Decision No. 73813, Application No. 49851 (Filed December 5, 1967)

In the matter of the Application of Southern California Edison Company for an order amending General Order No. 95, "Rules for Overhead Electric Line Construction," with respect to tower lines and extra high voltage lines.

O P I N I O N

Southern California Edison Company (Edison) requests an order amending and revising certain portions of General Order No. 95, "Rules for Overhead Electric Line Construction," relating to lines with operating voltages in excess of 68,000 volts.

Many lines at higher voltages are being planned and constructed to satisfy the rapidly increasing demands for electric services by the most feasible and economic means. The General Order contains no standards specifically applicable to the construction of extra high voltage lines.

There is present need to amend and revise certain portions of General Order No. 95 with respect to tower lines and extra high voltage lines for the purpose of keeping the provisions, rules, standards and specifications of the General Order up to date.

Through the cooperative effort of the major electric utilities, the Commission staff and other interested parties, certain modifications have been developed to establish appropriate minimum clearances, wire sizes, strength requirements and other provisions in keeping with the purpose, scope and intent of the General Order.

Attached to the application marked Exhibit A is a proposed modification to Section VI of General Order No. 95. All of present Section VI covering additional construction requirements for tower lines is deleted and replaced by detail construction requirements for tower lines and extra high voltage lines.

Attached to the application marked Exhibit B is a compilation of related modifications in other sections of General Order, including proposed changes or modifications in other sections of the General Order, including proposed changes or additions in the following rules: Rule 20.5-D; Rule 20.8; Rule 21.7-C; Rule 33.1; Rule 37 (Table 1); Rule 38 (Table 2); Rule 39 (Table 2-a); Rule 42 (Table 3); Rule 44; Rule 44.1 (Table 4); Rule 48.2; Rule 49.1-A; Rule 49.6-B (Table 9); Rule 50; Rule 51.6-A; Rule 54.4-A(1); Rule 54.4-C(2); Rule 54.4-C(7); Rule 100; Rule 103.2 and Rule 113.2. Edison by letter of January 19, 1968, filed certain revisions to Exhibit B of the application pertaining to prior decisions. Said letter is received herein as Exhibit 1.

Edison states the proposed modifications set forth in Exhibit A and Exhibit B have seen reviewed by Pacific Gas and Electric Company, Pacific Power & Light Company and San Diego Gas & Electric Company, each of which has advised Edison that it concurs in and endorses such modifications to General Order No. 95. In addition, said modifications were submitted to and reviewed by the Department of Water and Power of the City of Los Angeles, Sacramento Municipal Utility District, the Commission staff and representatives of the International Brotherhood of Electrical Workers.

The Commission finds that such modifications will not be detrimental to the safety of the General public and workmen; such modifications will assist in achieving greater statewide uniformity of practices relative to specifications and requirements for the construction, maintenance, or operation or use of tower lines and extra high voltage lines and concludes that General Order No. 95 should be modified to the extent set forth in Appendix A and B attached hereto.

No protest to the adoption of the proposed modifications has been received. A public hearing is not necessary.

O r d e r

IT IS ORDER that the Commission's General Order No. 95, "Rules for Overhead Electric Line Construction," is modified to the extent set forth in Appendices A and B attached hereto.

IT IS FURTHER ORDERED that the Secretary shall cause a copy of this order and its Appendices A and B to be served upon each electric and telephone utility subject to the jurisdiction of this commission, the State Division of Industrial Safety, and further, to cause a suitable number of copies to be made available for distribution to such other agencies furnishing utility service and the general public as may request the same.

The effective date of this order shall be twenty-five days after the date hereof.

Dated at San Francisco, California, this 5th day of March, 1968.

Appendix A

The rules of Section VI General Order No. 95 are modified, amended or added to as set forth below.

Delete: All of Section VI.

SECTION VI
DETAILED CONSTRUCTION REQUIREMENTS
FOR TOWER LINES
AND EXTRA HIGH VOLTAGE LINES (CLASS E CIRCUITS)

60. General

61. Towers and Structures

- 61.1 Definition
- 61.2 Maintenance and Inspection
- 61.3 Material and Strength
  - A. Material
    - (1) Tower Members
    - (2) Overhead Ground Wires or Lightning Protection Wires
    - (3) Guys and Anchor Rods
    - (a) Guys
    - (b) Anchor Rods
  - B. Strength
- 61.4 Clearances
  - A. From Railroad Tracks
- 61.5 Dimensions and Settings
- 61.6 Marking and Guarding
  - A. Marking
  - B. Guarding
- 61.7 Stepping

62. (Blank)

63. Deadends, Conductor Suspensions and Fastenings

- 63.1 Maintenance and Inspection
- 63.2 Material and Strength
- 63.3 Deadend and Suspension Spacing
- 63.4 Bonding

64. Conductors

SECTION VI
DETAILED CONSTRUCTION REQUIREMENTS
FOR TOWER LINES
AND EXTRA HIGH VOLTAGE LINES (CLASS E CIRCUITS)

60 General

The following rules cover certain special details for the construction of tower lines and extra high voltage lines.

These rules are supplemented, in certain cases, by rules in other sections. See Section X for special rules applicable to line crossings or conflicts; see Section XI for special rules applicable to lines crossing railways.

61 Towers and Structures

61.1 Definition (See Rule 21.7-C)

61.2 Maintenance and Inspection (See Rules 31.1 and 31.2)

61.3 Material and Strength (also see Section IV)

A Material

(1) **Tower Members:** Tower members shall have a thickness of metal equivalent to the following:

Galvanized steel: Main corner members, 3/16 inch; other members, 1/8 inch.

Painted steel: Main corner members, 1/4 inch; other members, 3/16 inch. All iron or steel members of towers and all hardware subject to injurious corrosion under the prevailing conditions shall be protected by galvanizing, painting or other treatment which will effectively retard corrosion.

(2) **Overhead Ground Wires or Lightning Protection Wires:** Overhead ground wires or lightning protection wires shall be galvanized steel cable not less than 1/4 inch in diameter, or other corrosion resistant material of equal tensile strength. Where overhead ground wires are not used, effort shall be made to secure an effectively grounded structure.

(3) **Guys and Anchor Rods:**

(a) **Guys:** Guys shall be galvanized steel strand not less than 5/16 inch in diameter, or other corrosion resistant material of equal tensile strength, or they shall be rolled rods of galvanized steel or other corrosion resistant material with tensile strength not less than the tensile strength of 5/16 inch diameter galvanized steel strand.

(b) **Anchor Rods:** Anchor rods shall be galvanized steel not less than 5/8 inch in diameter or shall be of equal strength and durability.

B Strength

Where support structures are used which are not capable of withstanding substantially as great a stress longitudinally as transversely, longitudinal guying shall be used. The line as a whole shall be designed so that a failure of an individual support structure shall not cause successive failures of more than ten additional support structures.

61.4 Clearances

A From Railroad Tracks (See Rule 36; also, Appendix E)

61.5 Dimensions and Settings (See Section IV)

61.6 Marking and Guarding

A Marking

All towers or structures which are of a design easily climbed and which are located in urban districts or in cultivated agricultural areas or near roads or trails which are frequently traveled shall be equipped with signs so worded as to warn the public of the danger of climbing same. Such signs shall be placed and arranged so that they may be read from the four corners of the structure. Such signs shall be neither less than 8 feet nor more than 20 feet above the ground except where the lowest horizontal member of the tower or structure is more than 20 feet above the ground in which case the sign shall be not more than 30 feet above the ground.

B Guarding

Where a tower or of a design which can be easily climbed supports supply conductors and is located in urban districts, or in rural areas adjacent to schools, dwellings, permanent or seasonal camps, or in orchards, or near roads or trails which are frequently traveled, a barrier or other provisions shall be made to prevent easy climbing.

The provisions of this rule shall not apply to towers or structures on which all conductors have a 5 feet or more

horizontal clearance from the supporting structure, nor to towers or structures within fenced substation yards.

Note: It is the intent of Rule 61.6-B to require such guarding as will prevent easy climbing of these towers by young persons who do not realize the danger of contact with live conductors supported thereon. It is not intended that such guarding will be required in sparsely settled districts, mountainous and desert areas, and similar locations.

61.7 Stepping

All towers upon which it may be necessary for workmen to climb shall be provided with steps or ladders, which shall start at not less than 7 feet 6 inches from the ground line. The spacing between steps on the same side of the tower legs shall not exceed 36 inches.

Where the members of the tower are so arranged that the tower may be climbed with safety, no steps or ladders need be provided.

62 (Blank)

63 Deadends, Conductor Suspensions and Fastenings

63.1 Maintenance and Inspection (See Rules 31.1 and 31.2)

63.2 Material and Strength (See Rule 49.5)

63.3 Deadend and Suspension Spacing (See Table 1 and Table 2)

63.4 Bonding

Bonding is not required by these rules. It is recognized that under certain conditions it may be deemed necessary. Where phase-to-phase bonding is used, the bond wire or strap shall have a conductivity of not less than No. 10 AWG copper wire.

64 Conductors

64.1 Definition (See Rule 20.8)

64.2 Maintenance and Inspection (See Rules 31.1 and 31.2)

64.3 Material and Strength (See Rule 49.4)

64.4 Clearances

Allowable variations in clearances due to side swing of suspension insulators, temperature, loading, etc., are given in Rules 37 and 38.

A Above Ground

The clearances shall be those specified in Rule 37.

B Above Railways and Trolley Lines

The clearances shall be those specified in Rule 37.

C Between Conductors

The minimum allowable clearances between conductors are specified in Rule 38, Table 2, with the following modifications for supply conductors:

These modifications, like the tabular values, are also subject to the allowable variations specified in Rule 38.

(1) **On Different Crossarms on the Same Structure, Triangular and Vertical Configuration:** Crossarms used to support conductors of a circuit at different levels (as in triangular or vertical configuration) need not be spaced as in Table 2.

(2) **On the Same Crossarms, Same Phase or Polarity:** The clearance specified in Table 2, Cases 15 and 17, are not required between conductors of both the same potential and the same phase or polarity, such as bundle conductors.

65 Conductor Insulators

65.1 Material

Insulators used on high voltage supply lines shall be porcelain or other equally suitable material to withstand the applied voltage.

65.2 Strength (See Rule 49.5)

66 Guys

66.1 Definition (See Rule 21.3)

66.2 Use

Where mechanical loads imposed on towers or structures are greater than can be supported with safety factors as specified in rule 44 or the design of such towers and structures requires it, additional strength shall be provided by the use of guys or other suitable construction.

Where guys are used with structures capable of considerable deflection before failure, the guys shall be able to support the entire load, the structure below the point of guy attachment acting merely as a strut.

Guys shall be attached to structures, as nearly as practicable, at the center of load. They shall be maintained taut and of such strength as to meet safety factors of rule 44.

66.3 Material And Strength (See Rules 49.6 And 61.3)

66.4 Clearances

The basic minimum clearances of overhead guys above the ground and from other wires or cables are specified in tables 1 and 2. Modifications of these basic clearances are specified in rules 37 and 38. the minimum clearance of 18 feet for overhead guys of high voltage supply lines shall not be decreased along public thoroughfares or railways.

For clearances of anchor guys from overhead guys, span wires and conductors supported on other poles or structures, see Rule 56.4.

66.5 Fastenings

Anchor guys shall be protected by the use of guy thimbles or their equivalent where attached to anchor rods or through bolts.

66.6 Grounding Of Anchor Guys

Anchor guys exposed to high voltage supply lines shall be securely grounded but may be sectionalized. Anchor guys which are

attached to grounded towers or structures need not be provided with a separate ground.

66.7 Protection (See Rule 56.9)

Appendix B

Related rules in other sections of General Order No. 95 are modified, amended or added to as set forth below.

Rule 20.5-D

Revised to read as follows:

D. SUPPLY CICUITS mean those circuits which are used for transmitting a supply of electrical energy.

(1) Class E circuits include constant potential alternating or direct current circuits of 300,000 volts or more between any two conductors.

(2) Class H circuits include the following:

Constant potential alternating current circuits of 5,000 volts or more but less than 300,000 volts between any two conductors.

Constant potential alternating current circuits of 2,900 volts or more but less than 174,000 volts between any conductor and ground.

Constant potential direct current circuits exceeding 750 volts but less than 150,000 volts between any conductor and ground.

Constant current circuits of 7.5 amperes or less supplied from transformers or devices having a normal full-load output voltage of 5,000 volts or more.

(3) Class L circuits include the following:

Constant potential alternating or direct current supply circuits of lower voltage than Class H.

Constant current circuits of 7.5 amperes or less supplied from transformers or devices having a normal full-load output voltage less than 5,000 volts.

Constant current circuits of more than 7.5 amperes supplied from transformers or devices having an open-circuit output voltage less than 2,900 volts.

Rule 20.8

Revised by renumbering as follows:

Present	Modified
20.8-A	20.8-B
20.8-B	20.8-C
20.8-C	20.8-D
20.8-D	20.8-E

Rule 20.8-A

New rule to read as follows:

A. Bundle conductor means a group of conductors of the same phase and polarity.

Rule 21.7-C

Revised to read as follows:

C. Tower Lines (Class E, H, L and T) mean supply lines, with supporting metal structure having an outside dimension of more than 4 feet measured either along or across the line in a horizontal plane at the ground level. Metal supporting structures, such as "A" frame or "H" structures, having a dimension from outside of one support to outside of another support greater than 4 feet at the ground level will be classified as towers.

Guyed V-type or Y-type metal structures will be classified as towers.

Note: Metal structures having maximum outside dimensions of 4 feet or less, measured along and across the line in a horizontal plane at the ground level, will be classified as poles under supply lines.

Rule 33.1

Add new paragraph to read as follows:

"This Rule need not apply to overhead lighting protection wires installed on metal structures or grounded wood structures."

Rule 37

Table 1 is modified by revising the heading of Column F and adding Column G and by adding references (kk), (ll), (mm) and (nn).

Rule 38

Table 2 is modified by revising Columns H and I, reference (g) and the statement of Case 18 and by adding Columns J and K and references (ff), (gg), (hh), (ii), (jj), (kk) and adding Case 20.

Rule 39

Table 2-A is modified by revising the heading of Column D, adding Column E and adding references g and h.

Table 1

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

	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 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 (0) (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), bridges or other structures	----------	3 ft (u)	3 ft	3 ft (u) (v)	6 ft (v)	6 ft (v)	15 ft (v)

	(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)

* reference (a) through (jj) omitted.

(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.

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	96	96	96 (gg)	156(hh)
5	Supply conductors, 750-7500 volts	36 (f)	48	48 (dd)	48	48 (h)	72	96	96	96	96 (gg)	156(hh)
6	Supply conductors 7500-20,000 volts	36	72	72	48	72	72	96	96	96	96 (gg)	156(hh)
7	Supply conductors, more than 20,000 volts	72	96	96	96	96	96	96	96	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	----------	----------	12 (j)	48 (k, l, m,	48 (k)	72 (m, n)	72(m)	72	78	87 (gg)	147(hh)

	and service drops	---	-		n)							
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)	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 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 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	---------- ---	---------- -	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, y, z)	---------- ---	---------- -	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	---------- ---	---------- -	9 (bb)	12	18	18	30	36	36 (ff)	78 (gg)	138(hh)
19	Guys and spans wires passing conductors supported on the same poles	(ee)	3 (bb)	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)

* reference (a) through (f) omitted

(g) shall be increase for voltages above 75,000 as required by table 2, columns I, J, K

* reference (h) through (ee) omitted

(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

Table 2A

Minimum Clearances of Wires from Signs Mounted on Buildings and Isolated Structures [A]

Case No.	Nature of Clearance Type of Sign	A Span Wires (Other than Trolley Span Wires) Overhead Guys and Messengers, Communication Cables and Communication Service Drops	B Communication Open Wire Conductors Supply Cables Treated as in Rule 57.8 and Supply Service Drops 0 - 750 Volts	C Supply Conductors, Supply Cables of 0 - 750 Volts and Trolley Span Wires	D Supply Conductors and Supply Cables, 750 – 300,000 volts [B]	E Supply Conductors and Supply Cables, 300 – 550 kV
1	Vertical clearance above all signs upon which men can walk	8 Feet	8 Feet	8 Feet	12 Feet	20 ft (g)
2	Vertical clearance above all signs upon which men cannot walk	2 Feet	2 Feet	3 Feet	8 Feet	20 ft (g)
3	Vertical clearance under signs which are illuminated	2 Feet [C]	2 Feet [E]	3 Feet	Prohibited [F]	Prohibited [F]
4	Vertical clearance under signs which are non–illuminated	6 inches [D]	1 Foot	3 Feet	Prohibited [F]	Prohibited [F]
5	Horizontal clearance from signs which are illuminated	3 Feet [C]	3 Feet [E]	3 Feet	6 Feet	15 ft. (h)
6	Horizontal clearance from signs which are non–illuminated	6 inches [D]	1 Foot	3 Feet	6 Feet	15 ft (h)

(a) These clearances do not apply to service drop conductors which are attached to signs for the purpose of serving such signs.

(b) Nothing herein contained shall be construed as authorization of noncompliance with standards of the Industrial Safety Board of the California Division of Industrial Safety, including section 2603 of the Electrical Safety Orders, entitled "Provision for Preventing Accidents Due to Proximity of High-Voltage Lines", approved by that Board.

(c) May be reduced to 6 inches provided illuminated sign is grounded.

(d) May be reduced if adequate separation is provided by means of a suitable non–conducting separator.

(e) May be reduced to 1 foot for communication open wire conductors only, provided illuminated sign is grounded

(f) When conductors are at a level of 8 feet or more below the level of the lowest portion of the sign but not vertically under the sign, no horizontal clearance is required between the vertical planes through the conductor nearest the sign and the vertical projection of the extremities of the sign. Also note (b) above.

(g) Shall be increased by 0.04 ft per kv in excess of 300 kv.

(h) Not applicable to certain kinds of conductors.

1. Supply conductors of same phase and polarity, Rule 54.4-C3c
2. Insulated supply conductors in multi-conductor cables, Rule 57.4-C
3. Communication insulated conductors or multiple-conductor cables, Rule 87.4-C1

Rule 42

Modified by inserting references to Class E supply circuits to read as follows:

42 Grades of Construction

For all classes of lines, the relative order of grades is "A," "B," "C" and "F," grade "A" being the highest. Supply and communication lines, where not involved in crossings, conflicts or on poles jointly used, shall be constructed and maintained so as to conform with grades of construction not less than as follows:

Class E supply- - - - - - - - - - - - - - - Grade B
Class H supply- - - - - - - - - - - - - - - Grade B
Class L supply- - - - - - - - - - - - - - - Grade C
Class C communication- - - - - - - - - Grade F

Supply and communication lines, where involved in crossings, conflicts or on poles jointly used, shall be constructed and maintained so as to conform with grades of construction not less than as specified in Table 3.

Table 3
Grades of Construction

Class of Circuits involved at upper level	Other facilities at lower level at crossing, conflicts or on poles jointly used	Grade of construction to be used at upper level
E or H- - - - - - - - - - - - - - - - - -	Major Class C Circuits- -	"A"
E, H or L - - - - - - - - - - - - - - - - -	Major railways (steam, electric or other motive power at crossing only)- -	"A"
E, H or L - - - - - - - - - - - - - - - - -	Minor railways (at crossing only)- - - - - - - - - - - - - -	"B"
E or H- - - - - - - - - - - - - - - - - -	Under all conditions not required to be grade "A" except supply cables treated as specified in Rule 57.8	"B"
L- -	Under all conditions not required to be Grade "A" or "B" -	"C"
Supply cables treated as specified in Rule 57.8- - - - - - - - - - - - - -	Under all conditions- -	"C"
Major Class C- - - - - - - - - - - - - -	Class H circuits- -	"A"
Minor Class C- - - - - - - - - - - - - -	Class H circuits- -	"B"
C- -	Major railways (at crossing only) - - - - - - - - - - - - - -	"B"
C- -	Class L circuits of more than 750 volts - - - - - - - - - -	"C"
C- -	Supply cables treated as specified in Rule 57.8- - - -	"F"
C- -	Under all conditions not required to Grade "A," "B," or "C" -	"F"

Note: Rule 57.8 specifies bonding and grounding of sheath and messenger of supply cables.

Rule 44

Modified by changing the reference in the second paragraph from "steel" to "material other than wood" to read as follows:

Safety Factors

The safety factors specified in these rules are the minimum allowable ratios of ultimate strengths of materials to maximum working stresses, except that:

The safety factors for structural material other than wood (towers, poles and crossarms) shall be applied as specified in Rule 48.2, and

The safety factors for wood members in bending shall be applied to longitudinal tension and compression as ratios of the moduli off rupture to the maximum working stresses.

The maximum working stresses used with these safety factors shall be the maximum stresses which would be developed in the materials under the construction arrangement with temperature and loadings as specified in Rule 43.

Rule 44.1

Table 4 is modified by substituting "metallic" for "steels" and by adding reference (a) to read as follows:

Table 4
Minimum Safety Factors

Element of Line	Grade of Construction			
	Grade "A"	Grade "B"	Grade "C"	Grade "F"
Conductors, splices and conductor fastenings (other than tie wires)	2	2	2	1
Pins	2	2	2	1
Pole line hardware	2	2	2	2
Line insulators (mechanical)	3	2	2	2
Guy Insulators (mechanical)				
Interlocking	2	2	2	2
Noninterlocking	3	3	3	----------
Guys, except in light loading districts	2	2	2	1 ½
Guys, in light loading rural districts	2	1 ½	1 ½	1 ½
Messengers and span wires	2	2	2	2
Wood poles	4	3	2	1
Metallic Service and Meter Poles	-	2	2	-
Structural or tubular metallic poles (other than service and meter poles), towers, crossarms and metallic members of foundations	1 ½ (a)	1 ½ (a)	1 ½ (a)	----------
Foundations against uplift	1 ½	1 ½	1 ½	----------
Foundations against depression	3	2	2	----------
Reinforced concrete poles	4	3	3	----------
Crossarms (wood)	2	2	2	1

(a) For aluminum members subject to tension caused by one or more estimated loads and where the critical load combination for the tension member would not endanger adjacent compression members, the factor of safety on ultimate tension shall be 2 for Grade "A" construction and 1.67 for Grades "B" and "C" construction

Rule 48.2

Modified by changing the heading and first paragraph references from structural steels to structural materials other than wood and by adding provisions governing the applications of safety factors to such materials to read as follows:

Structural materials (other than wood)

Structural members and their connections, shall be designed and constructed so that the structures and parts thereof will not fail or be seriously distorted at any load less than the maximum working loads developed under the construction arrangement with loadings as specified in Rule 43) multiplied by the safety factors specified in Rule 44.

The safety factors specified in Rule 44 shall be applied as follows to structural steel:

Tensions and Bending: The yield point, 33,000 pounds per square inch, shall be divided by the safety factor to determine the maximum allowable working stress.

Compression: The maximum allowable working stress shall be calculated by the following formula:

$$S_{\max} = \frac{1}{f_s}\left[YP - \left(\frac{YP - 12{,}000}{200}\right)\frac{l}{r}\right]$$

where S_{max} = maximum allowable working stress, lbs per sq in.
f_s = safety factor specified in Rule 44
YP = yield point of the steel, 33,000 lbs per sq in.
l = unsupported length of member, inches
r = radius of gyration of member, inches

Shear: The ultimate tensile strength, 60,000 pounds per square inch, shall be multiplied by 2/3 and divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.

Where the figures given are used, structural steel shall conform to Standards Specifications A7-39 of American Society for Testing Materials for carbon steel of structural quality. Other values may be used for steel of other strength provided the yield point and ultimate tensile strength are determined by test.

For other structural materials (other than concrete), the safety factor specified in Rule 44 shall be applied as follows:

Tension: The yield strength of the material used shall be divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.

Compression: The ultimate compressive strength of the material used be divided by the safety factor specified in Rule 44 to obtain the allowable working stress. The ultimate compressive strength shall be determined by suitable formulas for material used, considering yield strength of the material, modulus of elasticity, slenderness ratio and eccentricity of connection. In no case shall the ultimate compressive stress be greater than the yield strength of the material.

Shear: The ultimate shear strength of the material used be divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.

Rule 49.1-A

Modified by changing the reference in the first line of the second paragraph from "steels" to "metal" and to add "Towers and Structures" to read as follows.

POLES, TOWERS AND OTHER STRUCTURES

A Strength

Wood poles shall be of sound timber, free from defects which would materially reduce their strength or durability and they shall have sufficient strength to withstand, with safety factors not less than those specified in Rule 44, the maximum stresses to which they are subjected under the loading conditions specified in Rule 43. The modulus of rupture used in calculation of safety factors shall be not greater than the value given in Rule 48.1.

Metallic and reinforced concrete poles, towers and structures together with their foundations, shall be of such material and dimensions as to withstand, with safety factors not less than those specified in Rule 44, the maximum stresses to which they are subjected under the loading conditions specified in Rule 43. The fiber stress values used in calculation of safety factors shall be as specified in Rule 48.2 , 48.3 and 48.6.

Certain poles subject to special stresses due to angles in the line, dead –ending of conductors or other attachments, which stresses must be included in computing the loading and safety factor. Poles subject to these special stresses sometimes require the use of guy attachment shall be considered merely as a strut, the guy taking all lateral stresses. In such cases the pole strength requirement shall apply at the point of guy attachment rather than at the ground line.

Spliced or stub reinforced poles or pole top extensions, including the attachment (joint) of the different members involved, shall meet all of the vertical, transverse and longitudinal strength requirements of these rules as if a whole pole were used. Spliced or stub reinforced poles or pole top extensions shall not be used where Grade "A" construction is required in supports of crossings or conflicts, or where Grade "B" construction is required for Class C lines crossing the main lines of major railways.

Rule 49.6-B

Table 9 is modified by adding a reference to Class E circuits to read as follows:

Table 9
Minimum Size and Strength of Guys Crossing\
over Class E, H, L, T or C Circuits

Material of Strand	Minimum size	
	Anchor guys	Overhead guys
Galvanized Steel		
Common or Siemens-Martin	5/16 in. diam.	¼ in. diam.
High Strength or extra-high strength	¼ in. diam.	3/16 in diam
Copper-covered Steel	3 No. 9 AWG	3 No. 10 AWG
Bronze	¼ in diam.	3 No. 10 AWG
Minimum allowable ultimate strength of guys	3,200 Pounds	1,900 pounds

Rule 50

Modified by adding a new second sentence referring to the applicability of Section VI to read as follows:

General

The Following Rules cover certain special details for the construction of supply lines. These rules do not apply to Class E circuits, except where provisions are made for in Section VI. These rules are supplemented, in certain cases, by rules in other sections. See Section VII for the special rules applicable to Class T circuits; see Section IX for special rules applicable to supply lines on poles jointly used; see Section X for special rules applicable to line crossings or conflicts; see Section XI for special rules applicable to line crossing railroad.

Rule 51.6-A

Modified by revising the last sentence to read:

"See Rule 61.6 for marking towers."

Rule 54.4-A(1)

Modified by excluding Class E circuits to read as follows:

> Across Arid or Mountainous Areas: Across arid or mountainous areas supply circuits carrying 22,500-30,000 volts, inclusive, may have a clearance of less than 30 feet (Table 1, Case 4, Column F) but not less than 25 feet above ground subject to a reduction of not more than 10 per cent because of temperature and loading as specified in Rule 43. Upon special permission from the Rail Road Commission, a minimum clearance of 25 feet above ground may be applied in similar areas to circuits in excess of 30,000 volts, however not including Class E circuits. For circuits in excess of 30,000 volts, no reduction of the 25 feet will be permitted for conditions less than maximum loadings or temperature specified in Rules 43.1 and 43.2.

Rule 54.4-C(2)

Modified by adding a voltage classification to read as follows:

(a) One Voltage Classification*: The clearance of Table 2, Case 14 (and clearances less than as specified in cases 9 to 13) shall not be applied consecutively both above and below the same conductor. The foregoing provisions of this rule do not apply to conductors in triangular or vertical configuration, the clearances of Table 2, Case 14 being directly applicable.

Where Conductors of one voltage classification only are supported on the same crossarms, the vertical clearances specified in Table 2, Case 14 are not required between conductors on line arm and conductors on related buck arm provided no conductors on the line arm cross conductors of different phase or polarity on the buck arms.

*Voltage Classification for this purpose are:
0-750 volts
750-7500 volts
7500-20,000 volts and
20,000 – 75,000 volts

Rule 54.4-C(7)

Delete

Rule 100

Modified by clarifying the obligation to establish required clearances to read as follows:

GENERAL

The following rules cover certain details for the construction of supply and communication lines in line crossings or conflicts and apply to the line which is at the higher elevation; however, the owner or operator who last erects in point of time constructs or erects facilities shall establish the required clearances. These rules are supplemental to the rules for lines of these classifications in general and to the construction details for such lines where alone, which general rules shall be followed in all respects except as modified herein.

Rule 103.2

Modified by revising the last sentence to refer to proposed new Rule 61.3-A(2) to read as follows:

OVERHEAD LIGHTNING PROTECTION WIRES

Overhead lightning protection wires or cables, if used, shall conform to the requirements of this Order as to grades of construction, material, size and strength, for conductors of the voltage of the circuit protected. For Overhead ground wires or lighting protection wires supported on towers or structures, see Rule 61.3-A(2).

Rule 113.2

Modified by revising the last sentence to refer to proposed new Rule 61.3-A(2) to read as follows:

OVERHEAD LIGHTNING PROTECTION WIRES

Overhead lightning protection wires or cables, if used, shall conform to the requirements of this Order as to grades of construction, material, size and strength, for conductors of the voltage of the circuit protected. For Overhead ground wires or lighting protection wires supported on towers or structures, see Rule 61.3-A(2).

Strikeout and Underline added by Raymond Fugere on July 17, 2002.

Original Version
Rule 20.5-D

20.5-D **Supply Circuits** mean those circuits which are used for transmitting a supply of electrical energy.

1 **Class H Circuits** include the following:

Constant potential alternating current circuits of 5000 volts or more between any two conductors

Constant potential alternating current circuits of 2900 volts or more between any conductor and ground

Constant potential direct current circuits exceeding 750 volts between any conductor and ground

Constant current circuits of 7.5 amperes or less supplied from transformers or devices having a normal full-load output voltage of 5000 volts or more

Constant current circuits of more than 7.5 amperes supplied from transformers or devices having an open-circuit voltage of 2900 volts or more.

2 **Class L Circuits** include the following:

Constant potential alternating or direct current supply circuits of lower voltage than Class H

Constant current circuits of 7.5 amperes or less supplied from transformers or devices having a normal full-load output voltage less than 5000 volts

Constant current circuits of more than 7.5 amperes supplied from transformers or devices having an open-circuit output voltage less than 2900.

Strikeout and Underline Version
Rule 20.5-D

20.5-D **Supply Circuits** mean those circuits which are used for transmitting a supply of electrical energy.

1 Class E circuits include constant potential alternating or direct current circuits of 300,000 volts or more between any two conductors.

~~1~~2 Class H Circuits include the following:

Constant potential alternating current circuits of 5000 volts or more between any two conductors

Constant potential alternating current circuits of 2900 volts or more between any conductor and ground

Constant potential direct current circuits exceeding 750 volts between any conductor and ground

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Constant current circuits of more than 7.5 amperes supplied from transformers or devices having an open-circuit output voltage less than 2900.

Final Version
Rule 20.5-D

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1 Class E circuits include constant potential alternating or direct current circuits of 300,000 volts or more between any two conductors.

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Constant current circuits of more than 7.5 amperes supplied from transformers or devices having an open-circuit output voltage less than 2900.

Original Version
Rule 20.8

20.8 Conductor means a wire, or combination of wires not insulated from one another, suitable for carrying electric current.

A Lateral Conductor means a conductor extending in a general horizontal direction and usually at an angle of approximately 90 degrees to the direction of the line conductors.

B Line Conductor means an overhead conductor which extends from the last point of support on one overhead line structure to the first point of support on another overhead line structure.

C Open Wire Conductors mean communication conductors separately supported.

D Unprotected Conductors means supply conductors, including but not limited to lead wires, not covered by a "suitable protective covering" (see Rule 22.2), grounded metal conduit, grounded metal sheath or shield, or impregnated fiber and not enclosed in a grounded metal pole. The provisions for the use of these various types of coverings are specified in certain of these rules.

E Vertical Conductor means a conductor extending in a general vertical direction between conductor levels on an overhead line structure.

F Insulated Conductors, suitable, means supply conductors which are surrounded by an insulating material, the dielectric strength of which is sufficient to withstand the maximum difference of potential at normal operating voltages of the circuit without breakdown or puncture. A weather-resistant covering of a supply conductor does not meet the requirements of this rule as to a suitable insulation.

G Terminal Fittings are the terminal equipment used in terminating the conductors of runs and risers and include cable potheads and conduit entrance fittings.

Strikeout and Underline Version
Rule 20.8

20.8 Conductor means a wire, or combination of wires not insulated from one another, suitable for carrying electric current.

A Bundle conductor means a group of conductors of the same phase and polarity.

~~A~~B Lateral Conductor means a conductor extending in a general horizontal direction and usually at an angle of approximately 90 degrees to the direction of the line conductors.

~~B~~C Line Conductor means an overhead conductor which extends from the last point of support on one overhead line structure to the first point of support on another overhead line structure.

~~C~~D Open Wire Conductors mean communication conductors separately supported.

~~D~~E Unprotected Conductors means supply conductors, including but not limited to lead wires, not covered by a "suitable protective covering" (see Rule 22.2), grounded metal conduit, grounded metal sheath or shield, or impregnated fiber and not enclosed in a grounded metal pole. The provisions for the use of these various types of coverings are specified in certain of these rules.

~~E~~F Vertical Conductor means a conductor extending in a general vertical direction between conductor levels on an overhead line structure.

~~F~~G Insulated Conductors, suitable, means supply conductors which are surrounded by an insulating material, the dielectric strength of which is sufficient to withstand the maximum difference of potential at normal operating voltages of the circuit without breakdown or puncture. A weather-resistant covering of a supply conductor does not meet the requirements of this rule as to a suitable insulation.

~~G~~H Terminal Fittings are the terminal equipment used in terminating the conductors of runs and risers and include cable potheads and conduit entrance fittings.

Final Version
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H Terminal Fittings are the terminal equipment used in terminating the conductors of runs and risers and include cable potheads and conduit entrance fittings.

Original Version

Rule 21.7-C

21.7-C **Tower Lines** (Class H, L and T) mean supply lines, the supporting structures of which are of steel or other metal and have a maximum outside dimension of more than 4 feet measured either along or across the line in a horizontal plane at the ground level. Metal supporting structures, "A" frames or "H" structures, having a dimension from outside of one support to outside of another support greater than 4 feet at the ground level will be classified as towers.

Note-Steel or metal structures having maximum outside dimensions of 4 feet or less, measured along and cross the line in a horizontal plane at the ground level, will be classified as poles under supply lines.

Strikeout and Underline Version

Rule 21.7-C

21.7-C **Tower Lines** (Class E, H, L and T) mean supply lines, the supporting structures of which are of steel or other metal and have a maximum outside dimension of more than 4 feet measured either along or across the line in a horizontal plane at the ground level. Metal supporting structures, "A" frames or "H" structures, having a dimension from outside of one support to outside of another support greater than 4 feet at the ground level will be classified as towers.

Guyed V-type or Y-type-metal structures will be classified as towers.

Note-~~Steel or~~ metal structures having maximum outside dimensions of 4 feet or less, measured along and cross the line in a horizontal plane at the ground level, will be classified as poles under supply lines.

Final Version
Rule 21.7-C

21.7-C **Tower Lines** (Class E, H, L and T) mean supply lines, the supporting structures of which are of steel or other metal and have a maximum outside dimension of more than 4 feet measured either along or across the line in a horizontal plane at the ground level. Metal supporting structures, "A" frames or "H" structures, having a dimension from outside of one support to outside of another support greater than 4 feet at the ground level will be classified as towers.

Guyed V-type or Y-type-metal structures will be classified as towers.

Note-Metal structures having maximum outside dimensions of 4 feet or less, measured along and cross the line in a horizontal plane at the ground level, will be classified as poles under supply lines.

Original Version
Rule 33.1

33.1 Neutral Conductors

Neutral conductors of supply circuits, other than in distribution systems of 22,500 volts or less with common primary and secondary grounded neutrals, shall be considered as carrying the same voltage as the other conductors of the circuits. Insulators used to support neutral conductors shall meet the requirements of Rule 55, based on the nominal voltage of the circuit, but are not required to have the same insulating value as insulators actually used on the phase conductors. Where a common neutral system is installed, the neutral conductor may be considered as carrying the same voltage as any of its related systems conductors, compliance with special practices and construction requirements being necessary (see Rule 59).

Strikeout and Underline Version
Rule 33.1

33.1 Neutral Conductors

Neutral conductors of supply circuits, other than in distribution systems of 22,500 volts or less with common primary and secondary grounded neutrals, shall be considered as carrying the same voltage as the other conductors of the circuits. Insulators used to support neutral conductors shall meet the requirements of Rule 55, based on the nominal voltage of the circuit, but are not required to have the same insulating value as insulators actually used on the phase conductors. Where a common neutral system is installed, the neutral conductor may be considered as carrying the same voltage as any of its related systems conductors, compliance with special practices and construction requirements being necessary (see Rule 59).

<u>This rule need not apply to overhead lightning protection wires installed on metal structures or grounded wood structures.</u>

Final Version
Rule 33.1

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Neutral conductors of supply circuits, other than in distribution systems of 22,500 volts or less with common primary and secondary grounded neutrals, shall be considered as carrying the same voltage as the other conductors of the circuits. Insulators used to support neutral conductors shall meet the requirements of Rule 55, based on the nominal voltage of the circuit, but are not required to have the same insulating value as insulators actually used on the phase conductors. Where a common neutral system is installed, the neutral conductor may be considered as carrying the same voltage as any of its related systems conductors, compliance with special practices and construction requirements being necessary (see Rule 59).

This rule need not apply to overhead lightning protection wires installed on metal structures or grounded wood structures.

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

	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 more than 22,500 volts
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
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)
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)
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 (0) (p)
5	Vertical ground in areas accessible to pedestrians only.	7 ft	10 ft (m) (q)	19 ft	12 ft	17 ft	25 ft (o)
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
7	Horizontal clearance of conductor from buildings (except generating and substations), bridges or other structures (upon which men may work) where such conductor is not attached thereto. (a) (t)	----------	3 ft (u)	3 ft	3 ft (u) (v)	6 ft (v)	6 ft (v)
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)
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)

(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. 4. Communication conductors under bridges, etc. 5. Communication service drops.	 54.8-B4a 57.4-G 84.4-E 84.4-F 84.8-C4
(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	 53.4 54.6-B 54.6-C

	4. Supply vertical pins 5. Supply risers 6. Communication Ground Wires 7. Communication lateral conductors 8. Communication vertical runs 9. Communication risers	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	32.3 54.4D3
	2. Unattached supply conductors	54.8-C2
	3. Supply Service drops on clearance crossarms	54.8-C3
	4. Supply Service drops on pole top extensions	54.8-D
	5. Unattached Supply service drops	84.4-D3
	6. Communication lines, collinear, conflicting or crossing	
	7. Communication conductors passing supply poles and unattached thereto	84.4-D4 84.8-D2
	8. Communication service drops on clearance crossarms	84.8-D3
	9. Communication service drops on pole top extensions	84.8-E
	10. Unattached Communication service drops	
(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	54.4-D5
	2. Supply service drops from racks	54.8-F
	3. Supply cables and messengers attached to poles	57.4-F
	4. Communication conductors on communication poles	84.4-D
	5. Communication conductors on crossarms	84.4-D1
	6. Communication conductors attached to poles	84.4-D2
	7. Communication service drops attached to poles	84.8-B
	8. Communication cables and messengers	87.4-D
	9. Supply or communication cables and messengers on jointly used poles	92.1-B
	10. Communication service drops on pole top extensions	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	54.4-C4 54.4-D7
	2. Conductors dead-ended in horizontal configuration	54.4-D8
	3. Conductors in pole-top construction	
(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	54.4-E
	1. Suitably insulated leads to protected runs	54.4-E
	2. Leads of 0-5000 volts to equipment	58.5-C
	3. Leads of 0-5000 volts to cutouts or switches	
(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

Strikeout and Underline 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)

	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 ~~more than 22,500 volts~~ 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)

(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. 4. Communication conductors under bridges, etc. 5. Communication service drops.	 54.8-B4a 57.4-G 84.4-E 84.4-F 84.8-C4
(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	 53.4 54.6-B 54.6-C

	4. Supply vertical pins 5. Supply risers 6. Communication Ground Wires 7. Communication lateral conductors 8. Communication vertical runs 9. Communication risers	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 7. Communication conductors 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 on jointly used poles 10. Communication service drops on pole top extensions	 54.4-D5 54.8-F 57.4-F 84.4-D 84.4-D1 84.4-D2 84.8-B 87.4-D 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.	

Strikeout and Underline 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)

	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)

(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. 4. Communication conductors under bridges, etc. 5. Communication service drops.	 54.8-B4a 57.4-G 84.4-E 84.4-F 84.8-C4
(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	 53.4 54.6-B 54.6-C

	4. Supply vertical pins 5. Supply risers 6. Communication Ground Wires 7. Communication lateral conductors 8. Communication vertical runs 9. Communication risers	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 7. Communication conductors 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 on jointly used poles 10. Communication service drops on pole top extensions	 54.4-D5 54.8-F 57.4-F 84.4-D 84.4-D1 84.4-D2 84.8-B 87.4-D 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.	

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 35,000-68,000 volts	I Over 68,000 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	72(g)
2	Trolley contact conductors 0-750 volts	48 (d, e)	----------	48 (d)	48 (d, h)	48	72	96	96	96(g)
3	Communication conductors	24 (e)	48 (d)	24	48 (i)	48 (dd)	72	96	96	96(g)
4	Supply conductors, service drops and trolley feeders 0-750 volts	24 (e)	48 (d, h)	48 (i)	24	48	48	96	96	96(g)
5	Supply conductors, 750-7500 volts	36 (f)	48	48 (dd)	48	48 (h)	72	96	96	96(g)
6	Supply conductors 7500-20,000 volts	36	72	72	48	72	72	96	96	96(g)
7	Supply conductors, more than 20,000 volts	72	96	96	96	96	96	96	96	96(g)
	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	72
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)	72	72
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(q)
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(q)
12	Supply conductors 20,000-68,000 volts	----------	----------	72 (m)	72 (m)	48 (m, q)	48 (m, q)	48(o, q)	48(o,	60(q)

13	Supply conductors, more than 68,000 volts	---------- -	---------- -	72	72	60 (q)	60 (q)	60(q)	q) 60(q)	60(o, q)
	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	36	48(g)
	Horizontal separation of conductors on same crossarm									
15	Pin spacings of longitudinal conductors, vertical conductors and service drops	---------- -	---------- -	3(x)	11 ½ (h, x)	11 ½ (x)	17 ½ (x)	24 (x)	36	48(g)
	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)	36	48(g)
17	Conductors, tap or lead wires of same circuits (v, y, z)	---------- -	---------- -	3	3	6	6	12	18	24
	Radial separation between guys and conductors		----------							
18	Guys passing conductors supported on other poles, and guys approximately parallel to conductors supported on the same poles	---------- -	---------- -	9 (bb)	12	18	18	30	36	36
19	Guys and spans wires passing conductors supported on the same poles	(ee)	3 (bb)	3	3	6	9	12	18	24

(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 68,000 volts. 1. Conductors not supported on the same poles 2. Conductors supported on the same crossarm, pole or structure.	54.4-C7a 54.4-C7b
(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	54.8-C1a 54.8-C4 84.8-D1a

	conductors 4. Communication service drops and supply service drops	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

Strikeout and Underline 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-~~68,000~~ 75,000 volts	I ~~Over~~ ~~68,000~~ 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~~(g)~~	78(gg)	138(hh)
2	Trolley contact conductors 0-750 volts	48 (d, e)	----------	48 (d)	48 (d, h)	48	72	96	96	96~~(g)~~	96 (gg)	156(hh)
3	Communication conductors	24 (e)	48 (d)	24	48 (i)	48 (dd)	72	96	96	96~~(g)~~	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	96	96~~(g)~~	96 (gg)	156(hh)
5	Supply conductors, 750-7500 volts	36 (f)	48	48 (dd)	48	48 (h)	72	96	96	96~~(g)~~	96 (gg)	156(hh)
6	Supply conductors 7500-20,000 volts	36	72	72	48	72	72	96	96	96~~(g)~~	96 (gg)	156(hh)
7	Supply conductors, more than 20,000 volts	72	96	96	96	96	96	96	96	96~~(g)~~	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 ~~72~~	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)	72	78 ~~72~~	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) ~~(q)~~	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) ~~(q)~~	90 (gg)	150(hh)
12	Supply conductors 20,000-68,000 volts	--- -		72 (m)	72 (m)	48 (m, q)	48 (m, q)	48(o, q)	48(o, q)	60(ff) ~~(q)~~	90 (gg)	150(hh)
13	Supply conductors, more than 68,000 volts	--- -		72	72	60 (q)	60 (q)	60(q)	60(q)	60~~(o,q)~~(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	~~48 (g)~~ 60(ff)	90 (gg)	150(hh)
	Horizontal separation of conductors on same crossarm											
15	Pin spacings of longitudinal conductors, vertical conductors and service drops	--- -		3(x)	11 ½ (h, x)	11 ½ (x)	17 ½ (x)	24 (x)	48	~~48 (g)~~ 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	~~48 (g)~~ 60(ff)	90 (gg)	150(hh)
17	Conductors, tap or lead wires of same circuits (v, y, z)	--- -		3	3	6	6	12	24	~~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	--- -		9 (bb)	12	18	18	30	36	36 (ff)	78 (gg)	138(hh)
19	Guys and spans wires passing	(ee)	3 (bb)	3	3	6	9	12	18	24	48 (ll)	86 (jj)

	conductors supported on the same poles											
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 ~~68,000~~ 75,000 volts. As required by Table 2 Columns I, J, and K ~~1. Conductors not supported on the same poles~~ ~~2. Conductors supported on the same crossarm, pole or structure.~~	~~54.4-C7a~~ ~~54.4-C7b~~
(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	54.8-C1a 54.8-C4 84.8-D1a

	conductors 4. Communication service drops and supply service drops	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	

Final 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	96	96	96 (gg)	156(hh)
5	Supply conductors, 750-7500 volts	36 (f)	48	48 (dd)	48	48 (h)	72	96	96	96	96 (gg)	156(hh)
6	Supply conductors 7500-20,000 volts	36	72	72	48	72	72	96	96	96	96 (gg)	156(hh)
7	Supply conductors, more than 20,000 volts	72	96	96	96	96	96	96	96	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)	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 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 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	---------- ---	---------- -	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, y, z)	---------- ---	---------- -	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	---------- ---	---------- -	9 (bb)	12	18	18	30	36	36 (ff)	78 (gg)	138(hh)
19	Guys and spans wires passing	(ee)	3 (bb)	3	3	6	9	12	18	24	48 (ll)	86 (jj)

	conductors supported on the same poles											
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	54.9 57.4-F

	configuration 2. Supply cables and messengers attached to poles 3. Communication cables and messengers attached to poles 4. On Jointly used poles	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-	54.4-C3c 57.4-C

	conductor cables	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	 56.4-D2 56.4-D3

	3. Communication guys, crossing 4. Communication guys, approximately parallel	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	

Original Version

Table 2A

Minimum Clearances of Wires from Signs Mounted on Buildings and Isolated Structures [A]

Case No.	Nature of Clearance Type of Sign	A Span Wires (Other than Trolley Span Wires) Overhead Guys and Messengers, Communication Cables and Communication Service Drops	B Communication Open Wire Conductors Supply Cables Treated as in Rule 57.8 and Supply Service Drops 0 - 750 Volts	C Supply Conductors, Supply Cables of 0 - 750 Volts and Trolley Span Wires	D Supply Conductors and Supply Cables, Above 750 [B]
1	Vertical clearance above all signs upon which men can walk	8 Feet	8 Feet	8 Feet	12 Feet
2	Vertical clearance above all signs upon which men cannot walk	2 Feet	2 Feet	3 Feet	8 Feet
3	Vertical clearance under signs which are illuminated	2 Feet [C]	2 Feet [E]	3 Feet	Prohibited [F]
4	Vertical clearance under signs which are non–illuminated	6 inches [D]	1 Foot	3 Feet	Prohibited [F]
5	Horizontal clearance from signs which are illuminated	3 Feet [C]	3 Feet [E]	3 Feet	6 Feet
6	Horizontal clearance from signs which are non–illuminated	6 inches [D]	1 Foot	3 Feet	6 Feet

(a) These clearances do not apply to service drop conductors which are attached to signs for the purpose of serving such signs.

(b) Nothing herein contained shall be construed as authorization of noncompliance with standards of the Industrial Safety Board of the California Division of Industrial Safety, including section 2603 of the Electrical Safety Orders, entitled "Provision for Preventing Accidents Due to Proximity of High-Voltage Lines", approved by that Board.

(c) May be reduced to 6 inches provided illuminated sign is grounded.

(d) May be reduced if adequate separation is provided by means of a suitable non–conducting separator.

(e) May be reduced to 1 foot for communication open wire conductors only, provided illuminated sign is grounded

(f) When conductors are at a level of 8 feet or more below the level of the lowest portion of the sign but not vertically under the sign, no horizontal clearance is required between the vertical planes through the conductor nearest the sign and the vertical projection of the extremities of the sign. Also note (b) above.

Strikeout and Underline Version

Table 2A

Minimum Clearances of Wires from Signs Mounted on Buildings and Isolated Structures [A]

Case No.	Nature of Clearance Type of Sign	A Span Wires (Other than Trolley Span Wires) Overhead Guys and Messengers, Communication Cables and Communication Service Drops	B Communication Open Wire Conductors Supply Cables Treated as in Rule 57.8 and Supply Service Drops 0 - 750 Volts	C Supply Conductors, Supply Cables of 0 - 750 Volts and Trolley Span Wires	D Supply Conductors and Supply Cables, ~~Above~~ 750 – 300,000 volts [B]	E Supply Conductors and Supply Cables, 300 – 550 kV
1	Vertical clearance above all signs upon which men can walk	8 Feet	8 Feet	8 Feet	12 Feet	20 ft (g)
2	Vertical clearance above all signs upon which men cannot walk	2 Feet	2 Feet	3 Feet	8 Feet	20 ft (g)
3	Vertical clearance under signs which are illuminated	2 Feet [C]	2 Feet [E]	3 Feet	Prohibited [F]	Prohibited [F]
4	Vertical clearance under signs which are non–illuminated	6 inches [D]	1 Foot	3 Feet	Prohibited [F]	Prohibited [F]
5	Horizontal clearance from signs which are illuminated	3 Feet [C]	3 Feet [E]	3 Feet	6 Feet	15 ft. (h)
6	Horizontal clearance from signs which are non–illuminated	6 inches [D]	1 Foot	3 Feet	6 Feet	15 ft (h)

(a) These clearances do not apply to service drop conductors which are attached to signs for the purpose of serving such signs.

(b) Nothing herein contained shall be construed as authorization of noncompliance with standards of the Industrial Safety Board of the California Division of Industrial Safety, including section 2603 of the Electrical Safety Orders, entitled "Provision for Preventing Accidents Due to Proximity of High-Voltage Lines", approved by that Board.

(c) May be reduced to 6 inches provided illuminated sign is grounded.

(d) May be reduced if adequate separation is provided by means of a suitable non–conducting separator.

(e) May be reduced to 1 foot for communication open wire conductors only, provided illuminated sign is grounded

(f) When conductors are at a level of 8 feet or more below the level of the lowest portion of the sign but not vertically under the sign, no horizontal clearance is required between the vertical planes through the conductor nearest the sign and the vertical projection of the extremities of the sign. Also note (b) above.

(g) Shall be increased by 0.04 ft per kv in excess of 300 kv.

(h) Not applicable to certain kinds of conductors.

1. Supply conductors of same phase and polarity, Rule 54.4-C3c
2. Insulated supply conductors in multi-conductor cables, Rule 57.4-C
3. Communication insulated conductors or multiple-conductor cables, Rule 87.4-C1

Final Version

Table 2A

Minimum Clearances of Wires from Signs Mounted on Buildings and Isolated Structures [A]

Case No.	Nature of Clearance Type of Sign	A Span Wires (Other than Trolley Span Wires) Overhead Guys and Messengers, Communication Cables and Communication Service Drops	B Communication Open Wire Conductors Supply Cables Treated as in Rule 57.8 and Supply Service Drops 0 - 750 Volts	C Supply Conductors, Supply Cables of 0 - 750 Volts and Trolley Span Wires	D Supply Conductors and Supply Cables, 750 – 300,000 volts [B]	E Supply Conductors and Supply Cables, 300 – 550 kV
1	Vertical clearance above all signs upon which men can walk	8 Feet	8 Feet	8 Feet	12 Feet	20 ft (g)
2	Vertical clearance above all signs upon which men cannot walk	2 Feet	2 Feet	3 Feet	8 Feet	20 ft (g)
3	Vertical clearance under signs which are illuminated	2 Feet [C]	2 Feet [E]	3 Feet	Prohibited [F]	Prohibited [F]
4	Vertical clearance under signs which are non–illuminated	6 inches [D]	1 Foot	3 Feet	Prohibited [F]	Prohibited [F]
5	Horizontal clearance from signs which are illuminated	3 Feet [C]	3 Feet [E]	3 Feet	6 Feet	15 ft. (h)
6	Horizontal clearance from signs which are non–illuminated	6 inches [D]	1 Foot	3 Feet	6 Feet	15 ft (h)

(a) These clearances do not apply to service drop conductors which are attached to signs for the purpose of serving such signs.

(b) Nothing herein contained shall be construed as authorization of noncompliance with standards of the Industrial Safety Board of the California Division of Industrial Safety, including section 2603 of the Electrical Safety Orders, entitled "Provision for Preventing Accidents Due to Proximity of High-Voltage Lines", approved by that Board.

(c) May be reduced to 6 inches provided illuminated sign is grounded.

(d) May be reduced if adequate separation is provided by means of a suitable non–conducting separator.

(e) May be reduced to 1 foot for communication open wire conductors only, provided illuminated sign is grounded

(f) When conductors are at a level of 8 feet or more below the level of the lowest portion of the sign but not vertically under the sign, no horizontal clearance is required between the vertical planes through the conductor nearest the sign and the vertical projection of the extremities of the sign. Also note (b) above.

(g) Shall be increased by 0.04 ft per kv in excess of 300 kv.

(h) Not applicable to certain kinds of conductors.

1. Supply conductors of same phase and polarity, Rule 54.4-C3c
2. Insulated supply conductors in multi-conductor cables, Rule 57.4-C
3. Communication insulated conductors or multiple-conductor cables, Rule 87.4-C1

Original Version
Rule 42

42 Grades of Construction

For all classes of lines, the relative order of grades is "A," "B," "C" and "F," grade "A" being the highest.

Supply and communication lines, where not involved in crossings, conflicts or on poles jointly used, shall be constructed and maintained so as to conform with grades of construction not less than as follows:

Class H supply- - - - - - - - - - - - - - - Grade B
Class L supply- - - - - - - - - - - - - - - Grade C
Class C communication- - - - - - - - - Grade F

Supply and communication lines, where involved in crossings, conflicts or on poles jointly used, shall be constructed and maintained so as to conform with grades of construction not less than as specified in Table 3.

Table 3
Grades of Construction

Class of Circuits involved at upper level	Other facilities at lower level at crossing, conflicts or on poles jointly used	Grade of construction to be used at upper level
H- -	Major Class C Circuits- -	"A"
H or L - - - - - - - - - - - - - - - - - -	Major railways (steam, electric or other motive power at crossing only)- -	"A"
H or L- - - - - - - - - - - - - - - - - -	Minor railways (at crossing only)- - - - - - - - - - - - - -	"B"
H- -	Under all conditions not required to be grade "A" except supply cables treated as specified in Rule 57.8	"B"
L- -	Under all conditions not required to be Grade "A" or "B" -	"C"
Supply cables treated as specified in Rule 57.8- - - - - - - - - - - - - -	Under all conditions- -	"C"
Major Class C- - - - - - - - - - - - - -	Class H circuits- -	"A"
Minor Class C- - - - - - - - - - - - - -	Class H circuits- -	"B"
C- -	Major railways (at crossing only) - - - - - - - - - - - - - -	"B"
C- -	Class L circuits of more than 750 volts - - - - - - - - - -	"C"
C- -	Supply cables treated as specified in Rule 57.8- - - - -	"F"
C- -	Under all conditions not required to Grade "A," "B," or "C" -	"F"

Note: Rule 57.8 specifies bonding and grounding of sheath and messenger of supply cables.

Strikeout and Underline Version
Rule 42

Rule 42

Modified by inserting references to Class E supply circuits to read as follows:
42 Grades of Construction

For all classes of lines, the relative order of grades is "A," "B," "C" and "F," grade "A" being the highest. Supply and communication lines, where not involved in crossings, conflicts or on poles jointly used, shall be constructed and maintained so as to conform with grades of construction not less than as follows:

Class E supply- - - - - - - - - - - - - - - Grade B
Class H supply- - - - - - - - - - - - - - - Grade B
Class L supply- - - - - - - - - - - - - - - Grade C
Class C communication- - - - - - - - - Grade F

Supply and communication lines, where involved in crossings, conflicts or on poles jointly used, shall be constructed and maintained so as to conform with grades of construction not less than as specified in Table 3.

Table 3
Grades of Construction

Class of Circuits involved at upper level	Other facilities at lower level at crossing, conflicts or on poles jointly used	Grade of construction to be used at upper level
E or H- - - - - - - - - - - - - - - - - -	Major Class C Circuits- -	"A"
E, H or L - - - - - - - - - - - - - - - - -	Major railways (steam, electric or other motive power at crossing only)- -	"A"
E, H or L - - - - - - - - - - - - - - - - -	Minor railways (at crossing only)- - - - - - - - - - - - -	"B"
E or H- - - - - - - - - - - - - - - - - -	Under all conditions not required to be grade "A" except supply cables treated as specified in Rule 57.8	"B"
L- -	Under all conditions not required to be Grade "A" or "B" -	"C"
Supply cables treated as specified in Rule 57.8- - - - - - - - - - - - - -	Under all conditions- -	"C"
Major Class C- - - - - - - - - - - - - - -	Class H circuits- -	"A"
Minor Class C- - - - - - - - - - - - - - -	Class H circuits- -	"B"
C- -	Major railways (at crossing only) - - - - - - - - - - - - - -	"B"
C- -	Class L circuits of more than 750 volts - - - - - - - - - -	"C"
C- -	Supply cables treated as specified in Rule 57.8- - - - -	"F"
C- -	Under all conditions not required to Grade "A," "B," or "C" -	"F"

Note: Rule 57.8 specifies bonding and grounding of sheath and messenger of supply cables.

Final Version
Rule 42

Rule 42

Modified by inserting references to Class E supply circuits to read as follows:
42 Grades of Construction

For all classes of lines, the relative order of grades is "A," "B," "C" and "F," grade "A" being the highest. Supply and communication lines, where not involved in crossings, conflicts or on poles jointly used, shall be constructed and maintained so as to conform with grades of construction not less than as follows:

Class E supply- - - - - - - - - - - - - - - Grade B
Class H supply- - - - - - - - - - - - - - - Grade B
Class L supply- - - - - - - - - - - - - - - Grade C
Class C communication- - - - - - - - - Grade F

Supply and communication lines, where involved in crossings, conflicts or on poles jointly used, shall be constructed and maintained so as to conform with grades of construction not less than as specified in Table 3.

Table 3
Grades of Construction

Class of Circuits involved at upper level	Other facilities at lower level at crossing, conflicts or on poles jointly used	Grade of construction to be used at upper level
E or H- - - - - - - - - - - - - - - - - -	Major Class C Circuits- -	"A"
E, H or L - - - - - - - - - - - - - - - - -	Major railways (steam, electric or other motive power at crossing only)- -	"A"
E, H or L - - - - - - - - - - - - - - - - -	Minor railways (at crossing only)- - - - - - - - - - - - -	"B"
E or H- - - - - - - - - - - - - - - - - -	Under all conditions not required to be grade "A" except supply cables treated as specified in Rule 57.8	"B"
L- -	Under all conditions not required to be Grade "A" or "B" -	"C"
Supply cables treated as specified in Rule 57.8- - - - - - - - - - - - - -	Under all conditions- -	"C"
Major Class C- - - - - - - - - - - - - - -	Class H circuits- -	"A"
Minor Class C- - - - - - - - - - - - - - -	Class H circuits- -	"B"
C- -	Major railways (at crossing only) - - - - - - - - - - - - - -	"B"
C- -	Class L circuits of more than 750 volts - - - - - - - - - -	"C"
C- -	Supply cables treated as specified in Rule 57.8- - - - -	"F"
C- -	Under all conditions not required to Grade "A," "B," or "C" -	"F"

Note: Rule 57.8 specifies bonding and grounding of sheath and messenger of supply cables.

Original Version

Rule 44

44 Safety Factors

The safety factors specified in these rules are the minimum allowable ratios of ultimate strengths of materials to maximum working stresses, except that:

The safety factors for structural steel (towers, poles and crossarms) shall be applied as specified in Rule 48.2, and

The safety factors for wood members in bending shall be applied to longitudinal tension and compression as ratios of the moduli off rupture to the maximum working stresses.

The maximum working stresses used with these safety factors shall be the maximum stresses which would be developed in the materials under the construction arrangement with temperature and loadings as specified in Rule 43.

Strikeout and Underline Version

Rule 44

44 Safety Factors

The safety factors specified in these rules are the minimum allowable ratios of ultimate strengths of materials to maximum working stresses, except that:

The safety factors for structural ~~steel~~ materials other than wood (towers, poles and crossarms) shall be applied as specified in Rule 48.2, and

The safety factors for wood members in bending shall be applied to longitudinal tension and compression as ratios of the moduli off rupture to the maximum working stresses.

The maximum working stresses used with these safety factors shall be the maximum stresses which would be developed in the materials under the construction arrangement with temperature and loadings as specified in Rule 43.

Final Version

Rule 44

44 Safety Factors

The safety factors specified in these rules are the minimum allowable ratios of ultimate strengths of materials to maximum working stresses, except that:

The safety factors for structural materials other than wood (towers, poles and crossarms) shall be applied as specified in Rule 48.2, and

The safety factors for wood members in bending shall be applied to longitudinal tension and compression as ratios of the moduli off rupture to the maximum working stresses.

The maximum working stresses used with these safety factors shall be the maximum stresses which would be developed in the materials under the construction arrangement with temperature and loadings as specified in Rule 43.

Original Version
Rule 44.1

44.1 Installation and Reconstruction,

Lines and elements of lines, upon installation or reconstruction, shall provide as a minimum the safety factors specified in Table 4 for vertical loads and loads transverse to lines and for loads longitudinal to lines except where longitudinal loads are balanced or where there are changes in grade construction (see Rules 47.3, 47.4 and 47.5)

Table 4
Minimum Safety Factors

Element of Line	Grade of Construction			
	Grade "A"	Grade "B"	Grade "C"	Grade "F"
Conductors, splices and conductor fastenings (other than tie wires)	2	2	2	1
Pins	2	2	2	1
Pole line hardware	2	2	2	2
Line insulators (mechanical)	3	2	2	2
Guy Insulators (mechanical)				
Interlocking	2	2	2	2
Noninterlocking wood	3	3	3	----------
Noninterlocking glass fiber	3	2(a)	2(b)	----------
Guys, except in light loading districts	2	2	2	1 ½
Guys, in light loading rural districts	2	1 ½	1 ½	1 ½
Messengers and span wires	2	2	2	2
Wood poles	4	3	2	1
Metallic Service and Meter Poles	-	2	2	-
Structural or tubular steel poles (other than service and meter poles), towers, crossarms and steel members of foundations	1 ½	1 ½	1 ½	----------
Foundations against uplift	1 ½	1 ½	1 ½	----------
Foundations against depression	3	2	2	----------
Reinforced concrete poles	4	3	3	----------
Crossarms (wood)	2	2	2	1

(a) Insulators are to be replaced before safety factors have been reduced (due to deterioration or changes in construction, arrangement or other conditions subsequent to installation) to less than 95 percent of the safety factor specified in Rule 44.1.

(b) Insulator are to be replaced before safety factors have been reduced (due to deterioration or changes in construction, arrangement, or other conditions subsequent to installation) to less than 75 percent of the safety factor specified in Rule 44.1.

Strikeout and Underline Version
Rule 44.1

44.1 Installation and Reconstruction,

Lines and elements of lines, upon installation or reconstruction, shall provide as a minimum the safety factors specified in Table 4 for vertical loads and loads transverse to lines and for loads longitudinal to lines except where longitudinal loads are balanced or where there are changes in grade construction (see Rules 47.3, 47.4 and 47.5)

Table 4
Minimum Safety Factors

Element of Line	Grade of Construction			
	Grade "A"	Grade "B"	Grade "C"	Grade "F"
Conductors, splices and conductor fastenings (other than tie wires)	2	2	2	1
Pins	2	2	2	1
Pole line hardware	2	2	2	2
Line insulators (mechanical)	3	2	2	2
Guy Insulators (mechanical)				
Interlocking	2	2	2	2
Noninterlocking wood	3	3	3	----------
Noninterlocking glass fiber	3	2(a)	2(b)	----------
Guys, except in light loading districts	2	2	2	1 ½
Guys, in light loading rural districts	2	1 ½	1 ½	1 ½
Messengers and span wires	2	2	2	2
Wood poles	4	3	2	1
Metallic Service and Meter Poles	-	2	2	-
Structural or tubular ~~steel~~ metallic poles ~~(other than service and meter poles)~~, towers, crossarms and steel members of foundations	1 ½	1 ½	1 ½	----------
Foundations against uplift	1 ½	1 ½	1 ½	----------
Foundations against depression	3	2	2	----------
Reinforced concrete poles	4	3	3	----------
Crossarms (wood)	2	2	2	1

(a) Insulators are to be replaced before safety factors have been reduced (due to deterioration or changes in construction, arrangement or other conditions subsequent to installation) to less than 95 percent of the safety factor specified in Rule 44.1.

(b) Insulator are to be replaced before safety factors have been reduced (due to deterioration or changes in construction, arrangement, or other conditions subsequent to installation) to less than 75 percent of the safety factor specified in Rule 44.1.

(c) For aluminum members subject to tension caused by one or more estimated loads and where the critical load combination for the tension member would not endanger adjacent compression members, the factor of safety on ultimate tension shall be 2 for Grade "A" construction and 1.67 for Grades "B" and "C" construction

Final Version
Rule 44.1

44.1 Installation and Reconstruction,

Lines and elements of lines, upon installation or reconstruction, shall provide as a minimum the safety factors specified in Table 4 for vertical loads and loads transverse to lines and for loads longitudinal to lines except where longitudinal loads are balanced or where there are changes in grade construction (see Rules 47.3, 47.4 and 47.5)

Table 4
Minimum Safety Factors

Element of Line	Grade of Construction			
	Grade "A"	Grade "B"	Grade "C"	Grade "F"
Conductors, splices and conductor fastenings (other than tie wires)	2	2	2	1
Pins	2	2	2	1
Pole line hardware	2	2	2	2
Line insulators (mechanical)	3	2	2	2
Guy Insulators (mechanical)				
Interlocking	2	2	2	2
Noninterlocking wood	3	3	3	----------
Noninterlocking glass fiber	3	2(a)	2(b)	----------
Guys, except in light loading districts	2	2	2	1 ½
Guys, in light loading rural districts	2	1 ½	1 ½	1 ½
Messengers and span wires	2	2	2	2
Wood poles	4	3	2	1
Metallic Service and Meter Poles	-	2	2	-
Structural or tubular metallic poles, towers, crossarms and steel members of foundations	1 ½	1 ½	1 ½	----------
Foundations against uplift	1 ½	1 ½	1 ½	----------
Foundations against depression	3	2	2	----------
Reinforced concrete poles	4	3	3	----------
Crossarms (wood)	2	2	2	1

(a) Insulators are to be replaced before safety factors have been reduced (due to deterioration or changes in construction, arrangement or other conditions subsequent to installation) to less than 95 percent of the safety factor specified in Rule 44.1.

(b) Insulator are to be replaced before safety factors have been reduced (due to deterioration or changes in construction, arrangement, or other conditions subsequent to installation) to less than 75 percent of the safety factor specified in Rule 44.1.

(c) For aluminum members subject to tension caused by one or more estimated loads and where the critical load combination for the tension member would not endanger adjacent compression members, the factor of safety on ultimate tension shall be 2 for Grade "A" construction and 1.67 for Grades "B" and "C" construction

Original Version

Rule 48.2

48.2 Structural Steel

Steel structures, steel structural members and their connections, shall be designed and constructed so that the structures and parts thereof will not fail or be seriously distorted at any load less than the maximum working loads developed under the construction arrangement with loadings as specified in Rule 43) multiplied by the safety factors specified in Rule 44.

The safety factors specified in Rule 44 shall be applied as follows to structural steel:

Tensions and Bending: The yield point, 33,000 pounds per square inch, shall be divided by the safety factor to determine the maximum allowable working stress.

Compression: The maximum allowable working stress shall be calculated by the following formula:

$$S_{\max} = \frac{1}{f_s}\left[YP - \left(\frac{YP - 12{,}000}{200} \right) \frac{l}{r} \right]$$

where S_{max} = maximum allowable working stress, lbs per sq in.
f_s = safety factor specified in Rule 44
YP = yield point of the steel, 33,000 lbs per sq in.
l = unsupported length of member, inches
r = radius of gyration of member, inches

Shear: The ultimate tensile strength, 60,000 pounds per square inch, shall be multiplied by 2/3 and divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.

Where the figures given are used, structural steel shall conform to Standards Specifications A7-39 of American Society for Testing Materials for carbon steel of structural quality. Other values may be used for steel of other strength provided the yield point and ultimate tensile strength are determined by test.

Strikeout and Underline Version
Rule 48.2

48.2 Structural ~~Steel~~ Material (other than wood)

~~Steel structures, steel~~ structural members and their connections, shall be designed and constructed so that the structures and parts thereof will not fail or be seriously distorted at any load less than the maximum working loads developed under the construction arrangement with loadings as specified in Rule 43) multiplied by the safety factors specified in Rule 44.

The safety factors specified in Rule 44 shall be applied as follows to structural steel:

Tensions and Bending: The yield point, 33,000 pounds per square inch, shall be divided by the safety factor to determine the maximum allowable working stress.

Compression: The maximum allowable working stress shall be calculated by the following formula:

$$S_{\max} = \frac{1}{f_s}\left[YP - \left(\frac{YP - 12{,}000}{200} \right) \frac{l}{r} \right]$$

where S_{max} = maximum allowable working stress, lbs per sq in.
f_s = safety factor specified in Rule 44
YP = yield point of the steel, 33,000 lbs per sq in.
l = unsupported length of member, inches
r = radius of gyration of member, inches

Shear: The ultimate tensile strength, 60,000 pounds per square inch, shall be multiplied by 2/3 and divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.

Where the figures given are used, structural steel shall conform to Standards Specifications A7-39 of American Society for Testing Materials for carbon steel of structural quality. Other values may be used for steel of other strength provided the yield point and ultimate tensile strength are determined by test.

For other structural materials (other than concrete), the safety factor specified in Rule 44 shall be applied as follows:

Tension: The yield strength of the material used shall be divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.

Compression: The ultimate compressive strength of the material used be divided by the safety factor specified in Rule 44 to obtain the allowable working stress. The ultimate compressive strength shall be determined by suitable formulas for material used, considering yield strength of the material, modulus of elasticity, slenderness ratio and eccentricity of connection. In no case shall the ultimate compressive stress be greater than the yield strength of the material.

Shear: The ultimate shear strength of the material used be divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.

Strikeout and Underline Version
Rule 48.2

48.2 Structural Material (other than wood)

Structural members and their connections, shall be designed and constructed so that the structures and parts thereof will not fail or be seriously distorted at any load less than the maximum working loads developed under the construction arrangement with loadings as specified in Rule 43) multiplied by the safety factors specified in Rule 44.

The safety factors specified in Rule 44 shall be applied as follows to structural steel:

Tensions and Bending: The yield point, 33,000 pounds per square inch, shall be divided by the safety factor to determine the maximum allowable working stress.

Compression: The maximum allowable working stress shall be calculated by the following formula:

$$S_{\max} = \frac{1}{f_s}\left[YP - \left(\frac{YP - 12{,}000}{200}\right)\frac{l}{r}\right]$$

where S_{max} = maximum allowable working stress, lbs per sq in.
f_s = safety factor specified in Rule 44
YP = yield point of the steel, 33,000 lbs per sq in.
l = unsupported length of member, inches
r = radius of gyration of member, inches

Shear: The ultimate tensile strength, 60,000 pounds per square inch, shall be multiplied by 2/3 and divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.

Where the figures given are used, structural steel shall conform to Standards Specifications A7-39 of American Society for Testing Materials for carbon steel of structural quality. Other values may be used for steel of other strength provided the yield point and ultimate tensile strength are determined by test.

For other structural materials (other than concrete), the safety factor specified in Rule 44 shall be applied as follows:

Tension: The yield strength of the material used shall be divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.

Compression: The ultimate compressive strength of the material used be divided by the safety factor specified in Rule 44 to obtain the allowable working stress. The ultimate compressive strength shall be determined by suitable formulas for material used, considering yield strength of the material, modulus of elasticity, slenderness ratio and eccentricity of connection. In no case shall the ultimate compressive stress be greater than the yield strength of the material.

Shear: The ultimate shear strength of the material used be divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.

Original Version
Rule 49.1-A

49.1A Strength

Wood poles shall be of sound timber, free from defects which would materially reduce their strength or durability and they shall have sufficient strength to withstand, with safety factors not less than those specified in Rule 44, the maximum stresses to which they are subjected under the loading conditions specified in Rule 43. The modulus of rupture used in calculation of safety factors shall be not greater than the value given in Rule 48.1.

Metallic and reinforced concrete poles, together with their foundations, shall be of such material and dimensions as to withstand, with safety factors not less than those specified in Rule 44, the maximum stresses to which they are subjected under the loading conditions specified in Rule 43. The ~~fiber~~ stress values used in calculation of safety factors shall be as specified in Rule 48.2 , 48.3 and 48.6.

Certain poles subject to special stresses due to angles in the line, dead – ending of conductors or other attachments, which stresses must be included in computing the loading and safety factor. Poles subject to these special stresses sometimes require the use of guy attachment shall be considered merely as a strut, the guy taking all lateral stresses. In such cases the pole strength requirement shall apply at the point of guy attachment rather than at the ground line.

Spliced or stub reinforced poles or pole top extensions, including the attachment (joint) of the different members involved, shall meet all of the vertical, transverse and longitudinal strength requirements of these rules as if a whole pole were used. Spliced or stub reinforced poles or pole top extensions shall not be used where Grade "A" construction is required in supports of crossings or conflicts, or where Grade "B" construction is required for Class C lines crossing the main lines of major railways.

Strikeout and Underline Version
Rule 49.1-A

49.1A ~~Strength~~ Poles, Tower and Other Structures

Wood poles shall be of sound timber, free from defects which would materially reduce their strength or durability and they shall have sufficient strength to withstand, with safety factors not less than those specified in Rule 44, the maximum stresses to which they are subjected under the loading conditions specified in Rule 43. The modulus of rupture used in calculation of safety factors shall be not greater than the value given in Rule 48.1.

Metallic and reinforced concrete poles, together with their foundations, shall be of such material and dimensions as to withstand, with safety factors not less than those specified in Rule 44, the maximum stresses to which they are subjected under the loading conditions specified in Rule 43. The fiber stress values used in calculation of safety factors shall be as specified in Rule 48.2 , 48.3 and 48.6.

Certain poles subject to special stresses due to angles in the line, dead – ending of conductors or other attachments, which stresses must be included in computing the loading and safety factor. Poles subject to these special stresses sometimes require the use of guy attachment shall be considered merely as a strut, the guy taking all lateral stresses. In such cases the pole strength requirement shall apply at the point of guy attachment rather than at the ground line.

Spliced or stub reinforced poles or pole top extensions, including the attachment (joint) of the different members involved, shall meet all of the vertical, transverse and longitudinal strength requirements of these rules as if a whole pole were used. Spliced or stub reinforced poles or pole top extensions shall not be used where Grade "A" construction is required in supports of crossings or conflicts, or where Grade "B" construction is required for Class C lines crossing the main lines of major railways.

Final Version
Rule 49.1-A

49.1A Poles, Tower and Other Structures

Wood poles shall be of sound timber, free from defects which would materially reduce their strength or durability and they shall have sufficient strength to withstand, with safety factors not less than those specified in Rule 44, the maximum stresses to which they are subjected under the loading conditions specified in Rule 43. The modulus of rupture used in calculation of safety factors shall be not greater than the value given in Rule 48.1.

Metallic and reinforced concrete poles, together with their foundations, shall be of such material and dimensions as to withstand, with safety factors not less than those specified in Rule 44, the maximum stresses to which they are subjected under the loading conditions specified in Rule 43. The fiber stress values used in calculation of safety factors shall be as specified in Rule 48.2 , 48.3 and 48.6.

Certain poles subject to special stresses due to angles in the line, dead – ending of conductors or other attachments, which stresses must be included in computing the loading and safety factor. Poles subject to these special stresses sometimes require the use of guy attachment shall be considered merely as a strut, the guy taking all lateral stresses. In such cases the pole strength requirement shall apply at the point of guy attachment rather than at the ground line.

Spliced or stub reinforced poles or pole top extensions, including the attachment (joint) of the different members involved, shall meet all of the vertical, transverse and longitudinal strength requirements of these rules as if a whole pole were used. Spliced or stub reinforced poles or pole top extensions shall not be used where Grade "A" construction is required in supports of crossings or conflicts, or where Grade "B" construction is required for Class C lines crossing the main lines of major railways.

Original Version
Rule 49.6-B

49.6-B Size

The size and ultimate strength of guys crossing in spans over Class H, L, T or C circuits shall be not less than as specified in Table 9 and shall also be such as to provide safety factors not less than those specified in Rule 44 for the loads imposed by the construction involved under the loading conditions specified in Rule 43.

Table 9
Minimum Size and Strength of Guys Crossing over Class H, L, T or C Circuits

Material of Strand	Minimum size	
	Anchor guys	Overhead guys
Galvanized Steel		
Common or Siemens-Martin	5/16 in. diam.	¼ in. diam.
High Strength or extra-high strength	¼ in. diam.	3/16 in diam
Copper-covered Steel	3 No. 9 AWG	3 No. 10 AWG
Bronze	¼ in diam.	3 No. 10 AWG
Minimum allowable ultimate strength of guys	3,200 Pounds	1,900 pounds

Strikeout and Underline Version
Rule 49.6-B

49.6-B Size

The size and ultimate strength of guys crossing in spans over Class H, L, T or C circuits shall be not less than as specified in Table 9 and shall also be such as to provide safety factors not less than those specified in Rule 44 for the loads imposed by the construction involved under the loading conditions specified in Rule 43.

Table 9
Minimum Size and Strength of Guys Crossing over Class E, H, L, T or C Circuits

Material of Strand	Minimum size	
	Anchor guys	Overhead guys
Galvanized Steel		
Common or Siemens-Martin	5/16 in. diam.	¼ in. diam.
High Strength or extra-high strength	¼ in. diam.	3/16 in diam
Copper-covered Steel	3 No. 9 AWG	3 No. 10 AWG
Bronze	¼ in diam.	3 No. 10 AWG
Minimum allowable ultimate strength of guys	3,200 Pounds	1,900 pounds

Final Version
Rule 49.6-B

49.6-B Size

The size and ultimate strength of guys crossing in spans over Class H, L, T or C circuits shall be not less than as specified in Table 9 and shall also be such as to provide safety factors not less than those specified in Rule 44 for the loads imposed by the construction involved under the loading conditions specified in Rule 43.

Table 9
Minimum Size and Strength of Guys Crossing over Class E, H, L, T or C Circuits

Material of Strand	Minimum size	
	Anchor guys	Overhead guys
Galvanized Steel		
Common or Siemens-Martin	5/16 in. diam.	¼ in. diam.
High Strength or extra-high strength	¼ in. diam.	3/16 in diam
Copper-covered Steel	3 No. 9 AWG	3 No. 10 AWG
Bronze	¼ in diam.	3 No. 10 AWG
Minimum allowable ultimate strength of guys	3,200 Pounds	1,900 pounds

Original Version
Rule 50

50. General

The Following Rules cover certain special details for the construction of supply lines. These rules are supplemented, in certain cases, by rules in other sections. See Section VII for the special rules applicable to Class T circuits; see Section IX for special rules applicable to supply lines on poles jointly used; see Section X for special rules applicable to line crossings or conflicts; see Section XI for special rules applicable to line crossing railroad.

Strikeout and Underline Version
Rule 50

50. General

The Following Rules cover certain special details for the construction of supply lines. <u>These rules do not apply to Class E circuits, except where provisions are made for in Section VI.</u> These rules are supplemented, in certain cases, by rules in other sections. See Section VII for the special rules applicable to Class T circuits; see Section IX for special rules applicable to supply lines on poles jointly used; see Section X for special rules applicable to line crossings or conflicts; see Section XI for special rules applicable to line crossing railroad.

Final Version
Rule 50

50. General

The Following Rules cover certain special details for the construction of supply lines. These rules do not apply to Class E circuits, except where provisions are made for in Section VI. These rules are supplemented, in certain cases, by rules in other sections. See Section VII for the special rules applicable to Class T circuits; see Section IX for special rules applicable to supply lines on poles jointly used; see Section X for special rules applicable to line crossings or conflicts; see Section XI for special rules applicable to line crossing railroad.

Original Version
Rule 51.6-A

51.6A Marking of Poles where conductors are not on Crossarms

Wood or Metal poles which support conductors of more than 750 volts in vertical configuration and not on crossarms shall have bands of bright yellow color not less than one foot in width painted around them. The top of such a band shall be neither less than 2 ½ feet nor more than 3 feet below the lowest conductor of each circuit of more than 750 volts so supported.

In lieu of the paint required by this rule, similarly located signs, showing the words "High Voltage" in letters not less than 3 inches in height, shall be used. The letters on such signs shall be white on a green or black background, or such signs shall be of corrosion-resisting metal with the letters cut out therefrom and clearly legible.

The provisions of this rule, 51.6-A shall not apply to the marking of poles at the levels of supply circuits of more than 22,500 volts in rural districts.

See Rule 65 for marking of Towers.

Strikeout and Underline Version
Rule 51.6-A

51.6A Marking of Poles where conductors are not on Crossarms

Wood or Metal poles which support conductors of more than 750 volts in vertical configuration and not on crossarms shall have bands of bright yellow color not less than one foot in width painted around them. The top of such a band shall be neither less than 2 ½ feet nor more than 3 feet below the lowest conductor of each circuit of more than 750 volts so supported.

In lieu of the paint required by this rule, similarly located signs, showing the words "High Voltage" in letters not less than 3 inches in height, shall be used. The letters on such signs shall be white on a green or black background, or such signs shall be of corrosion-resisting metal with the letters cut out therefrom and clearly legible.

The provisions of this rule, 51.6-A shall not apply to the marking of poles at the levels of supply circuits of more than 22,500 volts in rural districts.

See Rule ~~65~~ 61.6 for marking of Towers.

Final Version
Rule 51.6-A

51.6A Marking of Poles where conductors are not on Crossarms

Wood or Metal poles which support conductors of more than 750 volts in vertical configuration and not on crossarms shall have bands of bright yellow color not less than one foot in width painted around them. The top of such a band shall be neither less than 2 ½ feet nor more than 3 feet below the lowest conductor of each circuit of more than 750 volts so supported.

In lieu of the paint required by this rule, similarly located signs, showing the words "High Voltage" in letters not less than 3 inches in height, shall be used. The letters on such signs shall be white on a green or black background, or such signs shall be of corrosion-resisting metal with the letters cut out therefrom and clearly legible.

The provisions of this rule, 51.6-A shall not apply to the marking of poles at the levels of supply circuits of more than 22,500 volts in rural districts.

See Rule 61.6 for marking of Towers.

Original Version
Rule 54.4-A1

54.4A Clearances, Above Ground

1) Across Arid or Mountainous Areas: Across arid or mountainous areas supply circuits carrying 22,500-30,000 volts, inclusive, may have a clearance of less than 30 feet (Table 1, Case 4, Column F) but not less than 25 feet above ground subject to a reduction of not more than 10 per cent because of temperature and loading as specified in Rule 43. Upon special permission from the Rail Road Commission, a minimum clearance of 25 feet above ground may be applied in similar areas to circuits in excess of 30,000 volts, in which case no reduction of the 25 feet will be permitted for conditions less than maximum loadings or temperature specified in Rules 43.1 and 43.2.

Strikeout and Underline Version
Rule 54.4-A1

54.4A Clearances, Above Ground

1) Across Arid or Mountainous Areas: Across arid or mountainous areas supply circuits carrying 22,500-30,000 volts, inclusive, may have a clearance of less than 30 feet (Table 1, Case 4, Column F) but not less than 25 feet above ground subject to a reduction of not more than 10 per cent because of temperature and loading as specified in Rule 43. Upon special permission from the Rail Road Commission, a minimum clearance of 25 feet above ground may be applied in similar areas to circuits in excess of 30,000 volts, <u>not including Class E circuits. For circuits in excess of 30,000 volts,</u> ~~in which case~~ no reduction of the 25 feet will be permitted for conditions less than maximum loadings or temperature specified in Rules 43.1 and 43.2.

Final Version
Rule 54.4-A1

54.4A Clearances, Above Ground

1) Across Arid or Mountainous Areas: Across arid or mountainous areas supply circuits carrying 22,500-30,000 volts, inclusive, may have a clearance of less than 30 feet (Table 1, Case 4, Column F) but not less than 25 feet above ground subject to a reduction of not more than 10 per cent because of temperature and loading as specified in Rule 43. Upon special permission from the Rail Road Commission, a minimum clearance of 25 feet above ground may be applied in similar areas to circuits in excess of 30,000 volts, in which case no reduction of the 25 feet will be permitted for conditions less than maximum loadings or temperature specified in Rules 43.1 and 43.2.

Original version
Rule 54.4-C(2)

54.4-C(2)a One Voltage Classification*: The clearance of Table 2, Case 14 (and clearances less than as specified in cases 9 to 13) shall not be applied consecutively both above and below the same conductor. The foregoing provisions of this rule do not apply to conductors in triangular or vertical configuration, the clearances of Table 2, Case 14 being directly applicable.

Where Conductors of one voltage classification only are supported on the same crossarms, the vertical clearances specified in Table 2, Case 14 are not required between conductors on line arm and conductors on related buck arm provided no conductors on the line arm cross conductors of different phase or polarity on the buck arms.

*Voltage Classification for this purpose are:
0-750 volts
750-7500 volts
7500-20,000 volts and
20,000 volts and above.

Strikeout and Underline version

Rule 54.4-C(2)

54.4-C(2)a One Voltage Classification*: The clearance of Table 2, Case 14 (and clearances less than as specified in cases 9 to 13) shall not be applied consecutively both above and below the same conductor. The foregoing provisions of this rule do not apply to conductors in triangular or vertical configuration, the clearances of Table 2, Case 14 being directly applicable.

Where Conductors of one voltage classification only are supported on the same crossarms, the vertical clearances specified in Table 2, Case 14 are not required between conductors on line arm and conductors on related buck arm provided no conductors on the line arm cross conductors of different phase or polarity on the buck arms.

*Voltage Classification for this purpose are:
0-750 volts
750-7500 volts
7500-20,000 volts ~~and~~
20,000 ~~volts and above.~~ – 75,000 volts

Final version
Rule 54.4-C(2)

54.4-C(2)a One Voltage Classification*: The clearance of Table 2, Case 14 (and clearances less than as specified in cases 9 to 13) shall not be applied consecutively both above and below the same conductor. The foregoing provisions of this rule do not apply to conductors in triangular or vertical configuration, the clearances of Table 2, Case 14 being directly applicable.

Where Conductors of one voltage classification only are supported on the same crossarms, the vertical clearances specified in Table 2, Case 14 are not required between conductors on line arm and conductors on related buck arm provided no conductors on the line arm cross conductors of different phase or polarity on the buck arms.

*Voltage Classification for this purpose are:
0-750 volts
750-7500 volts
7500-20,000 volts
20,000– 75,000 volts

Original Version
Section VI

Section VI
Additional Construction Requirements for Tower Lines

60 General

The following rules cover certain special details for the construction of tower lines. These rules are supplemental to the rules given for supply lines in general and to the detailed construction requirements for supply lines, which rules must be observed in tower line construction, except as modified herein, or where clearly inapplicable.

60.1 Definition (see Rule 21.7-C)

61 Maintenance and Inspection (See rules 31.1 and 31.2)

62 Strength and Requirements

Where steel supports or towers are used which are not capable of withstanding practically as great a stress longitudinally as transversely, longitudinal guying shall be used (see Rule 47.2) or anchor towers shall be placed at intervals not greater than 10 spans. Such anchor towers shall be capable of withstanding the combined longitudinal tension under the loadings of Section IV of all conductors up to 10,000 pounds plus one half the excess above 10,000 pounds.

63 Materials

63.1 Tower Members

Tower members shall have thickness of metal not less than the following:

Galvanized steel: main corner members, 3/16 inch; other members 1/8 inch.

Painted steel: Main corner members, ¼ inch; other members, 3/16 inch.

All iron or steel of towers and all hardware subject to injurious corrosion under the prevailing conditions shall be protected by galvanizing, painting or other treatment which will effectively retard corrosion.

63.2 Overhead Ground Wires

Overhead ground wires or lighting protection wires shall be galvanized steel cable not less than ¼ inch in diameter, or other corrosion resistant material equal tensile strength. Where overhead ground wire are not used, effort shall be made to secure an effectively grounded structure.

63.3 Guys and Anchors

A Guys

Guys shall be galvanized steel strand not less than 5/16 inch in diameter, or other corrosion resistant material of equal tensile strength, or they shall be rolled rods of galvanized steel or other corrosion resistant material, with a tensile strength at least equivalent to 5/16-inch steel cable.

B Anchors

Anchor rods shall be galvanized steel not less than 5/8 inch in diameter or shall be of other material of equal strength and durability.

64 Stepping

All metal towers shall be provided with steps or ladders, which shall start at not less than 7 feet 6 inches from the ground line and the spacings between steps on the same side of the tower legs shall not exceed 36 inches.

Where the members of the tower structure are so arranged that the tower may be climbed with safety or ladder need be provided.

65 Marking

All fabricated steel towers and similar structures which are of a design easily climbed and which are located in urban districts or in cultivated

agricultural areas near roads or trails which are frequently traveled, shall be equipped with a sign so worded as to warn the public of the danger of climbing same. Such sign shall be placed and arranged so that it may be read from the four corners of the structure. Such signs shall be neither less than 8 feet nor more than 20 feet above ground except where the lowest horizontal member of the tower is more than 20 feet above the ground in which case the sign shall be not more than 30 feet above the ground.

66 Crossing

Where lines supported by towers cross over major railroads (see Rules 22.3-B), or major communication lines (see Rule 20.5-A1), or other tower lines of voltage exceeding 30,000 volts, the towers supporting the crossing spans shall be designed to withstand, with safety factors as specified in Rule 44, the most severe conditions of temperature and loading specified in Rule 43 combined with the unbalanced pull which would be caused by any two conductors dead-ended or any two conductors broken in the span adjacent to the crossing.

Strikeout and Underline Version
Section VI

Section VI
Detailed ~~Additional~~ Construction Requirements for
Tower Lines
And Extra High Voltage Lines (Class E Circuits)

60 General

~~The following rules cover certain special details for the construction of tower lines. These rules are supplemental to the rules given for supply lines in general and to the detailed construction requirements for supply lines, which rules must be observed in tower line construction, except as modified herein, or where clearly inapplicable.~~

The following rules cover certain special details for the construction of tower lines and extra high voltage lines.

These rules are supplemented, in certain cases, by rules in other sections. See Section X for special rules applicable to line crossings or conflicts; see Section XI for special rules applicable to lines crossing railways.

~~60.1 Definition (see Rule 21.7-C)~~

61 ~~Maintenance and Inspection (See rules 31.1 and 31.2)~~ Towers and Structures

61.1 Definition (See Rule 21.7-C)

61.2 Maintenance and Inspection (See Rules 31.1 and 31.2)

61.3 Material and Strength (also see Section IV)

A Material

(1) **Tower Members:** Tower members shall have a thickness of metal equivalent to the following:

Galvanized steel: Main corner members, 3/16 inch; other members, 1/8 inch.

Painted steel: Main corner members, 1/4 inch; other members, 3/16 inch. All iron or steel members of

towers and all hardware subject to injurious corrosion under the prevailing conditions shall be protected by galvanizing, painting or other treatment which will effectively retard corrosion.

(2) **Overhead Ground Wires or Lightning Protection Wires:** Overhead ground wires or lightning protection wires shall be galvanized steel cable not less than 1/4 inch in diameter, or other corrosion resistant material of equal tensile strength. Where overhead ground wires are not used, effort shall be made to secure an effectively grounded structure.

(3) **Guys and Anchor Rods:**

(a) **Guys:** Guys shall be galvanized steel strand not less than 5/16 inch in diameter, or other corrosion resistant material of equal tensile strength, or they shall be rolled rods of galvanized steel or other corrosion resistant material with tensile strength not less than the tensile strength of 5/16 inch diameter galvanized steel strand.

(b) **Anchor Rods:** Anchor rods shall be galvanized steel not less than 5/8 inch in diameter or shall be of equal strength and durability.

B Strength

Where support structures are used which are not capable of withstanding substantially as great a stress longitudinally as transversely, longitudinal guying shall be used. The line as a whole shall be designed so that a failure of an individual support structure shall not cause successive failures of more than ten additional support structures.

61.4 Clearances

A From Railroad Tracks (See Rule 36; also, Appendix E)

61.5 Dimensions and Settings (See Section IV)

61.6 Marking and Guarding

A Marking

All towers or structures which are of a design easily climbed and which are located in urban districts or in cultivated agricultural areas or near roads or trails which are frequently traveled shall be equipped with signs so worded as to warn the public of the danger of climbing same. Such signs shall be placed and arranged so that they may be read from the four corners of the structure. Such signs shall be neither less than 8 feet nor more than 20 feet above the ground except where the lowest horizontal member of the tower or structure is more than 20 feet above the ground in which case the sign shall be not more than 30 feet above the ground.

B Guarding

Where a tower or of a design which can be easily climbed supports supply conductors and is located in urban districts, or in rural areas adjacent to schools, dwellings, permanent or seasonal camps, or in orchards, or near roads or trails which are frequently traveled, a barrier or other provisions shall be made to prevent easy climbing.

The provisions of this rule shall not apply to towers or structures on which all conductors have a 5 feet or more horizontal clearance from the supporting structure, nor to towers or structures within fenced substation yards.

Note: It is the intent of Rule 61.6-B to require such guarding as will prevent easy climbing of these towers by young persons who do not realize the danger of contact with live conductors supported thereon. It is not intended that such guarding will be required in sparsely settled districts, mountainous and desert areas, and similar locations.

61.7 Stepping

All towers upon which it may be necessary for workmen to climb shall be provided with steps or ladders, which shall start at not less than 7 feet 6 inches from the ground line. The spacing between steps on the same side of the tower legs shall not exceed 36 inches.

Where the members of the tower are so arranged that the tower may be climbed with safety, no steps or ladders need be provided.

62 ~~Strength and Requirements~~ (Blank)

~~Where steel supports or towers are used which are not capable of withstanding practically as great a stress longitudinally as transversely, longitudinal guying shall be used (see Rule 47.2) or anchor towers shall be placed at intervals not greater than 10 spans. Such anchor towers shall be capable of withstanding the combined longitudinal tension under the loadings of Section IV of all conductors up to 10,000 pounds plus one half the excess above 10,000 pounds.~~

63 ~~Materials~~ Deadends, Conductor Suspensions and Fastenings

63.1 ~~Tower Members~~ Maintenance and Inspection (See Rules 31.1 and 31.2)

~~Tower members shall have thickness of metal not less than the following:~~

~~Galvanized steel: main corner members, 3/16 inch; other members 1/8 inch.~~

~~Painted steel: Main corner members, ¼ inch; other members, 3/16 inch.~~

~~All iron or steel of towers and all hardware subject to injurious corrosion under the prevailing conditions shall be protected by galvanizing, painting or other treatment which will effectively retard corrosion.~~

63.2 ~~Overhead Ground Wires~~ **Material and Strength** (See Rule 49.5)

~~Overhead ground wires or lighting protection wires shall be galvanized steel cable not less than ¼ inch in diameter, or other corrosion resistant material equal tensile strength. Where overhead ground wire are not used, effort shall be made to secure an effectively grounded structure.~~

63.3 ~~Guys and Anchors~~ Deadend and Suspension Spacing (See Table 1 and Table 2)

~~A Guys~~

~~Guys shall be galvanized steel strand not less than 5/16 inch in diameter, or other corrosion resistant material of equal tensile strength, or they shall be rolled rods of galvanized steel or other corrosion resistant material, with a tensile strength at least equivalent to 5/16 inch steel cable.~~

~~B Anchors~~

~~Anchor rods shall be galvanized steel not less than 5/8 inch in diameter or shall be of other material of equal strength and durability.~~

63.4 Bonding

Bonding is not required by these rules. It is recognized that under certain conditions it may be deemed necessary. Where phase-to-phase bonding is used, the bond wire or strap shall have a conductivity of not less than No. 10 AWG copper wire.

64 ~~Stepping~~ Conductors

~~All metal towers shall be provided with steps or ladders, which shall start at not less than 7 feet 6 inches from the ground line and the spacings between steps on the same side of the tower legs shall not exceed 36 inches.~~

~~Where the members of the tower structure are so arranged that the tower may be climbed with safety or ladder need be provided.~~

64.1 Definition (See Rule 20.8)

64.2 Maintenance and Inspection (See Rules 31.1 and 31.2)

64.3 Material and Strength (See Rule 49.4)

64.4 Clearances

Allowable variations in clearances due to side swing of suspension insulators, temperature, loading, etc., are given in Rules 37 and 38.

A Above Ground

The clearances shall be those specified in Rule 37.

B Above Railways and Trolley Lines

The clearances shall be those specified in Rule 37.

C Between Conductors

The minimum allowable clearances between conductors are specified in Rule 38, Table 2, with the following modifications for supply conductors:

These modifications, like the tabular values, are also subject to the allowable variations specified in Rule 38.

(1) **On Different Crossarms on the Same Structure, Triangular and Vertical Configuration:** Crossarms used to support conductors of a circuit at different levels (as in triangular or vertical configuration) need not be spaced as in Table 2.

(2) **On the Same Crossarms, Same Phase or Polarity:** The clearance specified in Table 2, Cases 15 and 17, are not required between conductors of both the same potential and the same phase or polarity, such as bundle conductors.

65 ~~Marking~~ Conductor Insulators

~~All fabricated steel towers and similar structures which are of a design easily climbed and which are located in urban districts or in cultivated agricultural areas near roads or trails which are frequently traveled, shall be equipped with a sign so worded as to warn the public of the danger of climbing same. Such sign shall be placed and arranged so that it may be read from the four corners of the structure. Such signs shall be neither less than 8 feet nor more than 20 feet above ground except where the lowest horizontal member of the tower is more than 20 feet above the ground in which case the sign shall be not more than 30 feet above the ground.~~

65.1 Material

Insulators used on high voltage supply lines shall be porcelain or other equally suitable material to withstand the applied voltage.

65.2 Strength (See Rule 49.5)

~~66 Crossing~~ Guys

~~Where lines supported by towers cross over major railroads (see Rules 22.3 B), or major communication lines (see Rule 20.5 A1), or other tower lines of voltage exceeding 30,000 volts, the towers supporting the crossing spans shall be designed to withstand, with safety factors as specified in Rule 44, the most severe conditions of temperature and loading specified in Rule 43 combined with the unbalanced pull which would be caused by any two conductors dead-ended or any two conductors broken in the span adjacent to the crossing.~~

66.1 Definition (See Rule 21.3)

66.2 Use

Where mechanical loads imposed on towers or structures are greater than can be supported with safety factors as specified in rule 44 or the design of such towers and structures requires it, additional strength shall be provided by the use of guys or other suitable construction.

Where guys are used with structures capable of considerable deflection before failure, the guys shall be able to support the entire load, the structure below the point of guy attachment acting merely as a strut.

Guys shall be attached to structures, as nearly as practicable, at the center of load. They shall be maintained taut and of such strength as to meet safety factors of rule 44.

66.3 Material And Strength (See Rules 49.6 And 61.3)

66.4 Clearances

The basic minimum clearances of overhead guys above the ground and from other wires or cables are specified in tables 1 and 2.

Modifications of these basic clearances are specified in rules 37 and 38. the minimum clearance of 18 feet for overhead guys of high voltage supply lines shall not be decreased along public thoroughfares or railways.

For clearances of anchor guys from overhead guys, span wires and conductors supported on other poles or structures, see Rule 56.4.

66.5 Fastenings

Anchor guys shall be protected by the use of guy thimbles or their equivalent where attached to anchor rods or through bolts.

66.6 Grounding Of Anchor Guys

Anchor guys exposed to high voltage supply lines shall be securely grounded but may be sectionalized. Anchor guys which are attached to grounded towers or structures need not be provided with a separate ground.

66.7 Protection (See Rule 56.9)

SECTION VI
DETAILED CONSTRUCTION REQUIREMENTS FOR TOWER LINES AND EXTRA HIGH VOLTAGE LINES (CLASS E CIRCUITS)

60 General

The following rules cover certain special details for the construction of tower lines and extra high voltage lines.

These rules are supplemented, in certain cases, by rules in other sections. See Section X for special rules applicable to line crossings or conflicts; see Section XI for special rules applicable to lines crossing railways.

61 Towers and Structures

61.1 Definition (See Rule 21.7-C)

61.2 Maintenance and Inspection (See Rules 31.1 and 31.2)

61.3 Material and Strength (also see Section IV)

A Material

(1) **Tower Members:** Tower members shall have a thickness of metal equivalent to the following:

Galvanized steel: Main corner members, 3/16 inch; other members, 1/8 inch.

Painted steel: Main corner members, 1/4 inch; other members, 3/16 inch. All iron or steel members of towers and all hardware subject to injurious corrosion under the prevailing conditions shall be protected by galvanizing, painting or other treatment which will effectively retard corrosion.

(2) **Overhead Ground Wires or Lightning Protection Wires:** Overhead ground wires or lightning protection wires shall be galvanized steel cable not less than 1/4 inch in diameter, or other corrosion resistant material of equal tensile strength. Where overhead ground wires are not used, effort shall be made to secure an effectively grounded structure.

(3) **Guys and Anchor Rods:**

(a) **Guys:** Guys shall be galvanized steel strand not less than 5/16 inch in diameter, or other corrosion resistant material of equal tensile strength, or they shall be rolled rods of galvanized steel or other corrosion resistant material with tensile strength not less than the tensile strength of 5/16 inch diameter galvanized steel strand.

(b) **Anchor Rods:** Anchor rods shall be galvanized steel not less than 5/8 inch in diameter or shall be of equal strength and durability.

B Strength

Where support structures are used which are not capable of withstanding substantially as great a stress longitudinally as transversely, longitudinal guying shall be used. The line as a whole shall be designed so that a failure of an individual support structure shall not cause successive failures of more than ten additional support structures.

61.4 Clearances

A From Railroad Tracks (See Rule 36; also, Appendix E)

61.5 Dimensions and Settings (See Section IV)

61.6 Marking and Guarding

A Marking

All towers or structures which are of a design easily climbed and which are located in urban districts or in cultivated

agricultural areas or near roads or trails which are frequently traveled shall be equipped with signs so worded as to warn the public of the danger of climbing same. Such signs shall be placed and arranged so that they may be read from the four corners of the structure. Such signs shall be neither less than 8 feet nor more than 20 feet above the ground except where the lowest horizontal member of the tower or structure is more than 20 feet above the ground in which case the sign shall be not more than 30 feet above the ground.

B Guarding

Where a tower or of a design which can be easily climbed supports supply conductors and is located in urban districts, or in rural areas adjacent to schools, dwellings, permanent or seasonal camps, or in orchards, or near roads or trails which are frequently traveled, a barrier or other provisions shall be made to prevent easy climbing.

The provisions of this rule shall not apply to towers or structures on which all conductors have a 5 feet or more horizontal clearance from the supporting structure, nor to towers or structures within fenced substation yards.

Note: It is the intent of Rule 61.6-B to require such guarding as will prevent easy climbing of these towers by young persons who do not realize the danger of contact with live conductors supported thereon. It is not intended that such guarding will be required in sparsely settled districts, mountainous and desert areas, and similar locations.

61.7 Stepping

All towers upon which it may be necessary for workmen to climb shall be provided with steps or ladders, which shall start at not less than 7 feet 6 inches from the ground line. The spacing between steps on the same side of the tower legs shall not exceed 36 inches.

Where the members of the tower are so arranged that the tower may be climbed with safety, no steps or ladders need be provided.

62 (Blank)

63 Deadends, Conductor Suspensions and Fastenings

63.1 Maintenance and Inspection (See Rules 31.1 and 31.2)

63.2 Material and Strength (See Rule 49.5)

63.3 Deadend and Suspension Spacing (See Table 1 and Table 2)

63.4 Bonding

Bonding is not required by these rules. It is recognized that under certain conditions it may be deemed necessary. Where phase-to-phase bonding is used, the bond wire or strap shall have a conductivity of not less than No. 10 AWG copper wire.

64 Conductors

64.1 Definition (See Rule 20.8)

64.2 Maintenance and Inspection (See Rules 31.1 and 31.2)

64.3 Material and Strength (See Rule 49.4)

64.4 Clearances

Allowable variations in clearances due to side swing of suspension insulators, temperature, loading, etc., are given in Rules 37 and 38.

A Above Ground

The clearances shall be those specified in Rule 37.

B Above Railways and Trolley Lines

The clearances shall be those specified in Rule 37.

C Between Conductors

The minimum allowable clearances between conductors are specified in Rule 38, Table 2, with the following modifications for supply conductors:

These modifications, like the tabular values, are also subject to the allowable variations specified in Rule 38.

(1) **On Different Crossarms on the Same Structure, Triangular and Vertical Configuration:** Crossarms used to support conductors of a circuit at different levels (as in triangular or vertical configuration) need not be spaced as in Table 2.

(2) **On the Same Crossarms, Same Phase or Polarity:** The clearance specified in Table 2, Cases 15 and 17, are not required between conductors of both the same potential and the same phase or polarity, such as bundle conductors.

65 Conductor Insulators

65.1 Material

Insulators used on high voltage supply lines shall be porcelain or other equally suitable material to withstand the applied voltage.

65.2 Strength (See Rule 49.5)

66 Guys

66.1 Definition (See Rule 21.3)

66.2 Use

Where mechanical loads imposed on towers or structures are greater than can be supported with safety factors as specified in rule 44 or the design of such towers and structures requires it, additional strength shall be provided by the use of guys or other suitable construction.

Where guys are used with structures capable of considerable deflection before failure, the guys shall be able to support the entire load, the structure below the point of guy attachment acting merely as a strut.

Guys shall be attached to structures, as nearly as practicable, at the center of load. They shall be maintained taut and of such strength as to meet safety factors of rule 44.

66.3 Material And Strength (See Rules 49.6 And 61.3)

66.4 Clearances

The basic minimum clearances of overhead guys above the ground and from other wires or cables are specified in tables 1 and 2. Modifications of these basic clearances are specified in rules 37 and 38. the minimum clearance of 18 feet for overhead guys of high voltage supply lines shall not be decreased along public thoroughfares or railways.

For clearances of anchor guys from overhead guys, span wires and conductors supported on other poles or structures, see Rule 56.4.

66.5 Fastenings

Anchor guys shall be protected by the use of guy thimbles or their equivalent where attached to anchor rods or through bolts.

66.6 Grounding Of Anchor Guys

Anchor guys exposed to high voltage supply lines shall be securely grounded but may be sectionalized. Anchor guys which are attached to grounded towers or structures need not be provided with a separate ground.

66.7 **Protection** (See Rule 56.9)

Original Version
Rule 100

100 General

The following rules cover certain details for the construction of supply and communication lines in line crossings or conflicts and apply to the line which is at the higher elevation. These rules are supplemental to the rules for lines of these classifications in general and to the construction details for such lines where alone, which general rules shall be followed in all respects except as modified herein.

Strikeout and Underline Version
Rule 100

100 General

The following rules cover certain details for the construction of supply and communication lines in line crossings or conflicts and apply to the line which is at the higher elevation; however the owner or operator who last in point of time constructs or erects facilities shall establish the required clearances. These rules are supplemental to the rules for lines of these classifications in general and to the construction details for such lines where alone, which general rules shall be followed in all respects except as modified herein.

Final Version
Rule 100

100 General

The following rules cover certain details for the construction of supply and communication lines in line crossings or conflicts and apply to the line which is at the higher elevation; however the owner or operator who last in point of time constructs or erects facilities shall establish the required clearances. These rules are supplemental to the rules for lines of these classifications in general and to the construction details for such lines where alone, which general rules shall be followed in all respects except as modified herein.

Original Version
Rule 103.2

103.2 Overhead Lightning Protection Wires

Overhead lightning protection wires or cables, if used, shall conform to the requirements of this Order as to grades of construction, material, size and strength, for conductors of the voltage of the circuit protected. See Rule 63.2 for the requirements for lightning protection wires where supported by towers.

Strikeout and Underline Version
Rule 103.2

103.2 Overhead Lightning Protection Wires

Overhead lightning protection wires or cables, if used, shall conform to the requirements of this Order as to grades of construction, material, size and strength, for conductors of the voltage of the circuit protected. See ~~Rule 63.2 f~~For overhead ground wire or ~~the requirements for~~ lightning protection wires ~~where~~ supported on ~~by~~ towers or structures, see Rule 61.3-A(2).

Final Version
Rule 103.2

103.2 Overhead Lightning Protection Wires

Overhead lightning protection wires or cables, if used, shall conform to the requirements of this Order as to grades of construction, material, size and strength, for conductors of the voltage of the circuit protected. See For overhead ground wire or lightning protection wires supported on towers or structures, see Rule 61.3-A(2).

Original Version
Rule 103.2

113.2 Overhead Lightning Protection Wires

Overhead lightning protection wires or cables, if used, shall conform to the requirements of this Order as to grades of construction, material, size and strength, for conductors of the voltage of the circuit protected. See Rule 63.2 for the requirements for lightning protection wires where supported by towers.

Strikeout and Underline Version
Rule 113.2

103.2 Overhead Lightning Protection Wires

Overhead lightning protection wires or cables, if used, shall conform to the requirements of this Order as to grades of construction, material, size and strength, for conductors of the voltage of the circuit protected. See ~~Rule 63.2 f~~For overhead ground wire or ~~the requirements for~~ lightning protection wires ~~where~~ supported on ~~by~~ towers or structures, see Rule 61.3-A(2).

Final Version
Rule 113.2

113.2 Overhead Lightning Protection Wires

Overhead lightning protection wires or cables, if used, shall conform to the requirements of this Order as to grades of construction, material, size and strength, for conductors of the voltage of the circuit protected. See For overhead ground wire or lightning protection wires supported on towers or structures, see Rule 61.3-A(2).