

WE ENERGIES WORK PROCEDURE


 Work Procedure	MANUAL SECTION: 021 Distribution Engineering – Technical – Part 3	
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SUBJECT: Overhead Line Conductors, General Information		

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SCOPE

This document provides final sags for conductors that are currently being used in “Electric Distribution, Design And Construction Manual – Section 106” and the final sags for conductors that are used for maintenance in “Electric Distribution, Design And Construction Manual, Maintenance – Overhead & URD – Section 106”.

GENERAL

The final sags provided for this document shall be used to ensure vertical clearances. The sum of the clearance and final sag pole height shall be used to determined pole height.

This document details the applications of the conductors, how the final sags were determined, and where to find all other information used to obtain these numbers.

PROCEDURE

1. CONDUCTOR APPLICATION

The table below indicates typical applications of subtransmission, primary, and secondary conductors. See “**Illustration 1: Table One – Conductor Application**”.

NOTE: Note that all aluminum conductors and all copper conductors are for maintenance purposes only and should not be used in new installations.

1.1. Table One – Conductor Appliation

TABLE ONE CONDUCTOR APPLICATION			
Conductor Size And Type			
Application	New Installation	Maintenance	
Secondary Mains 120/240 V-1Ø And 240 V-3Ø	Secondary (RTS) Cable 1/0, 4/0, And 336 kcmil	#6, #4, #2, 1/0, And 4/0 WR CU, 1/0, 4/0, 336 And 477 WR AL	
Primary Feeder	#2, 1/0, 2/0, 3/0, 336, And 477 kcmil BARE ACSR	4/0 And 477 kcmil BARE AL, #6, #4, #2, 1/0, And 4/0 BARE CU	
Subtransmission – 13.2, 26.4, 34.5 kV	1/0*, 3/0, 336, And 477 kcmil BARE ACSR	#2*, 1/0, And 4/0 BARE CU	
Shield Wire		3/8" And 7/16" EHS (69 kV), 1/0 BARE ACSR	

* May be used only where available fault current is below 25,000 Amps.

Illustration 1: Table One – Conductor Application

2. CONDUCTOR SAG AND SPACING RELATIONSHIPS

The maximum allowable span length is a function of the conductor configuration at supports and conductor sag. See work procedure “021-106.10 Overhead Conductors, Ruling Span Calculations” to determine the maximum allowable span length based on these factors.

3. INITIAL AND FINAL SAG TABLE REFERENCE

The 160 foot ruling span sag tables will normally be used for primary and secondary construction only, but may be used for subtransmission lines. The 240 and 300 foot ruling span sag tables are to be used for subtransmission and long span primary lines.

The following tabulation listed in “**Illustration 2: Table Two – Initial And Final Sag Table Reference**” gives conductor sizes and ruling span length along with the proper initial sag table in “Electric Distribution, Design and Construction Manual, Overhead – Section 106”. This initial sag table shall be referenced on the construction order.

See “**Illustration 2: Table Two – Initial And Final Sag Table Reference**”.

3.1. Table Two – Final And Initial Sag Table References

TABLE TWO				
Final And Initial Sag Table Reference				
Conductor Description	Ruling Span Length In Feet	Max Span Length In Feet	Final Sag Table Location	Initial Sage Table Location
#2, 6/1 STRD, ACSR, BARE	160	200	Table Three	106-15 p1
#2, 6/1 STRD, ACSR, BARE	240	300	Table Seven	
#2, 6/1 STRD, ACSR, BARE	300	375	Table Eleven	
#2, 7/1 STRD, ACSR, BARE	160	200	Table Three	106-15 p2
#2, 7/1 STRD, ACSR, BARE	240	300	Table Seven	
#2, 7/1 STRD, ACSR, BARE	300	375	Table Eleven	
1/0, 6/1 STRD, ACSR, BARE	160	200	Table Four	106-15 p3
1/0, 6/1 STRD, ACSR, BARE	240	300	Table Eight	
1/0, 6/1 STRD, ACSR, BARE	300	375	Table Twelve	
2/0, 6/1 STRD, ACSR, BARE	160	200	Table Four	106-15 p4
2/0, 6/1 STRD, ACSR, BARE	240	300	Table Eight	
2/0, 6/1 STRD, ACSR, BARE	300	375	Table Twelve	
3/0, 6/1 STRD, ACSR, BARE	160	200	Table Five	106-15 p5
3/0, 6/1 STRD, ACSR, BARE	240	300	Table Nine	
3/0, 6/1 STRD, ACSR, BARE	300	375	Table Thirteen	
336, 18/1 STRD, ACSR, BARE	160	200	Table Five	106-15 p6
336, 18/1 STRD, ACSR, BARE	240	300	Table Nine	
336, 18/1 STRD, ACSR, BARE	300	375	Table Thirteen	
336, 26/7 STRD, ACSR, BARE	160	200	Table Six	106-15 p7
336, 26/7 STRD, ACSR, BARE	240	300	Table Ten	
336, 26/7 STRD, ACSR, BARE	300	375	Table Fourteen	
477, 26/7 STRD, ACSR, BARE	160	200	Table Six	106-15 p8
477, 26/7 STRD, ACSR, BARE	240	300	Table Ten	
477, 26/7 STRD, ACSR, BARE	300	375	Table Fourteen	
1/0, 4/0 SECONDARY (RTS) CABLE	160	200	Table Fifteen	106-30 p1
336 SECONDARY (RTS) CABLE	160	200	Table Sixteen	
1/0, 4/0 SECONDARY (RTS) CABLE	240	300	Table Seventeen	106-30 p2
336 SECONDARY (RTS) CABLE	240	300	Table Eighteen	

Illustration 2: Table Two – Final And Initial Sag Table Reference

4. LARGEST FINAL SAGS TO BE USED FOR CLEARANCE REQUIREMENTS

The following pages list the various conductor final sags at mid-span in inches. These final sags are determined based on the temperature and loading conditions, given in National Electrical Safety Code (NESC) 232.A that produce the largest final sag. The Alcoa SAG10 computer program was used to determine final sags.

See the following illustrations:

“Illustration 3: Table Three – Final Sage – #2 (6/1) And #2 (7/1) BARE ACSR”

“Illustration 4: Table Four – Final Sag 1/0 (6/1) And 2/0 (6/1) BARE ACSR”

“Illustration 5: Table Five – 3/0 (6/1) And 336 (18/1) BARE ACSR”

“Illustration 6: Table Six – Final Sag – 336 (26/7) And 477 (26/7) BARE ACSR”

“Illustration 7: Table Seven – Final Sag – #2 (6/1) And #2 (7/1) BARE ACSR”

“Illustration 8: Table Eight – Final Sag – 1/0 (6/1) And 2/0 (6/1) BARE ACSR”

“Illustration 9: Table Nine – Final Sag – 3/0 (6/1) And 336 (18/1) BARE ACSR”

“Illustration 10: Table Ten – Final Sag – 336 (26/7) And 477 (26/7) BARE ACSR”

“Illustration 11: Table Eleven – Final Sag – #2 (6/1) And #2 (7/1) BARE ACSR”

“Illustration 12: Table Twelve – Final Sag – 1/0 (6/1) And 2/0 (6/1) BARE ACSR”

“Illustration 13: Table Thirteen – Final Sag – 3/0 (6/1) And 336 (18/1) BARE ACSR”

“Illustration 14: Table Fourteen – Final Sag – 336 (26/7) And 477 (26/7) BARE ACSR”

“Illustration 15: Table Fifteen – Final Sag – 1/0 And 4/0 Secondary (RTS) Cable”

“Illustration 16: Table Sixteen – Final Sag – 336 Secondary (RTS) Cable”

“Illustration 17: Table Seventeen – Final Sag – 1/0 And 4/0 Secondary (RTS) Cable”

“Illustration 18: Table Eighteen – Final Sag – 336 Secondary (RTS) Cable”

The highlighted columns are the conditions that produce the greatest final sag. These final sags are to be used to determine clearance requirements only. The 167°F (75°C) temperature is the conductor temperature at the continuous rating. The 200°F (93°C) temperature is the conductor temperature at the emergency rating.

4.1. Table Three – Final Sag Table For #2 (6/1) And #2 (7/1) ACSR Conductors – 160 Ft Ruling Span

TABLE THREE										
Final Sag - #2 (6/1) And #2 (7/1) BARE ACSR										
Span In Length In Feet	#2 ACSR 6/1 BARE M/N 103-3441					#2 ACSR 7/1 BARE MAINT ONLY				
	0°F	60°F	32°F ½" Of Ice	167° F	200° F	0°F	60°F	32°F ½" Of Ice	167° F	200° F
80	2	4	7	7	8	1	3	7	7	8
100	2	6	12	12	13	2	5	11	11	13
120	3	9	17	17	19	3	7	15	16	18
140	5	12	23	23	25	4	10	21	22	25
160	6	15	30	29	33	6	13	27	29	33
180	8	20	38	37	42	7	16	34	37	41
200	10	24	47	46	52	9	20	42	45	51

Illustration 3: Table Three – Final Sag Table For #2 (6/1) And #2 (7/1) ACSR Conductors – 160 Ft Ruling Span

4.2. Table Four – Final Sag Table For 1/0 (6/1) And 2/0 (6/1) ACSR Conductors – 160 Ft Ruling Span

TABLE FOUR										
Final Sag – 1/0 (6/1) And 2/0 (6/1) BARE ACSR										
Span Length In Feet	1/0 ACSR 6/1 BARE M/N 103-3999					2/0 ACSR 6/1 BARE M/N 103-4201				
	0°F	60°F	32°F ½" Of Ice	167° F	200° F	0°F	60°F	32°F ½" Of Ice	167° F	200° F
80	2	4	7	8	8	2	4	6	8	9
100	2	6	10	12	13	3	7	10	12	14
120	4	9	15	17	19	4	9	14	18	20
140	5	12	20	23	26	5	13	19	24	27
160	6	16	26	30	34	7	17	25	31	35
180	8	20	33	38	42	8	21	32	40	44
200	10	25	41	47	52	10	26	39	49	55

Illustration 4: Table Four – Final Sag Table For 1/0 (6/1) And 2/0 (6/1) ACSR Conductors – 160 Ft Ruling Span

4.3. Table Five – Final Sag Table For 3/0 (6/1) And 336 (18/1) ACSR Conductors – 160 Ft Ruling Span

TABLE FIVE										
Final Sag – 3/0 (6/1) And 336 (18/1) BARE ACSR										
Span Length In Feet	3/0 ACSR 6/1 BARE M/N 103-4308					336 ACSR 18/1 BARE M/N 103-5118				
	0°F	60°F	32°F ½" Of Ice	167° F	200° F	0°F	60°F	32°F ½" Of Ice	167° F	200° F
80	2	4	6	8	9	2	6	6	11	11
100	3	7	9	13	14	3	9	9	17	18
120	4	10	13	18	20	5	13	14	24	26
140	5	13	18	25	27	6	17	19	33	35
160	7	17	24	32	36	8	22	24	43	46
180	8	21	30	41	45	10	28	31	55	58
200	10	26	37	50	56	13	35	38	68	72

Illustration 5: Table Five – Final Sag Table For 3/0 (6/1) And 336 (18/1) ACSR Conductors – 160 Ft Ruling Span

4.4. Table Six – Final Sag Table For 336 (26/7) And 477 (26/7) ACSR Conductors – 160 Ft Ruling Span

TABLE SIX										
Final Sag – 336 (26/7) And 477 (26/7) BARE ACSR										
Span Length In Feet	336 ACSR 26/7 BARE M/N 103-5142					477 ACSR 26/7 BARE M/N 103-6181				
	0°F	60°F	32°F ½" Of Ice	167° F	200° F	0°F	60°F	32°F ½" Of Ice	167° F	200° F
80	2	4	5	8	8	2	4	4	8	9
100	2	6	7	12	13	3	6	7	12	14
120	4	8	11	17	19	4	9	10	18	19
140	5	11	15	23	26	5	12	14	24	27
160	6	15	19	30	34	6	16	18	31	35
180	8	19	24	38	43	8	20	22	39	44
200	10	23	30	48	53	10	24	28	49	54

Illustration 6: Table Six – Final Sag Table For 336 (26/7) And 477 (26/7) ACSR Conductors – 160 Ft Ruling Span

4.5. Table Seven – Final Sag Table For #2 (6/1) And #2 (7/1) ACSR Conductors – 240 Ft Ruling Span

TABLE SEVEN										
Final Sag – #2 (6/1) And #2 (7/1) BARE ACSR										
Span Length In Feet	#2 ACSR 6/1 BARE M/N 103-3441					#2 ACSR 7/1 BARE MAINT ONLY				
	0°F	60°F	32°F ½" Of Ice	167° F	200° F	0°F	60°F	32°F ½" Of Ice	167° F	200° F
120	3	7	14	11	12	3	6	12	11	13
140	5	10	18	15	17	4	9	17	16	17
160	6	13	24	20	22	6	11	22	20	23
180	8	16	30	25	28	7	14	28	26	29
200	10	20	38	31	35	9	17	34	32	35
220	12	25	46	38	42	11	21	42	38	43
240	14	29	54	45	50	13	25	50	46	51
260	16	34	64	53	59	15	30	58	54	60
280	19	40	74	61	68	17	34	68	62	69
300	22	46	85	71	78	20	39	78	71	79

Illustration 7: Table Seven – Final Sag Table For #2 (6/1) And #2 (7/1) ACSR Conductors – 240 Ft Ruling Span

4.6. Table Eight – Final Sag Table For 1/0 (6/1) And 2/0 (6/1) ACSR Conductors – 240 Ft Ruling Span

TABLE EIGHT										
Final Sag – 1/0 (6/1) And 2/0 (6/1) BARE ACSR										
Span Length In Feet	1/0 ACSR 6/1 BARE M/N 103-3999					2/0 ACSR 6/1 BARE M/N 103-4201				
	0°F	60°F	32°F ½" Of Ice	167° F	200° F	0°F	60°F	32°F ½" Of Ice	167° F	200° F
120	4	7	12	12	13	4	8	12	13	14
140	5	10	16	16	18	5	11	16	17	19
160	6	13	21	21	24	7	14	21	23	25
180	8	17	27	27	30	8	17	26	29	31
200	10	21	34	34	37	10	21	32	35	38
220	12	25	41	41	44	13	26	39	43	47
240	14	30	48	48	53	15	31	46	51	55
260	17	35	57	57	62	17	36	54	60	65
280	19	40	66	66	72	20	42	63	69	75
300	22	46	76	75	83	23	48	72	79	87

Illustration 8: Table Eight – Final Sag Table For 1/0 (6/1) And 2/0 (6/1) ACSR Conductors – 240 Ft Ruling Span

4.7. Table Nine – Final Sag Table For 3/0 (6/1) And 336 (18/1) ACSR Conductors – 240 Ft Ruling Span

TABLE NINE										
Final Sag – 3/0 (6/1) And 336 (18/1) BARE ACSR										
Span Length In Feet	3/0 ACSR 6/1 BARE M/N 103-4308					336 ACSR 18/1 BARE M/N 103-5118				
	0°F	60°F	32°F ½" Of Ice	167° F	200° F	0°F	60°F	32°F ½" Of Ice	167° F	200° F
120	4	8	11	13	14	5	10	11	18	19
140	5	11	15	18	19	6	13	15	24	26
160	7	14	19	23	25	8	17	20	32	33
180	8	18	25	29	32	10	22	25	40	42
200	10	22	30	36	39	13	27	31	49	52
220	13	26	37	44	48	15	33	37	60	63
240	15	31	44	52	57	18	39	44	71	75
260	18	37	51	61	67	21	45	52	83	88
280	21	42	60	71	77	25	53	60	97	102
300	24	49	68	82	89	28	61	69	111	117

Illustration 9: Table Nine – Final Sag Table For 3/0 (6/1) And 336 (18/1) ACSR Conductors – 240 Ft Ruling Span

4.8. Table Ten – Final Sag Table For 336 (26/7) And 477 (26/7) ACSR Conductors – 240 Ft Ruling Span

TABLE TEN Final Sag – 336 (26/7) And 477 (26/7) BARE ACSR										
Span Length In Feet	336 ACSR 26/7 BARE M/N 103-5142					477 ACSR 26/7 BARE M/N 103-6181				
	0°F	60°F	32°F ½" Of Ice	167° F	200° F	0°F	60°F	32°F ½" Of Ice	167° F	200° F
120	4	7	9	13	14	4	7	9	13	14
140	5	10	12	17	19	5	10	12	18	19
160	6	13	16	22	25	6	13	15	23	25
180	8	16	20	28	31	8	17	19	29	32
200	10	20	25	35	38	10	20	24	36	39
220	12	24	31	43	46	12	25	29	44	48
240	14	29	36	51	55	15	29	34	52	57
260	17	34	43	59	65	17	34	40	61	66
280	19	39	49	69	75	20	40	47	71	77
300	22	45	57	79	86	23	46	54	81	88

Illustration 10: Table Ten – Final Sag Table For 336 (26/7) And 477 (26/7) ACSR Conductors – 240 Ft Ruling Span

4.9. Table Eleven – Final Sag Table For #2 (6/1) And #2 (7/1) ACSR Conductors – 300 Ft Ruling Span

TABLE ELEVEN										
Final Sag – #2 (6/1) And #2 (7/1) BARE ACSR										
Span Length In Feet	#2 ACSR 6/1 BARE M/N 103-3441					#2 ACSR 7/1 BARE MAINT ONLY				
	0°F	60°F	32°F ½" Of Ice	167° F	200° F	0°F	60°F	32°F ½" Of Ice	167° F	200° F
160	7	12	21	16	18	4	6	20	17	18
180	9	15	27	20	22	5	7	25	21	23
200	11	19	33	25	28	6	9	31	26	29
220	13	23	40	31	34	7	11	37	31	35
240	16	27	48	36	40	9	13	44	37	41
260	18	32	56	43	47	10	15	52	44	48
280	21	37	65	50	54	12	18	60	51	56
300	24	43	75	57	62	14	20	69	59	65
320	28	49	85	65	71	16	23	79	67	73
340	31	55	96	73	80	18	26	89	75	83
360	35	62	108	82	90	20	29	100	84	93
375	38	67	117	89	98	21	32	108	92	101

Illustration 11: Table Eleven – Final Sag Table For #2 (6/1) And #2 (7/1) ACSR Conductors – 300 Ft Ruling Span

4.10. Table Twelve – Final Sag Table For 1/0 (6/1) And 2/0 (6/1) ACSR Conductors – 300 Ft Ruling Span

TABLE TWELVE Final Sag – 1/0 (6/1) And 2/0 (6/1) BARE ACSR										
Span Length In Feet	1/0 ACSR 6/1 BARE M/N 103-3999					2/0 ACSR 6/1 BARE M/N 103-4201				
	0°F	60°F	32°F ½" Of Ice	167° F	200° F	0°F	60°F	32°F ½" Of Ice	167° F	200° F
160	4	7	19	18	19	5	8	18	19	20
180	6	8	24	23	25	6	10	23	24	26
200	7	10	30	28	30	8	12	29	30	32
220	8	13	36	34	37	9	14	35	36	39
240	10	15	43	40	44	11	17	41	43	46
260	12	17	50	47	51	13	20	48	50	54
280	13	20	59	55	60	15	23	56	58	63
300	15	23	67	63	68	17	27	64	67	72
320	18	26	77	72	78	19	31	73	76	82
340	20	30	86	81	88	22	35	83	85	92
360	22	33	97	91	98	25	39	93	96	104
375	24	36	105	98	107	27	42	101	104	112

Illustration 12: Table Twelve – Final Sag Table For 1/0 (6/1) And 2/0 (6/1) ACSR Conductors – 300 Ft Ruling Span

4.11. Table Thirteen – Final Sag Table For 3/0 (6/1) And 336 (18/1) ACSR Conductors – 300 Ft Ruling Span

TABLE THIRTEEN										
Final Sag – 3/0 (6/1) And 336 (18/1) BARE ACSR										
Span Length In Feet	3/0 ACSR 6/1 BARE M/N 103-4308					336 ACSR 18/1 BARE M/N 103-5118				
	0°F	60°F	32°F ½" Of Ice	167° F	200° F	0°F	60°F	32°F ½" Of Ice	167° F	200° F
160	5	8	17	20	21	7	12	18	26	28
180	7	11	22	25	27	8	16	22	33	36
200	8	13	27	31	33	10	19	27	41	44
220	10	16	33	37	40	13	23	33	49	53
240	12	19	39	44	47	15	28	40	58	63
260	14	22	46	52	56	18	33	46	69	74
280	16	26	53	60	65	20	38	54	79	86
300	18	30	61	69	74	23	44	62	91	99
320	21	34	70	78	84	27	50	70	104	113
340	24	38	79	88	95	30	56	79	117	127
360	26	42	88	99	107	34	63	89	131	143
375	29	46	96	107	116	36	68	97	143	155

Illustration 13: Table Thirteen – Final Sag Table For 3/0 (6/1) And 336 (18/1) ACSR Conductors – 300 Ft Ruling Span

4.12. Table Fourteen – Final Sag Table For 336 (26/7) And 477 (26/7) ACSR Conductors – 300 Ft Ruling Span

TABLE FOURTEEN										
Final Sag – 336 (26/7) And 477 (26/7) BARE ACSR										
Span Length In Feet	336 ACSR 26/7 BARE M/N 103-5142					477 ACSR 26/7 BARE M/N 103-6181				
	0°F	60°F	32°F ½" Of Ice	167° F	200° F	0°F	60°F	32° F ½" Of Ice	167° F	200° F
160	6	9	15	19	21	6	10	14	20	21
180	7	11	19	24	26	7	12	18	25	27
200	9	14	23	30	32	9	15	22	31	33
220	11	17	28	36	39	11	18	26	37	40
240	13	20	33	43	47	13	22	31	44	48
260	15	24	39	51	55	16	25	37	52	56
280	17	28	45	59	63	18	29	43	60	65
300	20	32	52	67	73	21	34	49	69	75
320	22	36	59	77	83	24	39	56	79	85
340	25	41	66	87	93	27	43	63	89	96
360	28	46	74	97	105	30	49	70	100	107
375	31	49	81	105	114	32	53	76	108	117

Illustration 14: Table Fourteen – Final Sag Table For 336 (26/7) And 477 (26/7) ACSR Conductors – 300 Ft Ruling Span

4.13. Table Fifteen – (Secondary Main Conductors) Final Sag Table For 1/0 And 4/0 Secondary (RTS) Conductors – 160 Ft Ruling Span

TABLE FIFTEEN										
Final Sag – 1/0 And 4/0 SECONDARY (RTS) CABLE										
Span In Length Feet	1/0 RTS M/N 101-9872					4/0 RTS M/N 102-0978				
	0°F	60°F	32°F ½" Of Ice	167°F	200°F	0°F	60°F	32°F ½" Of Ice	167°F	200°F
80	4	7	10	12	13	4	7	9	12	13
100	7	11	15	19	21	7	11	13	19	21
120	10	16	21	27	30	10	16	19	27	30
140	13	22	29	37	41	13	22	26	37	41
160	17	28	38	48	53	17	28	34	49	54
180	22	36	48	61	68	21	36	43	62	68
200	27	44	60	75	83	26	44	53	76	84

Illustration 15: Table Fifteen – (Secondary Main Conductors) Final Sag Table For 1/0 And 4/0 Secondary (RTS) Conductors – 160 Ft Ruling Span

4.14. Table Sixteen – (Secondary Main Conductors) Final Sag Table For 336 Secondary (RTS) Conductors – 160 Ft Ruling Span

TABLE SIXTEEN					
Final Sag – 336 SECONDARY (RTS) CABLE					
Span In Length Feet	336 RTS M/N 102-1737				
	0°F	60°F	32°F ½" Of Ice	167°F	200°F
80	4	7	8	12	14
100	7	11	13	19	21
120	10	16	18	28	30
140	13	22	25	37	42
160	17	29	32	49	54
180	22	36	41	62	69
200	27	45	50	77	85

Illustration 16: Table Sixteen – (Secondary Main Conductors) Final Sag Table For 336 Secondary (RTS) Conductors – 160 Ft Ruling Span

4.15. Table Seventeen – (Secondary Main Conductors) Final Sag Table For 1/0 And 4/0 Secondary (RTS) Conductors – 200 Ft Ruling Span

TABLE SEVENTEEN Final Sag – 1/0 And 4/0 SECONDARY (RTS) CABLE										
Span In Length Feet	1/0 RTS M/N 101-9872					4/0 RTS M/N 102-0978				
	0°F	60°F	32°F ½" Of Ice	167° F	200° F	0°F	60°F	32°F ½" Of Ice	167° F	200° F
120	10	15	19	23	25	10	15	17	23	25
140	13	20	26	31	33	13	20	24	31	34
160	17	26	34	40	44	17	26	31	41	45
180	22	33	43	51	55	21	33	39	52	57
200	27	41	54	63	68	26	40	48	64	70
220	33	49	65	76	83	32	49	59	77	85
240	39	59	77	91	98	38	58	70	92	101
260	45	69	90	107	115	45	68	82	108	119
280	53	80	105	124	134	52	79	95	126	138
300	61	91	120	142	154	59	91	109	144	158

Illustration 17: Table Seventeen – (Secondary Main Conductors) Final Sag Table For 1/0 And 4/0 Secondary (RTS) Conductors – 200 Ft Ruling Span

4.16. Table Eighteen – (Secondary Main Conductors) Final Sag Table For 336 Secondary (RTS) Conductors – 200 Ft Ruling Span

TABLE EIGHTEEN					
Final Sag – 336 SECONDARY (RTS) CABLE					
Span In Length Feet	336 RTS				
	M/N 102-1737				
	0°F	60°F	32°F ½" Of Ice	167° F	200° F
120	10	15	16	23	25
140	13	20	22	32	34
160	17	26	29	41	44
180	22	33	37	52	56
200	27	41	46	64	69
220	32	49	55	78	84
240	38	59	66	93	100
260	45	69	77	109	117
280	52	80	90	126	136
300	60	92	103	145	156

Illustration 18: Table Eighteen – (Secondary Main Conductors) Final Sag Table For 336 Secondary (RTS) Conductors – 200 Ft Ruling Span

5. MAINTENANCE ONLY

See the following illustrations:

See “**Illustration 19:** Table Nineteen – Final Sag – 4/0 And 477 BARE AL”.

See “**Illustration 20:** Table Twenty – Final Sag – 1/0, 4/0, And 336 WR AL”.

See “**Illustration 21:** Table Twenty-One – Final Sag – 477 WR AL”.

See “**Illustration 22:** Table Twenty-Two – Final Sag For #6 HD BARE CU”.

See “**Illustration 23:** Table Twenty-Three – Final Sag – #4 HD CU BARE”.

See “**Illustration 24:** Table Twenty-Four – Final Sag – #2 And 1/0 HD BARE CU”.

See “**Illustration 25:** Table Twenty-Five – Final Sag – 4/0 HD BARE CU”.

See “**Illustration 26:** Table Twenty-Six – Final Sag – #2 And 1/0 HD BARE CU”.

See “**Illustration 27:** Table Twenty-Seven – Final Sag – 4/0 HD BARE CU”.

See “**Illustration 28:** Table Twenty-Eight – Final Sag – #6 HD WR CU”.

5.1. Table Nineteen – (*Maintenance Only*) Final Sag Table For 4/0 And 477 Bare Aluminum Conductors – 160 Ft Ruling Span

TABLE NINETEEN										
Final Sag – 4/0 And 477 BARE AL (<i>Maintenance Only</i>)										
Span Length In Feet	4/0 AAC BARE 7 STRND M/N 103-4545					477 AAC BARE 19 STRND M/N 103-5606				
	0°F	60°F	32°F ½" Of Ice	167° F	200° F	0°F	60°F	32°F ½" Of Ice	167° F	200° F
80	2	7	8	13	14	3	7	7	13	14
100	4	11	12	20	22	4	11	10	20	22
120	6	15	17	28	31	6	15	15	28	31
140	8	21	23	38	42	8	21	21	38	43
160	10	27	30	50	56	10	27	27	50	56
180	13	34	38	63	70	13	34	34	63	70
200	16	42	48	78	87	16	42	42	78	87

Illustration 19: Table Nineteen – (*Maintenance Only*) Final Sag Table For 4/0 And 477 Bare Aluminum Conductors – 160 Ft Ruling Span

5.2. Table Twenty – (Maintenance Only) Final Sag Table For 1/0 And 4/0 Weather Resistant Aluminum Conductors – 160 Ft Ruling Span

TABLE TWENTY										
Final Sag – 1/0 And 4/0 WR AL (Maintenance Only)										
Span Length In Feet	1/0 AAC WR 7 STRND M/N 103-3981					4/0 AAC WR 7 STRND M/N 103-3981				
	0°F	60°F	32°F ½" Of Ice	167° F	200° F	0°F	60°F	32°F ½" Of Ice	167° F	200° F
80	9	12	13	16	17	3	8	8	13	14
100	14	19	20	25	27	5	12	13	20	22
120	20	27	29	36	39	8	17	19	29	32
140	27	37	39	49	53	11	23	26	40	44
160	36	48	51	64	69	14	30	33	52	57
180	45	60	65	81	87	18	38	42	66	72
200	56	75	80	101	107	22	48	52	81	89

Illustration 20: Table Twenty – (Maintenance Only) Final Sag Table For 1/0 And 4/0 Weather Resistant Aluminum Conductors – 160 Ft Ruling Span

5.3. Table Twenty-One – (Maintenance Only) Final Sag Table For 336 And 477 Weather Resistant Aluminum Conductors – 160 Ft Ruling Span

TABLE TWENTY-ONE										
Final Sag – 336 And 477 WR AL (Maintenance Only)										
Span Length In Feet	336 AAC WR 19 STRND M/N 103-3981					477 AAC WR 37 STRND M/N 103-5657				
	0°F	60°F	32°F ½" Of Ice	167° F	200° F	0°F	60°F	32°F ½" Of Ice	167° F	200° F
80	3	7	8	13	14	3	7	7	13	14
100	5	12	12	20	22	5	11	12	20	22
120	7	17	17	29	32	7	16	17	29	32
140	10	23	24	39	43	10	22	23	39	43
160	13	30	31	51	57	13	29	29	51	57
180	17	37	39	65	72	17	37	37	65	72
200	21	46	48	80	89	21	46	46	80	88

Illustration 21: Table Twenty-One – (Maintenance Only) Final Sag Table For 336 And 477 Weather Resistant Aluminum Conductors – 160 Ft Ruling Span

- 5.4. Table Twenty-Two – (*Maintenance Only*) Final Sag Table For #6 Hard Drawn Bare Copper Conductors – 200 Ft Ruling Span

TABLE TWENTY-TWO Final Sag – #6 HD BARE CU (Maintenance Only)					
#6 HD CU BARE M/N 103-2666					
Span Length In Feet	0°F	60°F	32°F ½" Of Ice	167° F	200° F
150	36	41	46	48	50
175	49	56	62	66	69
200	64	73	81	86	90
225	81	92	102	109	114
250	100	113	127	134	140

Illustration 22: Table Twenty-Two – (*Maintenance Only*) Final Sag Table For #6 Hard Drawn Bare Copper Conductors – 200 Ft Ruling Span

- 5.5. Table Twenty-Three – (*Maintenance Only*) Final Sag Table For #4 Hard Drawn Bare Copper Conductors – 250 Ft Ruling Span

TABLE TWENTY-THREE Final Sag – #4 HD BARE CU (Maintenance Only)					
#4 HD CU BARE M/N 103-3018					
Span Length In Feet	0°F	60°F	32°F ½" Of Ice	167° F	200° F
150	24	28	32	35	37
175	33	38	44	47	50
200	42	50	57	62	65
225	54	64	73	78	83
250	66	78	90	97	102
275	80	95	109	117	123
300	96	113	129	140	147
320	109	129	147	159	167

Illustration 23: Table Twenty-Three – (*Maintenance Only*) Final Sag Table for #4 Hard Drawn Bare Copper Conductors – 250 Ft Ruling Span

5.6. Table Twenty-Four – (Maintenance Only) Final Sag Table For #2 And 1/0 Hard Drawn Bare Copper Conductors – 160 Ft Ruling Span

TABLE TWENTY-FOUR										
Final Sag – #2 And 1/0 HD BARE CU (Maintenance Only)										
	#2 HD CU BARE 7 STRND M/N 103-3301					1/0 HD CU BARE 7 STRND M/N 103-3948				
Span Length In Feet	0°F	60°F	32°F ½" Of Ice	167° F	200° F	0°F	60°F	32°F ½" Of Ice e	167° F	200° F
80	3	6	8	10	11	3	6	7	10	11
100	5	9	12	16	18	5	9	11	16	18
120	7	13	17	23	26	7	13	16	23	26
140	10	18	24	31	35	10	18	22	32	35
160	13	23	31	41	46	13	23	28	41	46
180	16	29	39	52	58	17	30	36	52	58
200	20	36	48	64	71	21	36	44	65	72

Illustration 24: Table Twenty-Four – (Maintenance Only) Final Sag Table For # 2 And 1/0 Hard Drawn Bare Copper Conductors – 160 Ft Ruling Span

5.7. Table Twenty-Five – (Maintenance Only) Final Sag Table For 4/0 Hard Drawn Bare Copper Conductors – 160 Ft Ruling Span

TABLE TWENTY-FIVE					
Final Sag – 4/0 HD BARE CU (Maintenance Only)					
	4/0 HD CU BARE 7 STRND M/N 103-4456				
Span Length In Feet	0°F	60°F	32°F ½" Of Ice	167° F	200° F
80	3	6	6	10	12
100	5	9	10	16	18
120	8	14	14	24	26
140	10	18	20	32	36
160	14	24	26	42	46
180	17	30	32	53	59
200	21	38	40	65	73

Illustration 25: Table Twenty-Five – (Maintenance Only) Final Sag Table For 4/0 Hard Drawn Bare Copper Conductors – 160 Ft Ruling Span

5.8. Table Twenty-Six – (Maintenance Only) Final Sag Table For #2 And 1/0 Hard Drawn Bare Copper Conductors – 240 Ft Ruling Span

TABLE TWENTY-SIX Final Sag – #2 And 1/0 HD BARE CU (Maintenance Only)										
Span Length In Feet	#2 HD CU BARE 7 STRND M/N 103-3301					1/0 HD CU BARE 7 STRND M/N 103-3948				
	0°F	60°F	32°F ½" Of Ice	167° F	200° F	0°F	60°F	32°F ½" Of Ice	167° F	200° F
120	7	11	14	17	18	7	11	13	17	18
140	10	15	20	23	25	10	15	18	23	25
160	13	19	26	30	33	13	20	24	30	33
180	16	24	32	38	41	17	25	30	38	42
200	20	30	40	47	51	21	31	37	47	51
220	24	36	48	56	62	25	37	45	57	62
240	29	43	58	67	73	30	44	53	68	74
260	34	51	68	79	86	35	52	63	79	87
280	40	59	79	91	100	40	60	73	92	101
300	45	68	90	105	115	46	69	83	106	116

Illustration 26: Table Twenty-Six – (Maintenance Only) Final Sag Table For #2 And 1/0 Hard Drawn Bare Copper Conductors – 240 Ft Ruling Span

5.9. Table Twenty-Seven – (Maintenance Only) Final Sag Table For 4/0 Hard Drawn Bare Copper Conductors – 240 Ft Ruling Span

TABLE TWENTY-SEVEN					
Final Sag – 4/0 HD BARE CU (Maintenance Only)					
4/0 HD CU BARE 7 STRND					
M/N 103-4456					
Span Length In Feet	0°F	60°F	32°F ½" Of Ice	167° F	200° F
120	8	11	12	17	19
140	10	15	17	23	25
160	14	20	22	31	33
180	17	26	27	39	42
200	21	31	34	48	52
220	26	38	41	58	63
240	31	45	49	69	75
260	36	53	57	81	88
280	42	62	67	94	102
300	48	71	76	107	117

Illustration 27: Table Twenty-Seven – (Maintenance Only) Final Sag Table For 4/0 Hard Drawn Bare Copper Conductors – 240 Ft Ruling Span

5.10. Table Twenty-Eight – (*Maintenance Only*) Final Sag Table For #6 Hard Drawn Weather Resistant Copper Conductors – 150 Ft Ruling Span

TABLE TWENTY-EIGHT					
Final Sag – #6 HD WR CU (Maintenance Only)					
Span Length In Feet	#6 HD CU WR				
	M/N 103-2755				
	0°F	60°F	32°F ½" Of Ice	167° F	200° F
80	8	11	13	14	15
100	12	17	21	22	24
120	18	24	30	32	34
150	28	37	46	50	54
175	38	51	63	69	73

Illustration 28: Table Twenty-Eight – (*Maintenance Only*) Final Sag Table For #6 Hard Drawn Weather Resistant Copper Conductors – 150 Ft Ruling Span