

CLEARANCES FOR DROP WIRE IN THE HEAVY LOADING AREA

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1. GENERAL

1.01 This section contains the recommended clearances for drop wire installed in the heavy loading area. The values specified meet (and in some cases exceed) the requirements of the National Electrical Safety Code (Sixth Edition). They apply under conditions of 60°F with no wind or ice loading.

1.02 Drop wire placed in the heavy loading area will generally experience some permanent stretch as a result of ice loading. "Construction" values of clearances therefore generally contain an allowance for extra sag which will be introduced by this permanent stretch. "Maintenance" values of clearances should exist after the wire has been through one or more cycles of storm loading and the temperature returns to 60°F.

1.03 Drop wire tends to elongate as the temperature rises and contracts as the temperature falls. Wire placed during cold weather will, therefore, always have a greater sag in warm weather even if no permanent stretch is involved. In order to avoid having inadequate ground clearances at 60°F, it is necessary to provide extra clearance when wire is placed during cold weather (freezing or below). The amount of extra clearance required is the difference between the 60°F stringing sag and the cold weather stringing sag. No increase in clearance

is required when placing drop wire if the temperature is above 32°F, however. Drop wire sags are shown in Section 462-400-200.

1.04 Clearance requirements for drop wire overhanging the travelled part of roads vary somewhat with the degree of overhang involved. (See tables under Part 2A, 2B of this section and Fig. 3). Eliminating or reducing road overhang will frequently permit smaller ground clearances.

1.05 When drop wire sags exceed about two or three feet, it will generally be quite advantageous to locate poles so as to avoid having the middle of the crossing span occur above the travelled part of the road, alley, or driveway. This will frequently be the case when the pole is within 50 or even 75 feet of the far edge of the road, alley or driveway, (distance "A" in Fig. 1).

1.06 When the 50-foot criterion applies, this may permit a reduced clearance above the road, alley, or driveway. (See Part 2 of this section.) Also, it will usually be feasible to base the height of attachment on something less than 100 per cent of the midspan sag. This is also true when the distance from the pole is 75 feet, but the saving in height of attachment is considerably less. The following table shows the percentage of midspan sag existing at distances of 50 and 75 feet from the pole for span lengths up to 300 feet.

| POLE 50 FEET FROM FAR EDGE | | POLE 75 FEET FROM FAR EDGE | |
|----------------------------|----------------------------|----------------------------|----------------------------|
| SPAN LENGTH (FEET) | PER CENT OF MIDSPAN SAG | SPAN LENGTH (FEET) | PER CENT OF MIDSPAN SAG |
| 130-145 | 95 | 195-220 | 95 |
| 146-160 | 90 | 221-245 | 90 |
| 161-180 | 85 | 246-270 | 85 |
| 181-200 | 80 | 271-300 | 80 |
| 201-225 | 75 | | |
| 226-250 | 70 | | |
| 251-275 | 65 | | |
| 276-300 | 60 | | |

Note: Table may be used with normal or minimum sags.

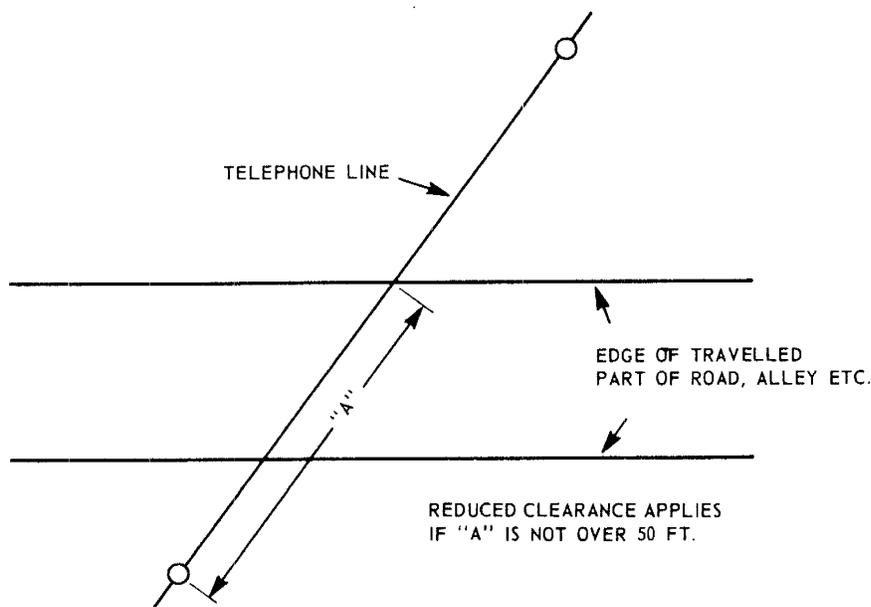


Fig. 1

Example: A 200-foot span crosses a driveway. One of the crossing poles will be within 50 feet of the far edge of the driveway. Normal midspan sag will be 7 feet. At 50 feet from the pole, the sag will be 80 per cent of midspan sag or about 5 feet 7 inches. In order to provide a clearance of 11 feet 8 inches, the minimum height of pole attachment would be 11 feet 8 inches plus 5 feet 7 inches or 17 feet 3 inches (assuming no difference in ground elevation). (Use the B drop wire rule when minimum sags are employed.)

1.07 Clearances shown in this section should be used unless the work order or local requirements calls for other values. This may occur when engineering forces recognize factors not allowed for in this section or because of local ordinances, etc. Clearances for span lengths, voltages and other conditions not covered in this section are an engineering responsibility and will be shown on the work order or detail plans.

2. CLEARANCES ABOVE GROUND OR RAILS

2.01 The designation "No Overhang — Back of Obst." in the tables that follow means that the pole line is located back of a fence, ditch, embankment, etc., so that the ground beneath the line can ordinarily be travelled by pedestrians only. The designation "No Overhang — Not Back of Obst." means that the line is not back of such obstruction and does not overhang the normally travelled part of the road. This category is also meant to include ground not ordinarily travelled but which can be reached by vehicles. If farm machinery is likely to pass under the line, provide sufficient clearance so that the wire will be 2 feet above the highest part of such machinery or the load it will carry. Initial clearance at 60°F should be *increased* by the *difference* between construction and maintenance clearance shown in the table for road crossings of the same length.

CLEARANCES ABOVE GROUND OR RAILS (at 60°F)

A. USING NORMAL SAGS

Span Lengths of 175 Feet and Less

| SITUATION | REF. | CONSTRUCTION | | | | | MAINTENANCE | | |
|---------------------------------------|--------|--------------------------------|-------------------|--------------------|--------------------|--------------------|---------------------|--------------------|--------------------|
| | | 75-LESS ft. in. | 76-100 ft. in. | 101-125 ft. in. | 126-150 ft. in. | 151-175 ft. in. | 125-LESS ft. in. | 126-150 ft. in. | 151-175 ft. in. |
| Crossing Above: | | | | | | | | | |
| Railroad Tracks | | | | | | | | | |
| Generally | — | 27-0 | 27-3 | 25-0† | 25-0† | 25-0† | (27-0)† | 25-0† | 25-0† |
| Special Case | Fig. 2 | 25-0 | 25-3 | 25-0† | 25-0† | 25-0† | (25-0)† | 25-0† | 25-0† |
| Public Roads | | | | | | | | | |
| Generally# | — | 18-0 | 18-3 | 18-6 | 19-3 | 20-2 | (18-0) | (18-5) | (19-0) |
| Pole not over 50 ft from far edge# | Fig. 1 | 18-0 | 18-3 | 18-6 | 18-11 | 19-3 | (18-0) | (18-1) | (18-3) |
| Public Alleys | | | | | | | | | |
| Generally | — | 15-0 | 15-3 | 15-6 | 16-3 | 17-2 | (15-0) | (15-5) | (16-0) |
| Pole not over 50 ft. from far edge | Fig. 1 | 15-0 | 15-3 | 15-6 | 15-11 | 16-3 | (15-0) | (15-1) | (15-3) |
| Resid. Driveways | | | | | | | | | |
| Generally | — | 10-0 | 10-3 | 10-6 | 11-3 | 12-2 | (10-0) | (10-5) | (11-0) |
| Pole not over 50 ft. from far edge | Fig. 1 | 10-0 | 10-3 | 10-6 | 10-11 | 11-3 | (10-0) | (10-1) | (10-3) |
| Flat Roof Bldgs. | — | 8-0 | 8-3 | 8-6 | 8-10 | 9-2 | (8-0) | (8-0) | (8-0) |
| Peak Roof Bldgs., Billboards | — | 2-0 | 2-2 | 2-3 | 2-5 | 2-7 | (2-0) | (2-0) | (2-0) |
| Neon Signs | — | 4-0 | 4-3 | 4-6 | 4-10 | 4-10 | (4-0) | (4-0) | (4-0) |
| Waterways | — | Must be shown on detail plans. | | | | | | | |
| Running Along: | | | | | | | | | |
| Public Roads | | | | | | | | | |
| Major Overhang | Fig. 3 | 18-0 | 18-3 | 18-6 | 19-3 | 20-2 | (18-0) | (18-5) | (19-0) |
| Minor Overhang | Fig. 3 | | | | | | | | |
| Urban | — | 18-0 | 18-3 | 18-6 | 18-10 | 19-2 | (18-0) | (18-0) | (18-0) |
| Rural (Lt. Traffic) | — | 14-0 | 14-3 | 14-6 | 14-10 | 15-2 | (14-0) | (14-0) | (14-0) |
| No Overhang | | | | | | | | | |
| Back of Obst. | Fig. 5 | 8-0 | 8-3 | 8-6 | 8-10 | 9-2 | (8-0) | (8-0) | (8-0) |
| Not back of Obst. | Fig. 6 | 13-0 | 13-3 | 13-6 | 13-10 | 14-2 | (13-0) | (13-0) | (13-0) |
| Public Alleys | — | 15-0 | 15-3 | 15-6 | 15-10 | 16-2 | (15-0) | (15-0) | (15-0) |

For Service drops, over residential streets, these clearances may be reduced 2 feet at the edge of the road if required clearance is obtained at the center of the road. See Fig. 4.

† Must be supported on 6M strand for spans over 100 feet; clearance of 25 feet permitted when supported on strand.

WIRE CROSSING RAILROAD TRACKS - SPECIAL CASE

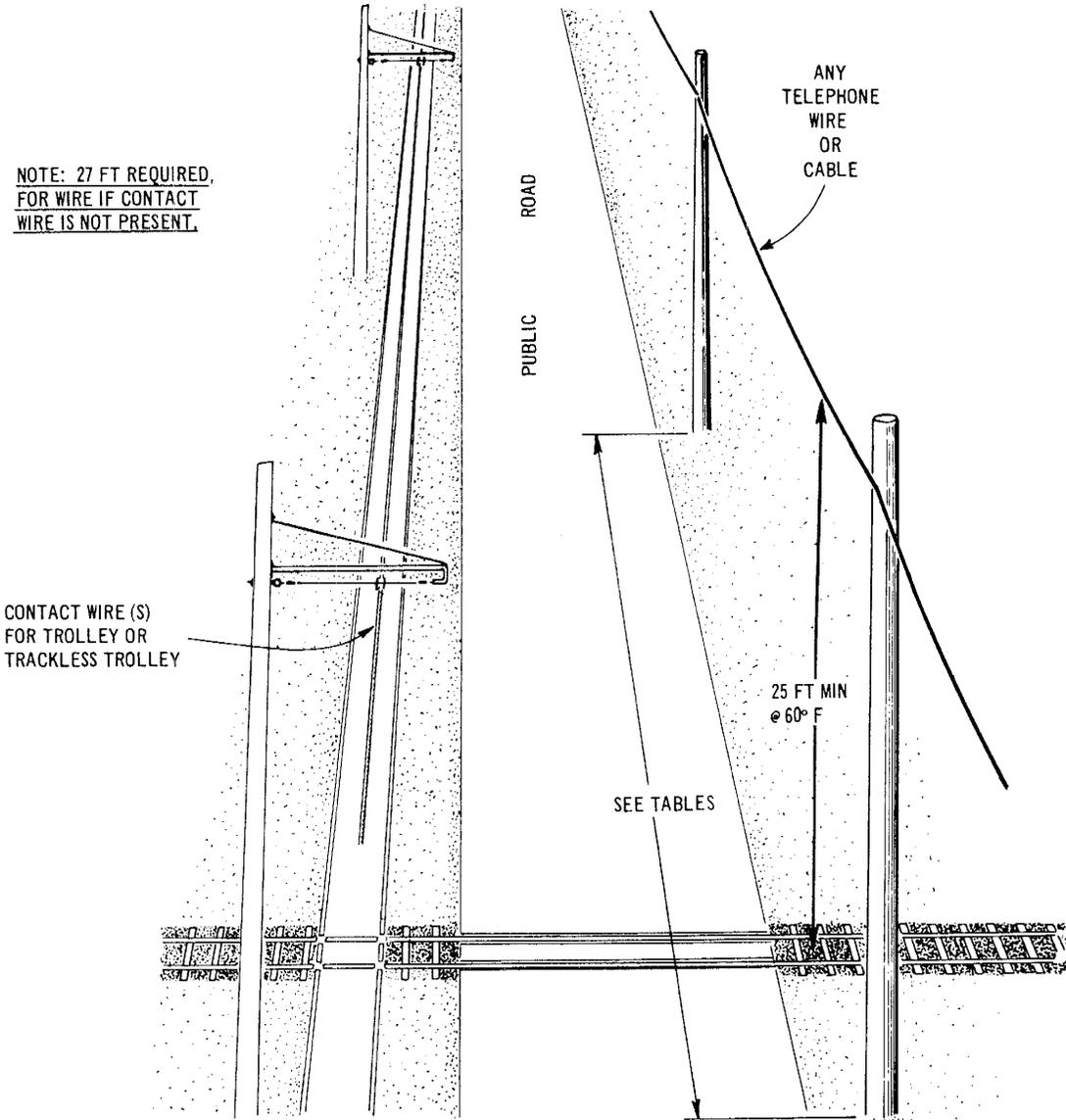


Fig. 2

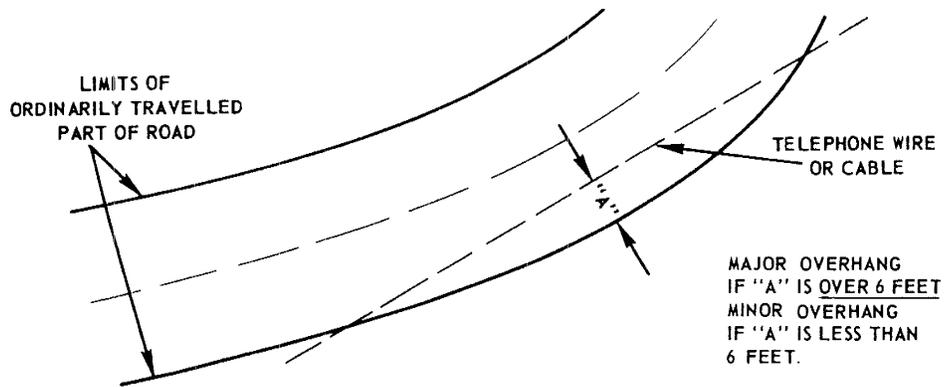


Fig. 3

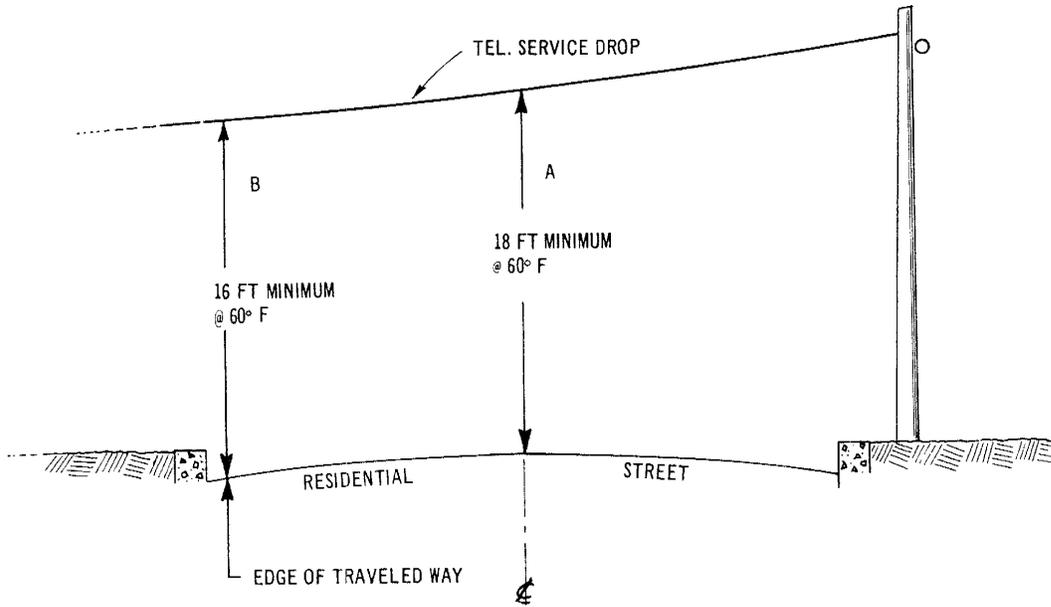


Fig. 4

RUNNING ALONG PUBLIC ROADS - BACK OF DITCHES ETC.

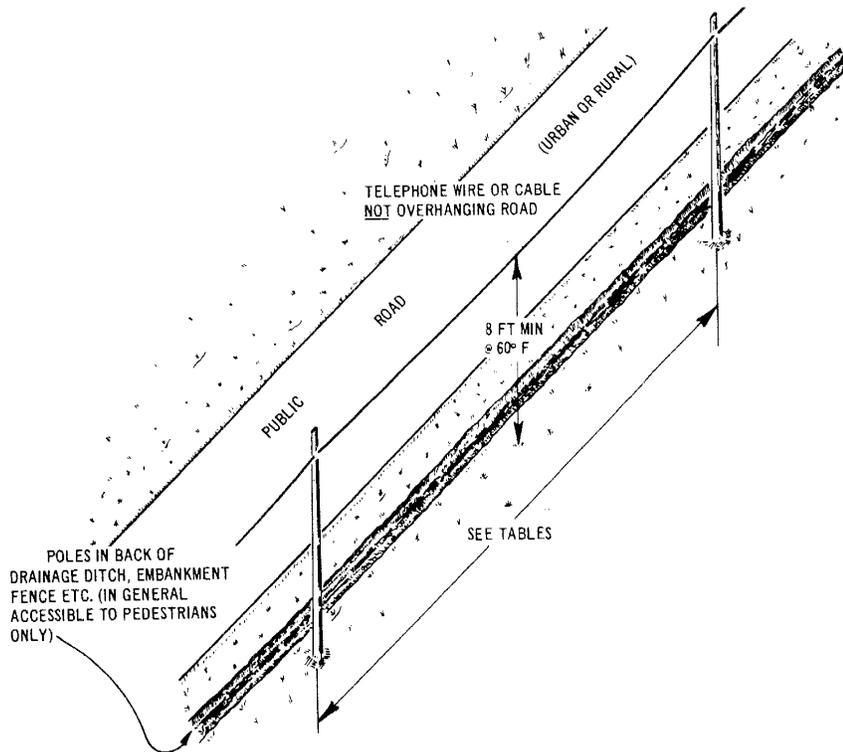


Fig. 5

RUNNING ALONG, BUT NOT OVERHANGING PUBLIC ROADS
(NOT BACK OF OBSTRUCTION)

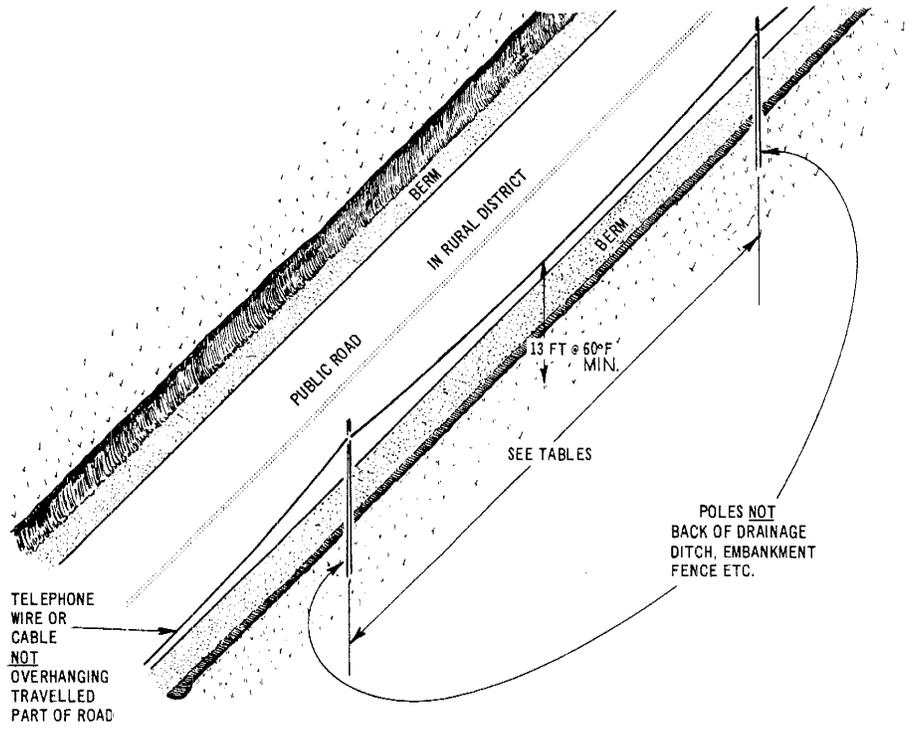


Fig. 6

2. CLEARANCES ABOVE GROUND OR RAILS (at 60°F)

A. USING NORMAL SAGS (Cont.)

Span Lengths of 176-250 Feet

| SITUATION | REF. | CONSTRUCTION | | | MAINTENANCE | | |
|---|-------------|--|--------------------|--------------------|--------------------|--------------------|--------------------|
| | | 176-200 ft. in. | 201-225 ft. in. | 226-250 ft. in. | 176-200 ft. in. | 201-225 ft. in. | 226-250 ft. in. |
| Crossing Above: Railroad Tracks Generally Special Case | — Fig. 2 | Not recommended for these span lengths. Not recommended for these span lengths. | | | | | |
| Public Roads Generally# Pole not over 50 feet from far edge# | — Fig. 1 | 21-3 19-8 | 22-4 20-1 | 23-5 20-5 | (19-9) (18-7) | (20-6) (18-10) | (21-3) (19-0) |
| Public Alleys Generally Pole not over 50 feet from far edge | — Fig. 1 | 18-3 16-8 | 19-4 17-1 | 20-5 17-5 | (16-9) (15-7) | (17-6) (15-10) | (18-3) (16-0) |
| Resid. Driveways Generally Pole not over 50 feet from far edge | — Fig. 1 | 13-3 11-8 | 14-4 12-1 | 15-5 12-5 | (11-9) (10-7) | (12-6) (10-10) | (13-3) (11-0) |
| Flat Roof Bldgs. | — | 9-6 | 9-10 | 10-2 | (8-0) | (8-0) | (8-0) |
| Peak Roof Bldgs., Billboards | — | 2-9 | 2-11 | 3-1 | (2-0) | (2-0) | (2-0) |
| Neon Signs | — | 4-10 | 4-11 | 5-1 | (4-0) | (4-0) | (4-0) |
| Waterways | — | Must be shown on detail plans. | | | | | |
| Running Along: Public Roads Major Overhang | Fig. 3 | 21-3 | 22-4 | 23-5 | (19-9) | (20-6) | (21-3) |
| Minor Overhang Urban | Fig. 3 — | 19-9 | 20-4 | 20-11 | (18-3) | (18-6) | (18-9) |
| Rural (Lt. Traffic) | — | 15-9 | 16-4 | 16-11 | (14-3) | (14-6) | (14-9) |
| No Overhang Back of Obst. | Fig. 5 | 9-6 | 9-10 | 10-2 | (8-0) | (8-0) | (8-0) |
| Not back of Obst. | Fig. 6 | 14-6 | 14-10 | 15-2 | (13-0) | (13-0) | (13-0) |
| Public Alleys | — | 16-9 | 17-4 | 17-11 | (15-3) | (15-6) | (15-9) |

For service drops, these clearances may be reduced 2 feet at the edge of the road, if the required clearance is obtained at the center of the road. See Fig. 4.

2. CLEARANCES ABOVE GROUND OR RAILS (at 60°F)

B. USING MINIMUM SAGS

Span Lengths of 150 Feet and Less

| SITUATION | REF. | CONSTRUCTION | | | | MAINTENANCE | | |
|---|--------|--------------------------------|-------------------|--------------------|--------------------|---------------------|--------------------|--------------------|
| | | 75-LESS ft. in. | 76-100 ft. in. | 101-125 ft. in. | 126-150 ft. in. | 100-LESS ft. in. | 101-125 ft. in. | 126-150 ft. in. |
| Crossing Above: | | | | | | | | |
| Railroad Tracks | | | | | | | | |
| Generally | — | 27-3 | 27-6 | 25-0† | 25-0† | (27-0) | 25-0† | 25-0† |
| Special Case | Fig. 2 | 25-3 | 25-6 | 25-0† | 25-0† | (25-0) | 25-0† | 25-0† |
| Public Roads | | | | | | | | |
| Generally# | — | 18-3 | 18-6 | 19-5 | 20-8 | (18-0) | (18-7) | (19-4) |
| Pole not over 50 feet from far edge# | Fig. 1 | 18-3 | 18-6 | 19-3 | 20-1 | (18-0) | (18-5) | (18-10) |
| Public Alleys | | | | | | | | |
| Generally | — | 15-3 | 15-6 | 16-5 | 17-8 | (15-0) | (15-7) | (16-4) |
| Pole not over 50 feet from far edge | Fig. 1 | 15-3 | 15-6 | 16-3 | 17-1 | (15-0) | (15-5) | (15-10) |
| Resid. Driveways | | | | | | | | |
| Generally | — | 10-3 | 10-6 | 11-5 | 12-8 | (10-0) | (10-7) | (11-4) |
| Pole not over 50 feet from far edge | Fig. 1 | 10-3 | 10-6 | 11-3 | 12-1 | (10-0) | (10-5) | (10-10) |
| Flat Roof Bldgs. | — | 8-3 | 8-6 | 8-10 | 9-4 | (8-0) | (8-0) | (8-0) |
| Peak Roof Bldgs., Billboards | — | 2-2 | 2-3 | 2-5 | 2-8 | (2-0) | (2-0) | (2-0) |
| Neon Signs | — | 4-3 | 4-6 | 4-6 | 4-8 | (4-0) | (4-0) | (4-0) |
| Waterways | — | Must be shown on detail plans. | | | | | | |
| Running Along: | | | | | | | | |
| Public Roads | | | | | | | | |
| Major Overhang | Fig. 3 | 18-3 | 18-6 | 19-5 | 20-8 | (18-0) | (18-7) | (19-4) |
| Minor Overhang | Fig. 3 | | | | | | | |
| Urban | — | 18-3 | 18-6 | 18-10 | 19-4 | (18-0) | (18-0) | (18-0) |
| Rural (Lt. Traffic) | — | 14-3 | 14-6 | 14-10 | 15-4 | (14-0) | (14-0) | (14-0) |
| No Overhang | | | | | | | | |
| Back of Obst. | Fig. 5 | 8-3 | 8-6 | 8-10 | 9-4 | (8-0) | (8-0) | (8-0) |
| Not Back of Obst. | Fig. 6 | 13-3 | 13-6 | 13-10 | 14-4 | (13-0) | (13-0) | (13-0) |
| Public Alleys | — | 15-3 | 15-6 | 15-10 | 16-4 | (15-0) | (15-0) | (15-0) |

† Must be supported on 6M strand for spans over 100 ft.

For Service drops, over residential streets, these clearances may be reduced 2 feet at the edge of the road if required clearance is obtained at the center of the road. See Fig. 4.

2. CLEARANCES ABOVE GROUND OR RAILS (at 60°F)

B. USING MINIMUM SAGS (Cont.)

Span Lengths of 151-200 Feet

| SITUATION | REF. | CONSTRUCTION | | MAINTENANCE | |
|---|------------------|--|--------------------|--------------------|--------------------|
| | | 151-175 ft. in. | 176-200 ft. in. | 151-175 ft. in. | 176-200 ft. in. |
| Crossing Above: Railroad Tracks Generally Special Case | — Fig. 2 | Not recommended for these span lengths Not recommended for these span lengths | | | |
| Public Roads Generally# Pole not over 50 feet from far edge# | — Fig. 1 | 22-0 20-9 | 23-5 21-4 | (20-0) (19-1) | (20-5) (19-1) |
| Public Alleys Generally Pole not over 50 feet from far edge | — Fig. 1 | 19-0 17-9 | 20-5 18-4 | (17-0) (16-1) | (17-5) (16-1) |
| Resid. Driveways Generally Pole not over 50 feet from far edge | — Fig. 1 | 14-0 12-9 | 15-5 13-4 | (12-0) (11-1) | (12-5) (11-1) |
| Flat Roof Bldgs. | — | 10-0 | 11-0 | (8-0) | (8-0) |
| Peak Roof Bldgs., Billboards | — | 3-0 | 3-6 | (2-0) | (2-0) |
| Neon Signs | — | 5-0 | 5-6 | (4-0) | (4-0) |
| Waterways | — | Must be shown on detail plans | | | |
| Running Along: Public Roads Major Overhang | Fig. 3 | 22-0 | 23-5 | (20-0) | (20-5) |
| Minor Overhang Urban Rural (Lt. Traffic) | Fig. 3 — — | 20-0 16-0 | 21-3 17-3 | (18-0) (14-0) | (18-3) (14-3) |
| No Overhang Back of Obst. Not Back of Obst. | Fig. 5 Fig. 6 | 10-0 15-0 | 11-0 16-0 | (8-0) (13-0) | (8-0) (13-0) |
| Public Alleys | — | 17-0 | 18-3 | (15-0) | (15-3) |

For service drops, over residential streets, these clearances may be reduced 2 feet at the edge of the road if required clearance is obtained at the center. See Fig. 4.

3. CLEARANCES CROSSING BELOW POWER WIRES AND CABLES

Drop Wire Strung to Normal or Minimum Sags

CONSTRUCTION¹ CLEARANCES
FOR POWER SPAN LENGTHS OF:

| KIND OF POWER FACILITY | 100-LESS ft. in. | 101-150 ft. in. | 151-175 ft. in. |
|--|------------------------------------|--------------------|--------------------|
| 300 Volts ² or less | | | |
| Service Wires or Cables | 2-0 | 2-6 | 2-9 |
| Line Wires — Generally | 2-0 | 2-6 | 2-9 |
| If within 6 feet of telephone pole ³ (See Section 620-210-012) | 4-0 | 4-6 | 4-9 |
| 301-750 Volts ² — Phase Wires | 4-0 | 4-6 | 4-9 |
| 751-8700 Volts ² — Phase Wires — Generally | 4-0 | 4-6 | 4-9 |
| If within 6 feet of telephone pole ³ | 6-0 | 6-6 | 6-9 |
| 8701-50,000 Volts ² — Phase Wires — Generally | 6-0 | 6-6 | 6-9 |
| If near telephone pole see Section 620-210-012 | | | |
| Grounded Neutrals — Systems of: | | | |
| Up to 22,000 Volts to ground | 2-0 | 2-6 | 2-9 |
| Over 22,000 Volts to ground | Same as Associated Phase Wires. | | |
| Other Neutrals | Same as Associated Phase Wires. | | |
| Grounded Metal Sheath Cables or Any Cable Lashed to Grounded Strand — Any Voltage | 2-0 | 2-0 | 2-0 |
| Spacer Cables ⁴ | | | |
| 300 Volts ² or Less — Generally | 2-0 | 2-0 | 2-0 |
| If within 6 feet of telephone pole ³ | 4-0 | 4-0 | 4-0 |
| 301-750 Volts ² | 4-0 | 4-0 | 4-0 |
| 751-8700 Volts ² — Generally | 4-0 | 4-0 | 4-0 |
| If within 6 feet of telephone pole ³ | 6-0 | 6-0 | 6-0 |
| 8701-50,000 Volts ² | 6-0 | 6-0 | 6-0 |
| If near telephone pole see Section 620-210-012 | | | |

- Maintenance clearances for span lengths of 101 to 175 feet are the same as construction clearances for span lengths of 100 feet and less.
- Voltage to ground if power circuit is effectively grounded; voltage between wires if not.
- Every effort should be made to avoid these situations and establish a common pole crossing instead.*
- Illustrated in Section 620-216-013.

4. MISCELLANEOUS CLEARANCES

| Drop Wire Above: Power service drops or power line wires of 300 volts or less, foreign guys, foreign communications facilities, trolley span wires. | | | | |
|---|----------------------------|-------|--------------|-------|
| Span Length of Drop Wire (Ft.) | CLEARANCES IN FEET, INCHES | | | |
| | NORMAL SAGS | | MINIMUM SAGS | |
| | CONST. | MTCE. | CONST. | MTCE. |
| 75-less | 2-0 | (2-0) | 2-3 | (2-0) |
| 76-100 | 2-3 | (2-0) | 2-6 | (2-0) |
| 101-125 | 2-6 | (2-0) | 2-10 | (2-0) |
| 126-150 | 2-10 | (2-0) | 3-4 | (2-0) |
| 151-175 | 3-2 | (2-0) | 4-0 | (2-0) |
| Trolley Contact Wires 750 Volts — Less | | | | |
| 75-less* | 4-0 | (4-0) | 4-3 | (4-0) |
| 76-100* | 4-3 | (4-0) | 4-6 | (4-0) |
| 101-125* | 4-6 | (4-0) | 4-10 | (4-0) |
| 126-150* | 4-10 | (4-0) | 5-4 | (4-0) |
| 151-175* | 5-2 | (4-0) | 6-0 | (4-0) |
| Drop Wire Below: | | | | |
| Foreign Guys, Communications Cables† | | | | |
| Any span length | 2-0 | (2-0) | 2-0 | (2-0) |
| Neon Signs | | | | |
| Any span length | 4-0 | (4-0) | 4-0 | (4-0) |
| Drop Wire Alongside: | | | | |
| Neon Signs | | | | |
| Any span length | 2-0 | (2-0) | 2-0 | (2-0) |

* Place wire guard at point of crossing.

† Span length of foreign cable not over 175 feet.