out From Pole by accepted "hotline" techniques, or

(b) When Both Circuits Are De-energized and grounded the climbing space shall be maintained to the top conductors of the circuits. The space shall not be less than 30 inches square.

(c) When One Circuit Is De-energized and grounded, the climbing space shall be maintained on the climbing side between the center line of the pole and the de-energized conductors. The space shall be not less than 36 inches square.

(3) Vertical Circuits Bonded Together: When vertical circuits are bonded together, regardless of location on the pole, the climbing space shall be maintained to the lowest conductor level of those circuits on the climbing side of the pole and workmen shall not go above such lowest conductor level, unless conductors are moved out from pole by accepted "hotline" techniques, or

EXCEPT:

(a) Where a Single Circuit is Involved and such circuit is de-energized and the bond and the de-energized circuit is grounded as required in Rule 53.4-A3b, the climbing space shall not be less than 36 inches and shall be maintained for a vertical distance of not less than 4 feet below the lowest conductor and not less than 4 feet above the top conductor when not at the top of pole.

(b) Where Two Circuits Are Involved:

1. When Both Circuits Are De-energized and commonly bonded and the bond and the circuits grounded as required in Rule 53.4-A3b, the climbing space shall be maintained to the top conductors of the circuits. The space shall not be less than 36 inches square and shall be maintained for a vertical distance of not less than 4 feet below the lowest conductor and not less than 4 feet above the top conductor when not at the top of pole.

2. When One Circuit Is De-energized and both circuits are commonly bonded and the bond and the de-energized circuit grounded as required in Rule 53.4-A3b, the climbing space shall be maintained on the climbing side between the center line of the pole and the de-energized conductors. The space shall not be less than 36 inches square, and shall be maintained for a vertical distance of not less than 4 feet below the lowest conductor and not less than 4 feet above the top conductor when not at the top of pole.

(4) Unbonded Circuits Below Pole Top: For unbonded circuits below the pole top position climbing space shall be maintained through the levels of conductors supported on post insulators for a vertical distance of not less than four feet above the top conductor and not less than four feet below the lowest conductor.

The climbing space shall be a square of horizontal dimensions tabulated below and one side of the climbing space shall pass through the center line of the pole.

Voltage of Conductor	Dimensions of Square
750-7,500 volts :	36"
7,500-46,000 volts	42"
More than 46,000 volts	42" plus ½ " per kV in excess of 46 kV

G ALLOWABLE CLIMBING SPACE OBSTRUCTIONS

Post-type insulators and their attaching brackets which support line conductors of over 750 volts may extend not more than one-half of their dimension into the climbing space.

Suitable protected vertical conductors attached to the surface of poles and guys (except those guys contacting metal pins or dead-end hardware (as specified in Rule 52.7D)) are allowed in the climbing spaces provided that not more than one guy and one vertical riser, run, or ground wire are installed in any 4-foot vertical section of climbing space. The terminals or terminal fittings of risers or runs shall not be installed within climbing spaces.

H Pin type insulators supporting conductors of more than 750 volts may be attached to poles in triangular configuration. Where pin type insulators in triangular configuration are employed, all provisions of Rule 54.11 not herein modified shall be applicable.

Strikeout and Underline Version
Rule 54.11

54.11 ~~Post~~ Insulators in vertical and horizontal position without the use of wood crossarms; more than 750 volts.

A. GENERAL

~~Post~~ Insulators supporting conductors of more than 750 volts may be attached to poles in vertical or horizontal position, and, where so attached, the following rules shall apply.

An ~~post~~ insulator mounted directly on the side of a pole shall be considered as in a horizontal position.

An ~~post~~ insulator mounted directly at the top of the pole in a vertical position shall be considered as in vertical position.

B. POLE ARRANGEMENT AND CLEARANCES

(1) Clearances: Conductors and the hardware used to secure the conductor to the insulator shall have clearances from the centerline of the pole (as specified in Rule 54.4-D2) when supported on ~~post~~ insulators that are mounted in horizontal position. Conductors and the hardware used to secure the conductor to the insulator shall have clearance from the surface of the pole (as specified by Table 1, Case 9, Columns E and F) when mounted in a vertical position.

(2) Conductor Arrangement: Not more than one circuit over 750 volts shall be attached to any pole ~~on post insulators~~ in triangular configuration. Not more than four conductors of anyone circuit over 750 volts shall be attached to a pole ~~on post insulators~~. The number of circuits attached to a pole ~~by post insulators~~, except in triangular configuration, is not restricted (a circuit is in triangular configuration only when it consists of one phase on insulators mounted vertically at the top of the pole and other phases on insulators mounted horizontally on opposite sides of the pole).

Conductors on post insulators over 750 volts shall not be attached to more than three sides (there being four sides) of any pole at the same level of any circuit group. Climbing

space in con- junction with these attachments shall be maintained as specified by Rule 54.11F.

C. CONDUCTOR MATERIAL

All conductors of the same circuit ~~on post insulators~~ in the same vertical plane shall be of the same material.

D. CONDUCTOR SPACING

The vertical separation between conductors of the same circuit supported ~~on post insulators~~ in the same vertical plane shall be not less than spacing as indicated in Table 2, Case 20, Columns E, F, G, H and I.

E. VERTICAL CLEARANCES BETWEEN CONDUCTOR LEVELS

A vertical clearance of not less than that specified in Table 2, Case 8 through 13, shall be maintained between the lowest conductor ~~supported on post insulator~~ of a circuit group and the conductors supported on the same pole of the next lower circuit group.

F. CLIMBING SPACE

(1) One Vertical Circuit at Pole Top: For a single circuit at the top of the pole, the climbing space shall be maintained to the lowest conductor on the climbing side of the pole and workmen shall not go above the lowest conductor level,

EXCEPT:

(a) When Conductors Are Moved Out From Pole by accepted "hotline" techniques, or

(b) When the Pole Top Circuit Is De-energized and grounded, the climbing space shall be maintained to the top conductor of the circuit and the climbing space shall not be less than 30 inches square.

(2) Two Vertical Circuits at Pole Top: When two vertical circuits are installed at the top of pole, the climbing space shall be maintained to the lowest conductor level of those circuits on

the climbing side of the pole and workmen shall not go above such lowest conductor level,

EXCEPT:

(a) When Conductors Are Moved Out From Pole by accepted "hotline" techniques, or

(b) When Both Circuits Are De-energized and grounded the climbing space shall be maintained to the top conductors of the circuits. The space shall not be less than 30 inches square.

(c) When One Circuit Is De-energized and grounded, the climbing space shall be maintained on the climbing side between the center line of the pole and the de-energized conductors. The space shall be not less than 36 inches square.

(3) Vertical Circuits Bonded Together: When vertical circuits are bonded together, regardless of location on the pole, the climbing space shall be maintained to the lowest conductor level of those circuits on the climbing side of the pole and workmen shall not go above such lowest conductor level, unless conductors are moved out from pole by accepted "hotline" techniques, or

EXCEPT:

(a) Where a Single Circuit is Involved and such circuit is de-energized and the bond and the de-energized circuit is grounded as required in Rule 53.4-A3b, the climbing space shall not be less than 36 inches and shall be maintained for a vertical distance of not less than 4 feet below the lowest conductor and not less than 4 feet above the top conductor when not at the top of pole.

(b) Where Two Circuits Are Involved:

1. When Both Circuits Are De-energized and commonly bonded and the bond and the circuits grounded as required in Rule 53.4-A3b, the climbing space shall be maintained to the top conductors of the circuits. The space shall not be less than 36 inches square and shall be maintained for a vertical distance of not less than 4 feet below the lowest conductor and not less than 4 feet above the top conductor when not at the top of pole.

2. When One Circuit Is De-energized and both circuits are commonly bonded and the bond and the de-energized circuit grounded as required in Rule 53.4-A3b, the climbing space shall be maintained on the climbing side between the center line of the pole and the de-energized conductors. The space shall not be less than 36 inches square, and shall be maintained for a vertical distance of not less than 4 feet below the lowest conductor and not less than 4 feet above the top conductor when not at the top of pole.

(4) Unbonded Circuits Below Pole Top: For unbonded circuits below the pole top position climbing space shall be maintained through the levels of conductors supported on post insulators for a vertical distance of not less than four feet above the top conductor and not less than four feet below the lowest conductor.

The climbing space shall be a square of horizontal dimensions tabulated below and one side of the climbing space shall pass through the center line of the pole.

Voltage of Conductor	Dimensions of Square
750-7,500 volts :	36"
7,500-46,000 volts	42"
More than 46,000 volts	42" plus ½ " per kV in excess of 46 kV

G ALLOWABLE CLIMBING SPACE OBSTRUCTIONS

~~Post type~~ insulators and their attaching brackets which support line conductors of over 750 volts may extend not more than one-half of their dimension into the climbing space.

Suitable protected vertical conductors attached to the surface of poles and guys (except those guys contacting metal pins or dead-end hardware (as specified in Rule 52.7D)) are allowed in the climbing spaces provided that not more than ~~one guy~~ two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches) and one vertical riser, run, or ground wire are installed in any 4-foot vertical section of climbing space. The terminals or terminal fittings of risers or runs shall not be installed within climbing spaces.

~~H Pin type insulators supporting conductors of more than 750 volts may be attached to poles in triangular configuration. Where pin type insulators in triangular configuration are employed, all provisions of Rule 54.11 not herein modified shall be applicable.~~

Final Version
Rule 54.11

54.11 Insulators in vertical and horizontal position without the use of wood crossarms; more than 750 volts.

A. GENERAL

Insulators supporting conductors of more than 750 volts may be attached to poles in vertical or horizontal position, and, where so attached, the following rules shall apply.

An insulator mounted directly on the side of a pole shall be considered as in a horizontal position.

An insulator mounted directly at the top of the pole in a vertical position shall be considered as in vertical position.

B. POLE ARRANGEMENT AND CLEARANCES

(1) Clearances: Conductors and the hardware used to secure the conductor to the insulator shall have clearances from the centerline of the pole (as specified in Rule 54.4-D2) when supported on insulators that are mounted in horizontal position. Conductors and the hardware used to secure the conductor to the insulator shall have clearance from the surface of the pole (as specified by Table 1, Case 9, Columns E and F) when mounted in a vertical position.

(2) Conductor Arrangement: Not more than one circuit over 750 volts shall be attached to any pole in tri- angular configuration. Not more than four conductors of anyone circuit over 750 volts shall be attached to a pole. The number of circuits attached to a pole, except in triangular configuration, is not restricted (a circuit is in triangular configuration only when it consists of one phase on insulators mounted vertically at the top of the pole and other phases on insulators mounted horizontally on opposite sides of the pole).

Conductors on post insulators over 750 volts shall not be attached to more than three sides (there being four sides) of any pole at the same level of any circuit group. Climbing

space in con- junction with these attachments shall be maintained as specified by Rule 54.11F.

C. CONDUCTOR MATERIAL

All conductors of the same circuit in the same vertical plane shall be of the same material.

D. CONDUCTOR SPACING

The vertical separation between conductors of the same circuit supported in the same vertical plane shall be not less than spacing as indicated in Table 2, Case 20, Columns E, F, G, H and I.

E. VERTICAL CLEARANCES BETWEEN CONDUCTOR LEVELS

A vertical clearance of not less than that specified in Table 2, Case 8 through 13, shall be maintained between the lowest conductor of a circuit group and the conductors supported on the same pole of the next lower circuit group.

F. CLIMBING SPACE

(1) One Vertical Circuit at Pole Top: For a single circuit at the top of the pole, the climbing space shall be maintained to the lowest conductor on the climbing side of the pole and workmen shall not go above the lowest conductor level,

EXCEPT:

(a) When Conductors Are Moved Out From Pole by accepted "hotline" techniques, or

(b) When the Pole Top Circuit Is De-energized and grounded, the climbing space shall be maintained to the top conductor of the circuit and the climbing space shall not be less than 30 inches square.

(2) Two Vertical Circuits at Pole Top: When two vertical circuits are installed at the top of pole, the climbing space shall be maintained to the lowest conductor level of those circuits on the climbing side of the pole and workmen shall not go above such lowest conductor level,

EXCEPT:

(a) When Conductors Are Moved Out From Pole by accepted "hotline" techniques, or

(b) When Both Circuits Are De-energized and grounded the climbing space shall be maintained to the top conductors of the circuits. The space shall not be less than 30 inches square.

(c) When One Circuit Is De-energized and grounded, the climbing space shall be maintained on the climbing side between the center line of the pole and the de-energized conductors. The space shall be not less than 36 inches square.

(3) Vertical Circuits Bonded Together: When vertical circuits are bonded together, regardless of location on the pole, the climbing space shall be maintained to the lowest conductor level of those circuits on the climbing side of the pole and workmen shall not go above such lowest conductor level, unless conductors are moved out from pole by accepted "hotline" techniques, or

EXCEPT:

(a) Where a Single Circuit is Involved and such circuit is de-energized and the bond and the de-energized circuit is grounded as required in Rule 53.4-A3b, the climbing space shall not be less than 36 inches and shall be maintained for a vertical distance of not less than 4 feet below the lowest conductor and not less than 4 feet above the top conductor when not at the top of pole.

(b) Where Two Circuits Are Involved:

1. When Both Circuits Are De-energized and commonly bonded and the bond and the circuits grounded as required in

Rule 53.4-A3b, the climbing space shall be maintained to the top conductors of the circuits. The space shall not be less than 36 inches square and shall be maintained for a vertical distance of not less than 4 feet below the lowest conductor and not less than 4 feet above the top conductor when not at the top of pole.

2. When One Circuit Is De-energized and both circuits are commonly bonded and the bond and the de-energized circuit grounded as required in Rule 53.4-A3b, the climbing space shall be maintained on the climbing side between the center line of the pole and the de-energized conductors. The space shall not be less than 36 inches square, and shall be maintained for a vertical distance of not less than 4 feet below the lowest conductor and not less than 4 feet above the top conductor when not at the top of pole.

(4) Unbonded Circuits Below Pole Top: For unbonded circuits below the pole top position climbing space shall be maintained through the levels of conductors supported on post insulators for a vertical distance of not less than four feet above the top conductor and not less than four feet below the lowest conductor.

The climbing space shall be a square of horizontal dimensions tabulated below and one side of the climbing space shall pass through the center line of the pole.

Voltage of Conductor	Dimensions of Square
750-7,500 volts :	36"
7,500-46,000 volts	42"
More than 46,000 volts	42" plus ½ " per kV in excess of 46 kV

G ALLOWABLE CLIMBING SPACE OBSTRUCTIONS

insulators and their attaching brackets which support line conductors of over 750 volts may extend not more than one-half of their dimension into the climbing space.

Suitable protected vertical conductors attached to the surface of poles and guys (except those guys contacting metal pins or dead-end hardware (as specified in Rule 52.7D)) are allowed in the climbing spaces provided that not more than two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches) and one vertical riser, run, or ground wire are installed in any 4-foot vertical section of climbing space. The terminals or terminal fittings of risers or runs shall not be installed within climbing spaces.

Original Version
Rule 57.4-H

Rule 57.4-H From Non-climbable Street Lighting or Traffic Signal Poles or Standards:

Messengers and metal-sheathed cables passing unattached which are bonded and grounded as specified in Rule 57.8, shall clear non-climbable street lighting and traffic signal poles or standards, including mastarms, brackets, and lighting fixtures; a radial distance of 15 inches as specified in Table 1, Case 10, Column D; except when the conductors are mechanically protected from abrasion by materials specified in Rule 22.2. Such mechanical protection shall extend 15 inches in each direction along the cable from centerline if pole, standard, attaching mastarms or fixtures; whether passing above, below or alongside. The conductors shall be installed in such a manner so as not to interfere with light distribution from lighting fixtures and shall not hamper workmen changing lamps or maintaining equipment.

Strikeout and Underline Version
Rule 57.4-H

Rule 57.4-H From Non-climbable Street Lighting or Traffic Signal Poles or Standards:

Messengers and metal-sheathed cables ~~passing unattached~~ which are bonded and grounded as specified in Rule 57.8, ~~shall clear~~ passing (unattached) non-climbable street lighting and traffic signal poles or standards, including mastarms, brackets, and lighting fixtures~~; a radial distance of 15 inches as specified in Table 1, Case 10, Column D;~~ may have a clearance of less than 36 inches specified in Table 1, Case 10, Column D, but shall have a clearance of not less than 15 inches except when the conductors are mechanically protected from abrasion by materials specified in Rule 22.2. Such mechanical protection shall extend not less than 15 inches in each direction along the cable from centerline if pole, standard, attaching mastarms or fixtures; whether passing above, below or alongside. The conductors shall be installed in such a manner so as not to interfere with light distribution from lighting fixtures and shall not hamper workmen changing lamps or maintaining equipment.

Final Version
Rule 57.4-H

Rule 57.4-H From Non-climbable Street Lighting or Traffic Signal Poles or Standards:

Messengers and metal-sheathed cables which are bonded and grounded as specified in Rule 57.8, passing (unattached) non-climbable street lighting and traffic signal poles or standards, including mastarms, brackets, and lighting fixtures may have a clearance of less than 36 inches specified in Table 1, Case 10, Column D, but shall have a clearance of not less than 15 inches except when the conductors are mechanically protected from abrasion by materials specified in Rule 22.2. Such mechanical protection shall extend not less than 15 inches in each direction along the cable from centerline if pole, standard, attaching mastarms or fixtures; whether passing above, below or alongside. The conductors shall be installed in such a manner so as not to interfere with light distribution from lighting fixtures and shall not hamper workmen changing lamps or maintaining equipment.

Original Version
Rule 83.4

83.4 New Rule

Strikeout and Underline Version
Rule 83.4

83.4 Bonding

Where separate communication messengers, or guys, or both, of the same or different ownership, are attached tot the same pole, and they are in proximity to electric supply circuits (see Rule 21.3-D), railway signal circuits or Class T electric railway or trolley circuits, such messengers, or guys, or both, shall be bonded together at frequent intervals (See Rule 83.4-A). For purpose of this rule, communication messengers and guys are those which support Major Class C circuits (see Rule 20.5) and those Minor Class C Circuits which are used for television transmission.

Where bonding is required, the bond wire or bond strap shall have a conductivity of not less than No. 6 AWG copper wire, and shall be securely attached to the messenger or guy. Such a bond wire or bond strap may be attached tot eh surface of a pole or to the underside of a crossarm using metal staples, but shall in no case be attached to the top surface of any crossarm. Bond wires or bond straps placed in the climbing space shall be covered by a suitable protective covering (see Rule 22.2).

Communication systems owned by electric utilities are exempt from these requirements.

A. MESSENGERS ON THE SAME POLE

(1) Bonds are required between separate communication messengers or guys, attached above or below electric supply circuits, railway signal circuits or Class T electric railroad or trolley circuits on same pole line system, at all dead-end poles and at intervals not to exceed 1,500 feet.

(2) Bonds between separate communication messengers on the same pole line system are required at the first pole on either side of the location where such messengers cross over or under electric supply circuits, railway signal circuits or Class T electric railway or trolley circuits.

(3) Bonds are not required between communication messengers or guys which are attached to the same pole by a common bolt.

B MESSENGERS OF DIFFERENT POLE LINE SYSTEMS

Bonding is required between communication messengers or guys, or both, where the pole line systems intersect at a common pole.

Final Version
Rule 83.4

83.4 Bonding

Where separate communication messengers, or guys, or both, of the same or different ownership, are attached tot the same pole, and they are in proximity to electric supply circuits (see Rule 21.3-D), railway signal circuits or Class T electric railway or trolley circuits, such messengers, or guys, or both, shall be bonded together at frequent intervals (See Rule 83.4-A). For purpose of this rule, communication messengers and guys are those which support Major Class C circuits (see Rule 20.5) and those Minor Class C Circuits which are used for television transmission.

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Communication systems owned by electric utilities are exempt from these requirements.

A. MESSENGERS ON THE SAME POLE

(1) Bonds are required between separate communication messengers or guys, attached above or below electric supply circuits, railway signal circuits or Class T electric railroad or trolley circuits on same pole line system, at all dead-end poles and at intervals not to exceed 1,500 feet.

(2) Bonds between separate communication messengers on the same pole line system are required at the first pole on either side of the location where such messengers cross over or under electric supply circuits, railway signal circuits or Class T electric railway or trolley circuits.

(3) Bonds are not required between communication messengers or guys which are attached to the same pole by a common bolt.

B MESSENGERS OF DIFFERENT POLE LINE SYSTEMS

Bonding is required between communication messengers or guys, or both, where the pole line systems intersect at a common pole.

Original Version
Rule 84.4-D

84.4-D(4) Conductors Passing Supply Poles And Unattached Thereto: The center line clearance between poles supporting supply conductors and any communication conductors which pass such poles unattached shall be not less than 22 ½ inches (1 ½ times the clearance specified in Table 1, Case 8), except where the supply pole is within 10 feet of the pole on which the communication conductors are supported. Where poles of the two lines are less than 10 feet apart, clearances not less than as specified in Table 1, Case 8, shall be maintained.

Note Resolution No. E-999, effective October 7, 1958 rescinded and replaced by new Rule 84.4-D(4)a; deleted and revised January 8, 1980 by Decision No. 91186.

(a) From Non-climbable Street Lighting or Traffic Signal Poles or Standards:

Communications cables passing unattached to non-climbable street lighting and traffic signal poles or standards including mastarms, brackets and lighting fixtures, shall clear a radial distance of 12 inches as specified in Table 1, Case 10, Column B; except when the cable sheath and messenger are suitably insulated for the highest voltage involved and mechanically protected from abrasion where necessary. Such mechanical protection shall extend 15 inches in each direction along the cable from centerline of pole, standard, attaching mastarms or fixtures; whether passing above, below or alongside. The cable shall be installed in such a manner so as not to interfere with light distribution from lighting fixtures and shall not hamper workmen changing lamps or maintaining equipment.

Strikeout and Underline Version
Rule 84.4-D

84.4-D(4) Conductors Passing Supply Poles And Unattached Thereto: The center line clearance between poles supporting supply conductors and any communication conductors which pass such poles unattached shall be not less than 22 ½ inches (1 ½ times the clearance specified in Table 1, Case 8), except where the supply pole is within 10 feet of the pole on which the communication conductors are supported. Where poles of the two lines are less than 10 feet apart, clearances not less than as specified in Table 1, Case 8, shall be maintained.

Note Resolution No. E-999, effective October 7, 1958 rescinded and replaced by new Rule 84.4-D(4)a; deleted and revised January 8, 1980 by Decision No. 91186.

(a) From Non-climbable Street Lighting or Traffic Signal Poles or Standards:

Communications cables passing (unattached) ~~to~~ non-climbable street lighting and traffic signal poles or standards including mastarms, brackets and lighting fixtures, shall clear a radial distance of 12 inches as specified in Table 1, Case 10, Column B; except when the cable sheath and messenger are suitably insulated for the highest voltage involved and mechanically protected from abrasion where necessary. Such mechanical protection shall extend not less than 15 inches in each direction along the cable from centerline of pole, standard, attaching mastarms or fixtures; whether passing above, below or alongside. The cable shall be installed in such a manner so as not to interfere with light distribution from lighting fixtures and shall not hamper workmen changing lamps or maintaining equipment.

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Rule 84.4-D

84.4-D(4) Conductors Passing Supply Poles And Unattached Thereto: The center line clearance between poles supporting supply conductors and any communication conductors which pass such poles unattached shall be not less than 22 ½ inches (1 ½ times the clearance specified in Table 1, Case 8), except where the supply pole is within 10 feet of the pole on which the communication conductors are supported. Where poles of the two lines are less than 10 feet apart, clearances not less than as specified in Table 1, Case 8, shall be maintained.

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Original Version
Rule 84.6-E

84.6-E Risers

Risers of wires or underground cables shall be encased in securely grounded iron or steel pipe (or other covering of equal strength) from the ground line to a level not less than 8 feet above the ground line. Risers from underground cables of Class C circuits may be encased in plastic pipes or in plastic U-shaped moulding, as provided in this rule, in lieu of the grounded iron or steel pipe required by this rule. Such plastic pipe shall be of material as specified in Rule 22.2-C, designated as EPC-80-PVC with a minimum nominal pipe size of 2 ½ inches.

Risers shall be covered by a suitable protective covering as defined in Rule 22.2, where within a vertical distance of 3 feet above or 6 feet below the level of unprotected supply conductors supported on the same pole or structure.

Vertical risers where within both a 6-foot radius of another pole supporting supply conductors and within a vertical distance of 3 feet above or 6 feet below the level of any unprotected supply conductor shall be covered.

Strikeout and Underline Version
Rule 84.6-E

84.6-E Risers

Risers of wires or underground cables shall be encased in securely grounded iron or steel pipe (or other covering of equal strength) from the ground line to a level not less than 8 feet above the ground line. Risers from underground cables of Class C circuits may be encased in plastic pipes or in plastic U-shaped moulding, as provided in this rule, in lieu of the grounded iron or steel pipe required by this rule. ~~Such plastic pipe shall be of material as specified in Rule 22.2-C, designated as EPC-80-PVC with a minimum nominal pipe size of 2 ½ inches.~~ Such plastic pipe shall be of material as specified in Rule 22.2-C with a minimum nominal pipe size of 1 inch and with a minimum impact strength equal to 2-½" nominal EPC-80-PVC plastic pipe.

Risers shall be covered by a suitable protective covering as defined in Rule 22.2, where within a vertical distance of 3 feet above or 6 feet below the level of unprotected supply conductors supported on the same pole or structure.

Vertical risers where within both a 6-foot radius of another pole supporting supply conductors and within a vertical distance of 3 feet above or 6 feet below the level of any unprotected supply conductor shall be covered.

Final Version
Rule 84.6-E

84.6-E Risers

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Risers shall be covered by a suitable protective covering as defined in Rule 22.2, where within a vertical distance of 3 feet above or 6 feet below the level of unprotected supply conductors supported on the same pole or structure.

Vertical risers where within both a 6-foot radius of another pole supporting supply conductors and within a vertical distance of 3 feet above or 6 feet below the level of any unprotected supply conductor shall be covered.

Original Version
Rule 84.7-E

84.7E Allowable Climbing Space Obstructions

Vertical conductors, when in a suitable protective covering attached directly to the surface of the pole, terminal boxes or similar equipment which do not extend more than 5 inches from the surface of the pole, and guys, will not be held to obstruct the climbing space provided not more than one guy and one other of the above named obstructions are installed in any 4-foot vertical section of climbing space.

Crossarms and their supporting members are allowed in climbing spaces provided that, where buck arms are involved, any arms within climbing spaces are treated as double arms.

A guard arm, a longitudinal run of messenger, cable or insulated wire will not be held to obstruct the climbing space where they are placed in the climbing space because the presence of a building wall or similar obstacle will not permit the cable to be placed on the side of pole opposite the climbing space. Pole steps shall be suitably placed for the purpose of facilitating climbing past the level of terminal box, cable, drop wires and guard arm.

Unnecessary impairment of the climbing space is not permitted by the application of this Rule 84.7 -E.

Strikeout and Underline Version
Rule 84.7-E

84.7E Allowable Climbing Space Obstructions

Vertical conductors, when in a suitable protective covering attached directly to the surface of the pole, terminal boxes or similar equipment which do not extend more than 5 inches from the surface of the pole, and guys, will not be held to obstruct the climbing space provided not more than ~~one guy~~ two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches) and one other of the above named obstructions are installed in any 4-foot vertical section of climbing space.

Crossarms and their supporting members are allowed in climbing spaces provided that, where buck arms are involved, any arms within climbing spaces are treated as double arms.

A guard arm, a longitudinal run of messenger, cable or insulated wire will not be held to obstruct the climbing space where they are placed in the climbing space because the presence of a building wall or similar obstacle will not permit the cable to be placed on the side of pole opposite the climbing space. Pole steps shall be suitably placed for the purpose of facilitating climbing past the level of terminal box, cable, drop wires and guard arm.

Unnecessary impairment of the climbing space is not permitted by the application of this Rule 84.7 -E.

Final Version
Rule 84.7-E

84.7E Allowable Climbing Space Obstructions

Vertical conductors, when in a suitable protective covering attached directly to the surface of the pole, terminal boxes or similar equipment which do not extend more than 5 inches from the surface of the pole, and guys, will not be held to obstruct the climbing space provided not more than two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches) and one other of the above named obstructions are installed in any 4-foot vertical section of climbing space.

Crossarms and their supporting members are allowed in climbing spaces provided that, where buck arms are involved, any arms within climbing spaces are treated as double arms.

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Unnecessary impairment of the climbing space is not permitted by the application of this Rule 84.7 -E.

Original Version

Rule 84.8-E1

84.8-E(1) From Non-climbable Street Lighting or Traffic Signal Poles or Standards:

Communications service drops passing unattached shall clear non-climbable street lighting and traffic signal poles. or standards, including mastarms, brackets and lighting fixtures; a radial distance of 12 inches as specified in Table 1, Case 10, Column B; except when the service drops are suitably insulated for the voltage involved and mechanically protected from abrasion where necessary. Such mechanical protection shall extend 15 inches in each direction along the cable from centerline of pole, standard, attaching mastarms or fixtures; whether passing above, below or alongside. The conductors shall be installed in such a manner so as not to interfere with light distribution from lighting fixtures and shall not hamper workmen changing lamps or maintaining equipment.

Strikeout and Underline Version

Rule 84.8-E1

84.8-E(1) From Non-climbable Street Lighting or Traffic Signal Poles or Standards:

Communications service drops passing (unattached) ~~shall clear~~ non-climbable street lighting and traffic signal poles~~,~~ or standards, including mastarms, brackets and lighting fixtures~~;~~ shall clear a radial distance of 12 inches as specified in Table 1, Case 10, Column B; except when the service drops are suitably insulated for the voltage involved and mechanically protected from abrasion where necessary. Such mechanical protection shall extend not less than 15 inches in each direction along the cable from centerline of pole, standard, attaching mastarms or fixtures; whether passing above, below or alongside. The conductors shall be installed in such a manner so as not to interfere with light distribution from lighting fixtures and shall not hamper workmen changing lamps or maintaining equipment.

Final Version
Rule 84.8-E1

84.8-E(1) From Non-climbable Street Lighting or Traffic Signal Poles or Standards:

Communications service drops passing (unattached) non-climbable street lighting and traffic signal poles~~,~~ or standards, including mastarms, brackets and lighting fixtures~~ shall~~ clear a radial distance of 12 inches as specified in Table 1, Case 10, Column B; except when the service drops are suitably insulated for the voltage involved and mechanically protected from abrasion where necessary. Such mechanical protection shall extend not less than 15 inches in each direction along the cable from centerline of pole, standard, attaching mastarms or fixtures; whether passing above, below or alongside. The conductors shall be installed in such a manner so as not to interfere with light distribution from lighting fixtures and shall not hamper workmen changing lamps or maintaining equipment.

Original Version
Rule 86.6-C

86.6C Exposed To Supply Conductors Of More Than 22,500 Volts

Portions of guys exposed to supply conductors of more than 22,500 volts shall be securely grounded and such guys need not be sectionalized, unless sectionalization is required by Rule 86.6-B2 because of proximity to supply conductors of 0-35,500 volts. (See App. G, Fig. 52c.)

Strikeout and Underline Version
Rule 86.6-C

86.6C Guys Exposed To Supply Conductors Of More Than 22,500 Volts

Portions of guys exposed to supply conductors of more than 22,500 volts shall be securely grounded and such guys need not be sectionalized, unless sectionalization is required by Rule 86.6-B2 because of proximity to supply conductors of 0-35,500 volts. (See App. G, Fig. 52c.)

Final Version
Rule 86.6-C

86.6C Guys Exposed To Supply Conductors Of More Than 22,500 Volts

Portions of guys exposed to supply conductors of more than 22,500 volts shall be securely grounded and such guys need not be sectionalized, unless sectionalization is required by Rule 86.6-B2 because of proximity to supply conductors of 0-35,500 volts. (See App. G, Fig. 52c.)

Original Version
Rule 87.4-D5

87.4-D(5) Conductors passing Unattached From Non-climbable Street Lighting and Traffic Signal Poles or Standards (see Rule 84.4-D(4))

Strikeout and Underline Version
Rule 87.4-D5

87.4-D(5) ~~Conductors~~ Cables or Messengers passing Unattached From Non-climbable Street Lighting and Traffic Signal Poles or Standards (see Rule 84.4-D(4))

Final Version
Rule 87.4-D5

87.4-D(5) Cables or Messengers passing Unattached From Non-climbable Street Lighting and Traffic Signal Poles or Standards (see Rule 84.4-D(4))

Appendix G Changes

Delete Figures 13 and 14 and Replace with "This page intentionally left blank"

Figure 39, add Rule 84.8-B2b, under title

Figure 84 – delete upper dimension "V" shown between bottom of drip loop and 0-750v conductor level above.

Figure 89 - Add to title reference: "and Rule 54.4-C4c

Original Version
Rule 92.1-B

92.1B Between Cables and Messengers and Other Conductors

Where any cable or messenger (supply or communication) is less than 15 inches from center line of pole or is attached directly to the surface of jointly used poles, the following minimum vertical clearances shall apply between such cable and other conductors or cables (see App. G, Fig. 9):

Cables or messengers above	
Conductors, cables or messengers 15 inches or more from center line of pole	4 feet
Unguarded racks attached to pole	6 feet
Unguarded cables or messengers attached to pole	4 feet
Guarded cables, messengers or racks attached to poles	4 feet
Unguarded cables or messengers below	
All unprotected supply conductors (a)	6 feet
All grounded cables (c)	4 feet
Guarded cable, or messenger, below	
Unprotected supply conductors of more than 750 volts (b)	6 feet
Unprotected supply conductors of 0-750 volts or communication circuits (c)	4 feet

(a) See Rule 84.6-C for exception applicable to suitably insulated lateral runs.

(b) This is not intended to prohibit the attachment of an unguarded cable or messenger 6 feet or more below supply circuits of more than 750 volts.

(c) This is not intended to apply between communication cables or messengers and other communication conductors.

Strikeout and Underline Version
Rule 92.1-B

92.1B Between Cables and Messengers and Other Conductors

Where any cable or messenger (supply or communication) is less than 15 inches from center line of pole or is attached directly to the surface of jointly used poles, the following minimum vertical clearances shall apply between such cable and other conductors or cables (see App. G, Fig. 9):

Cables or messengers above	
Conductors, cables or messengers 15 inches or more from center line of pole	4 feet
Unguarded racks attached to pole	6 feet
Unguarded cables or messengers attached to pole	4 feet
Guarded cables, messengers or racks attached to poles	4 feet
Unguarded grounded cables or messengers below	
All unprotected supply conductors (a)	6 feet
All grounded cables (c)	4 feet
Guarded cable, or messenger, below	
Unprotected supply conductors of more than 750 volts (b)	6 feet
Unprotected supply conductors of 0-750 volts or communication circuits (c)	4 feet

(a) See Rule 84.6-C for exception applicable to suitably insulated lateral runs.

(b) This is not intended to prohibit the attachment of an unguarded cable or messenger 6 feet or more below supply circuits of more than 750 volts.

(c) This is not intended to apply between communication cables or messengers and other communication conductors.

Final Version
Rule 92.1-B

92.1B Between Cables and Messengers and Other Conductors

Where any cable or messenger (supply or communication) is less than 15 inches from center line of pole or is attached directly to the surface of jointly used poles, the following minimum vertical clearances shall apply between such cable and other conductors or cables (see App. G, Fig. 9):

Cables or messengers above	
Conductors, cables or messengers 15 inches or more from center line of pole	4 feet
Unguarded racks attached to pole	6 feet
Unguarded cables or messengers attached to pole	4 feet
Guarded cables, messengers or racks attached to poles	4 feet
Unguarded grounded cables or messengers below	
All unprotected supply conductors (a)	6 feet
All grounded cables (c)	4 feet
Guarded cable, or messenger, below	
Unprotected supply conductors of more than 750 volts (b)	6 feet
Unprotected supply conductors of 0-750 volts or communication circuits (c)	4 feet

(a) See Rule 84.6-C for exception applicable to suitably insulated lateral runs.

(b) This is not intended to prohibit the attachment of an unguarded cable or messenger 6 feet or more below supply circuits of more than 750 volts.

(c) This is not intended to apply between communication cables or messengers and other communication conductors.

General Order 128 Strikeout and Underline Added on August 19, 2002 by Raymond G Fugere.

Original Version

Rule 41.4-C2

41.4-C(2) Thoroughfares: Communication duct systems in thoroughfares may be installed with not less than 18 inches of cover. Where it is not practicable to obtain such cover it may be reduced provided the duct material itself, or additional top protection installed, has sufficient strength to protect the system from injury by traffic.

Strikeout and Underline Version

Rule 41.4-C2

41.4-C(2) Thoroughfares: Communication duct systems in thoroughfares may be installed with not less than 18 inches of cover. Where it is not practicable to obtain such cover it may be reduced provided the duct material itself, or additional top protection installed, has sufficient strength to protect the system from injury by traffic. <u>The sufficient strength requirement shall be deemed to have been met in paved thoroughfares where the width of the trench is 6 inches or less and a concrete slurry backfill provided of a thickness at least equal to the thickness of the pavement.</u>

Final Version

Rule 41.4-C2

41.4-C(2) Thoroughfares: Communication duct systems in thoroughfares may be installed with not less than 18 inches of cover. Where it is not practicable to obtain such cover it may be reduced provided the duct material itself, or additional top protection installed, has sufficient strength to protect the system from injury by traffic. The sufficient strength requirement shall be deemed to have been met in paved thoroughfares where the width of the trench is 6 inches or less and a concrete slurry backfill provided of a thickness at least equal to the thickness of the pavement.

Original Version
Rule 43.3-C

43.3-C New Rule

Strikeout and Underline Version
Rule 43.3-C

43.3C. Depths

Communication cables shall be installed at a minimum depth below the surface under which they are located as follows except as provided in Rule 43.3–D:

(1) Sidewalks, Parkways and Private Property: 12 inches

(2) Thoroughfares: 18 inches

Final Version
Rule 43.3-C

43.3C. Depths

Communication cables shall be installed at a minimum depth below the surface under which they are located as follows except as provided in Rule 43.3–D:

(1) Sidewalks, Parkways and Private Property: 12 inches

(2) Thoroughfares: 18 inches

Original Version
Rule 43.3-D

43.3-D New Rule

Strikeout and Underline Version
Rule 43.3-D

43.3D.EXCEPTIONS

(1) Mechanical Protection: Lesser depth than those listed in Rule 43.3–C may be used where suitable mechanical protection is employed. Suitable mechanical protection shall consist of the following or their equivalents:

(a) Steel conduit or plastic pipe made of unplasticised polyvinyl chloride having the properties and dimensions specified in Type II, High Impact, Normal Chemical Resistance in United States Commercial Standard No. CS 207–60 with a minimum wall thickness of 0.15 inch, or

(b) A layer of concrete at least 3 inches in thickness above the cable.

(2) Terminations, Splices or Other Points of Access: Lesser depths than those listed in Rule 43.3–C are permitted where cables and conductors rise for terminations or splices or where access is otherwise required.

Final Version
Rule 43.3-D

43.3D. EXCEPTIONS

(1) Mechanical Protection: Lesser depth than those listed in Rule 43.3–C may be used where suitable mechanical protection is employed. Suitable mechanical protection shall consist of the following or their equivalents:

(a) Steel conduit or plastic pipe made of unplasticised polyvinyl chloride having the properties and dimensions specified in Type II, High Impact, Normal Chemical Resistance in United States Commercial Standard No. CS 207–60 with a minimum wall thickness of 0.15 inch, or

(b) A layer of concrete at least 3 inches in thickness above the cable.

(2) Terminations, Splices or Other Points of Access: Lesser depths than those listed in Rule 43.3–C are permitted where cables and conductors rise for terminations or splices or where access is otherwise required.