PRIMARIES 07

This Standard covers stock numbers, ampacities, mechanical properties, and applications of Standard Distribution and Sub-transmission conductors.

Bare wire is the standard conductor for all overhead distribution feeders (up to 15kV) and sub-transmission lines (34kV & 69kV). It is to be used for both vertical and horizontal constructions, which includes both re-conductoring and addition of phases where covered wire had been previously installed. T2 conductor consist of two (2) identical conductors twisted together at approximately 9ft. intervals. The values in parentheses next to the conductor size refer to conductor stranding.

Covered conductors (DCS **07 00 01 03**) may be used in 15kV or less installations where one of the following applies:

a. In extremely heavy tree conditions where excessive trimming permission cannot be obtained, or where the aesthetic of the trees are important to the area.
b. Where climbing or working space on the pole is restricted by being too close to a building or other obstacles.

Table 1 - Standard Conductors (Bare)

Conductor Size, Type and Stranding	Cond. Code Name	Ameren Stk No.	Overall Dia. (in)	Wire Area (in²)	Ultimate Strength (lbs)	Cond. Wt. (lbs/ft)	Vert. Wt. Of Cond. +1/2" Ice (lbs/ft)	Horiz. 4Lbs Wind on 1/2" Ice (lbs/ft)	Resultant Wt. + C = 0.30 Heavy Loaded Wt. (lbs/ft)	Common Use
1/0 (7) AAAC	Azusa	18 05 060 18 05 088	0.398	0.0968	4,460	0.1157	0.6743	0.466	1.1197	Line & Static Wire
110.8 kcmil (12/7) ACSR	Minorca	18 05 117	0.481	0.1378	11,300	0.2763	0.8865	0.4937	1.3147	Static Wire
336.4 kcmil (18/1) ACSR	Merlin	18 05 120	0.684	0.2789	8,680	0.3653	1.1017	0.5613	1.5365	Line Wire
556.5 kcmil (19) AAC	Dahlia	18 05 047 18 05 082 18 05 092	0.856	0.437	9,750	0.5224	1.3658	0.6187	1.7994	Line Wire
954 kcmil (45/7) ACSR	Rail	18 05 173	1.165	0.801	25,900	1.076	2.111	0.7217	2.531	Line Wire
1272 kcmil (45/7) ACSR	Bittern	18 05 246	1.345	1.0678	34,100	1.431	2.578	0.782	2.994	Line Wire
T2-4/0 (6/1) ACSR	T2-Penguin	18 05 241	0.922	0.3878	16,700	0.582	1.485	0.641	1.917	Line Wire
T2-336.4 kcmil (18/1) ACSR	T2-Merlin	18 05 243	1.12	0.5578	17,360	0.73	1.737	0.706	2.175	Line Wire
T2-556.5 kcmil (19) AAC	T2-Dahlia	18 05 250	1.401	0.8738	19,500	1.045	2.265	0.8003	2.702	Line Wire
T2-954 kcmil (45/7) ACSR	T2-Rail	18 05 210	1.907	1.6022	51,800	2.15	3.711	0.969	4.136	Line Wire

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7	11/22/10	DCG	

Overhead current ratings listed in Table 3 cover single and T2 conductor used in open overhead construction.
CLPU stands for Cold Load PickUp.
Ratings are based on following:

a. 2 ft/s crosswind;
b. Emissive of 0.5 for bare and 0.91 for covered conductors;
c. Absorptiveness of 0.5 for bare and 0.95 for covered conductions;

Table 2 - Temperatures (°C)				
Conductor Type	Normal	Emergency	Ambient	
#6 and #4 COPPER	80	90	Summer	40
COPPER (other)	90	100	Spring/Fall	10
AAC & AAAC	90	100	Winter	-13
ACSR	90	120	CLPU	0

Table 3 - Ampacities for Standard Conductors								
CONDUCTOR TYPE & SIZE		RATING (AMP)						
LINE CONDUCTORS	CODE NAME	SN	SE	S/F N	S/F E	W N	W E	CLPU
1/0 (7) AAAC	Azusa	252	276	323	341	369	383	361
336.4 kcmil (18/1) ACSR	Merlin	511	645	659	759	754	835	795
556.5 kcmil (19) AAC	Dahlia	693	763	896	947	1026	1067	1004
954 kcmil (45/7) ACSR	Rail	981	1255	1273	1476	1460	1625	1548
1272 kcmil (45/7) ACSR	Bittern	1173	1506	1523	1773	1749	1952	1859
T2 LINE CONDUCTORS	CODE NAME	SN	SE	S/F N	S/F E	W N	W E	CLPU
T2-4/0 (6/1) ACSR	T2-Penguin	535	652	692	767	793	844	804
T2-336.4 kcmil (18/1) ACSR	T2-Merlin	820	1048	1063	1233	1219	1357	1292
T2-556.5 kcmil (19) AAC	T2-Dahlia	1108	1227	1441	1528	1654	1723	1623
T2-954 kcmil (45/7) ACSR	T2-Rail	1587	2054	2070	2419	2381	2664	2538
STATIC (SHIELD) WIRES	CODE NAME	SN	SE	S/F N	S/F E	W N	W E	CLPU
110.8 kcmil (12/7) ACSR	Minorca	234	281	301	330	344	363	346
1/0 (7) AAAC	Azusa	252	276	323	341	369	383	361

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7	11/22/10	DCG	

This Standard covers stock numbers, ampacities, and mechanical properties for non-standard aluminum and copper conductors. For 4kV lead wire size, refer to DCS **10 00 01 01**.

Overhead current ratings cover single and T2 conductors used in open overhead construction.
CLPU stands for Cold Load PickUp.
Ratings are based on following:

a) 2 ft/s crosswind;
b) Emissivity of 0.5 for bare and 0.91 for covered conductors;
c) Absorptiveness of 0.5 for bare and 0.95 for covered conductors;

Table 1 - Temperatures (°C)

Conductor Type	Normal	Emergency	Ambient	
#6 and #4 COPPER	80	90	Summer	40
COPPER (other)	90	100	Spring/Fall	10
AAC & AAAC	90	100	Winter	-13
ACSR	90	120	CLPU	0

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Table 2 - Ampacities for Non-Standard Bare Aluminum Conductors

SIZE	CODE NAME	RATING (AMP)						
		SN	SE	S/F N	S/F E	W N	W E	CLPU
#6 ACSR (6/1)	Turkey	102	125	130	147	148	161	154
#4 ACSR (7/1)	Swanate	135	165	173	194	197	214	203
#2 ACSR (6/1)	Sparrow	178	219	229	257	261	282	269
#2 ACSR (7/1)	Sparate	178	219	229	257	261	282	269
1/0 ACSR (6/1)	Raven	235	288	302	338	345	372	354
134.6 kcmil ACSR (12/7)	Leghorn	259	310	333	364	381	401	382
2/0 ACSR (6/1)	Quail	269	329	346	387	395	426	405
3/0 ACSR (6/1)	Pigeon	308	377	396	443	453	488	464
3/0 AAAC (7)	Amherst	337	370	433	458	495	515	485
4/0 AAAC (7)	Alliance	390	428	502	530	574	597	562
4/0 ACSR (6/1)	Penguin	353	432	454	507	520	558	532
266.8 kcmil ACSR (18/1)	Waxwing	441	556	569	654	651	720	685
266.8 kcmil ACSR (26/7)	Partridge	450	568	580	667	664	734	699
336.4 kcmil ACSR (26/7)	Linnet	520	658	672	774	769	852	811
336.4 kcmil ACSR (30/7)	Oriole	526	666	680	784	778	862	821
394.9 kcmil AAAC (19)	Canton	526	579	678	718	777	808	761
397.5 kcmil ACSR (26/7)	Ibis	578	733	747	862	856	949	903
397.5 kcmil ACSR (30/7)	Lark	585	742	756	873	866	961	914
477 kcmil ACSR (18/1)	Pelican	636	807	822	949	942	1045	995
477 kcmil ACSR (26/7)	Hawk	649	824	839	969	961	1067	1016
477 kcmil ACSR (30/7)	Hen	657	834	849	981	973	1080	1028
556.5 kcmil ACSR (18/1)	Osprey	701	891	907	1048	1039	1153	1098
556.5 kcmil ACSR (26/7)	Dove	715	910	926	1069	1061	1178	1122
636 kcmil ACSR (24/7)	Rook	773	985	1001	1158	1147	1275	1214
636 kcmil ACSR (26/7)	Grosbeak	778	991	1007	1166	1155	1284	1222
795 kcmil ACSR (26/7)	Drake	896	1145	1161	1347	1332	1483	1412
795 kcmil ACSR (45/7)	Tern	875	1116	1134	1313	1301	1446	1377
954 kcmil ACSR (54/7)	Cardinal	982	1251	1274	1472	1462	1620	1543
477 kcmil AAC (19)	Cosmos	629	692	813	859	931	967	911
636 kcmil AAC (37)	Orchid	754	831	976	1032	1118	1162	1095
795 kcmil AAC (37)	Arbutus	867	956	1122	1188	1287	1338	1260
954 kcmil AAC (37)	Magnolia	970	1071	1258	1333	1443	1502	1414
1272 kcmil AAC (61)	Narcissus	1156	1279	1501	1592	1723	1795	1690
T2-3/0 (or T2-335.6 kcmil) ACSR (6/1)	T2-Pigeon	474	580	613	683	702	751	715
T2-266.8 kcmil ACSR (26/7)	T2-Partridge	720	918	933	1081	1070	1190	1133
T2-477 kcmil ACSR (18/1)	T2-Pelican	1019	1309	1323	1540	1519	1696	1615
T2-477 kcmil ACSR (26/7)	T2-Hawk	1036	1333	1347	1569	1547	1727	1645
T2-477 kcmil ACSR (30/7)	T2-Hen	1046	1346	1360	1585	1562	1744	1662
T2-795 kcmil AAC (37)	T2-Arbutus	1402	1554	1826	1939	2098	2187	2060
T2-3/0 AAAC (7)	T2-Amherst	503	554	649	688	744	774	729

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Table 3 - Ampacities for Non-Standard Bare Copper Conductors							
SIZE	RATING (AMP)						
	SN	SE	S/F N	S/F E	W N	W E	CLPU
#6 Cu SOL	126	137	161	169	183	190	178
#4 Cu SOL	168	183	215	226	245	254	239
#4 Cu (7)	171	186	218	230	249	258	243
#2 Cu SOL	225	246	288	303	329	341	321
#2 Cu (7)	228	250	293	308	334	347	326
#1 Cu SOL	261	285	334	352	381	395	372
#1 Cu (7)	264	289	339	357	387	401	378
1/0 Cu SOL	299	327	384	404	438	454	428
1/0 Cu (7)	306	335	393	414	448	465	438
2/0 Cu SOL	347	380	446	470	509	528	497
2/0 Cu (7)	356	390	457	482	523	542	511
3/0 Cu SOL	402	440	516	544	590	612	576
3/0 Cu (7)	410	449	527	556	602	625	588
4/0 Cu SOL	465	509	598	630	683	709	667
4/0 Cu (7)	474	520	610	644	698	724	682
250 kcmil Cu (19)	528	579	680	718	778	808	760
350 kcmil Cu (12)	660	726	851	900	975	1013	954
350 kcmil Cu (19)	652	717	841	889	963	1000	942
500 kcmil Cu (37)	817	899	1055	1116	1209	1256	1183
750 kcmil Cu (61)	1046	1155	1354	1435	1553	1617	1522
800 kcmil Cu (37)	1087	1201	1408	1493	1615	1686	1584
1000 kcmil Cu (61)	1241	1373	1609	1708	1846	1925	1812

Table 4 - Ampacities for Non-Standard Aluminum (Polyethylene - Covered) Conductors								
SIZE	CODE NAME	RATING (AMP)						
		SN	SE	S/F N	S/F E	W N	W E	CLPU
#4 ACSR (7/1)	Hickory	140	153	179	188	205	210	198
1/0 AAAC (7)	Oilnut	230	255	299	320	344	357	337
4/0 AAC (7)	Olive	369	409	481	516	554	575	542
336.4 kcmil AAC (19)	Anona	497	553	650	699	749	779	735
397.5 kcmil AAC (19)	Moiles	543	606	714	769	824	857	808
556.5 kcmil AAC (37)	Paw Paw	670	749	883	953	1020	1062	1001

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Table 5 - Ampacities for Non-Standard Copperweld-Copper Conductors							
SIZE	RATING (AMP)						
	SN	SE	S/F N	S/F E	W N	W E	CLPU
8A	103	113	132	139	151	156	147
6A	135	147	173	181	197	204	184
4A	180	196	230	242	263	272	256
2A	239	261	307	323	351	363	342
2/0 F	349	381	448	471	512	530	499
4/0 E	471	516	607	639	695	719	677

Table 6 - Ampacities for Non-Standard Copper (Polyethylene - Covered) Conductors							
SIZE	RATING (AMP)						
	SN	SE	S/F N	S/F E	W N	W E	CLPU
#6 Cu SOL	104	132	134	180	194	201	190
#4 Cu SOL	136	174	178	240	258	267	252
#2 Cu SOL	230	253	296	315	339	351	331
1/0 Cu (7)	306	338	396	424	455	472	445
4/0 Cu (7)	469	520	611	656	703	731	689
500 kcmil Cu (37)	788	882	1038	1121	1199	1249	1178

Table 7 - Ampacities for 2.4kV Insulated Wire				
SIZE	1−3 Conductors in Conduit or Triplexed in Air		Single Conductor in Air	
	Normal	Emergency	Normal	Emergency
#6 Cu	80	90	96	112
#2 Cu	140	165	167	195
1/0 Cu	185	220	222	260
4/0 Cu	290	340	343	400
350 kcmil Cu	395	465	470	575
500 kcmil Cu	485	570	589	688
750 kcmil Cu	600	710	760	889

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3	03/13/18	DT	

This Standard covers stock numbers, ampacities, mechanical properties, and application of Standard Distribution and Sub-transmission conductors.

T2 conductors consist of two (2) Identical conductors twisted together at approximately 9ft intervals. Because of its aerodynamic and mechanical properties, the conductor is resistant to both galloping and aeolian vibration. The values in parentheses next to the conductor size refer to conductor stranding.

Certain T2 conductors (DCS **07 00 01 05**) may be used in 15kV installations to combat galloping if necessary. T2-4/0 is the preferred T2 conductor in 15kV installations should it be required. For T2-336 applications in 15 kV installations, consult with Standards.

Table 1 - Standard T2 Conductors (Bare)

Conductor Size, Type and Stranding	Cond. Code Name	Ameren Stk No.	Overall Dia. (in)	Wire Area (in^2)	Ultimate Strength (lbs)	Cond. Wt. (lbs/ft)	Vert. Wt. Of Cond. +1/2" Ice (lbs/ft)	Horiz. 4Lbs Wind on 1/2" Ice (lbs/ft)	Resultant Wt. + C = 0.30 Heavy Loaded Wt. (lbs/ft)	Common Use
T2-4/0 (6/1) ACSR	T2-Penguin	18 05 241	0.922	0.388	16,700	0.582	1.485	0.641	1.917	Line Wire
T2-336.4 kcmil (18/1) ACSR	T2-Merlin	18 05 243	1.12	0.558	17,360	0.73	1.737	0.706	2.175	Line Wire
T2-556.5 kcmil (19) AAC	T2-Dahlia	18 05 250	1.401	0.874	19,500	1.045	2.265	0.8003	2.702	Line Wire
T2-954 kcmil (45/7) ACSR	T2-Rail	18 05 210	1.907	1.602	51,800	2.15	3.711	0.969	4.136	Line Wire

Overhead current ratings Listed in Table 3 cover T2 conductors used in open overhead construction.
CLPU stands for Cold Load PickUp.
Ratings are based on following:

a) 2ft/s crosswind;
b) Emissivity of 0.5 for bare and 0.91 for covered conductors;
c) Absorptiveness of 0.5 for bare and 0.95 for covered conductors;

Table 2 - Temperatures (°C)

Conductor Type	Normal	Emergency	Ambient	
AAC & AAAC	90	100	Winter	-13
ACSR	90	120	CLPU	0

Table 3 - Ampacities for Standard T2 Conductors

T2 LINE CONDUCTORS	CODE NAME	SN	SE	S/F N	S/F E	W N	W E	CLPU
T2-4/0 (6/1) ACSR	T2-Penguin	535	652	692	767	793	844	804
T2-336.4 kcmil (18/1) ACSR	T2-Merlin	820	1048	1063	1233	1219	1357	1292
T2-556.5 kcmil (19) AAC	T2-Dahlia	1108	1227	1441	1528	1654	1723	1623
T2-954 kcmil (45/7) ACSR	T2-Rail	1587	2054	2070	2419	2381	2664	2538

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Table 4 - Ampacities for Non-Standard Bare Aluminum Conductors								
SIZE	CODE NAME	RATING (AMP)						
		SN	SE	S/F N	S/F E	W N	W E	CLPU
T2-3/0 (or T2-335.6 kcmil) ACSR (6/1)	T2-Pigeon	474	580	613	683	702	751	715
T2-266.8 kcmil ACSR (26/7)	T2-Partridge	720	918	933	1081	1070	1190	1133
T2-477 kcmil ACSR (18/1)	T2-Pelican	1019	1309	1323	1540	1519	1696	1615
T2-477 kcmil ACSR (26/7)	T2-Hawk	1036	1333	1347	1569	1547	1727	1645
T2-477 kcmil ACSR (30/7)	T2-Hen	1046	1346	1360	1585	1562	1744	1662
T2-795 kcmil AAC (37)	T2-Arbutus	1402	1554	1826	1939	2098	2187	2060
T2-3/0 AAAC (7)	T2-Amherst	503	554	649	688	744	774	729

Table 5 - Standard T2 Conductor Material Reference						
Wire Size	Code Name	STK #	Compression Sleeves	Presses (12 Ton Hand or Power Press)	Triangular Yoke Plate	Wye-Clevis - Eye
T2-4/0 (6/1) ACSR	(T2-Penguin)	18 05 241	626	86 03 864	-	-
T2-336.4 kcmil (18/1) ACSR	(T2-Merlin)	18 05 260	254	86 11 139	-	-
		18 05 243			-	-
T2-556.5 kcmil (19) AAC	(T2-Dahlia)	18 05 250	195	86 11 131	-	-
		18 05 262			-	-
T2-954 kcmil (45/7) ACSR	(T2-Rail)	18 05 210	739	TBD	23 67 388	23 58 134

CONSTRUCTION NOTE(s):

1. Automatic splices do not apply to T2 conductors.

2. Conductors are joined by separately splicing each component conductor. Splices should be staggered a minimum of 5 feet apart.

3. Ameren defines a highway as a roadway with 2 or more through lanes in each direction, divided or undivided with partial access control at a minimum.

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Table 6 - Standard T2 Conductor Clamp Reference						
Wire Size	Code Name	Deadend Clamps	Suspension Clamps	Trunnion Clamps	Stirrup Clamp	Hot Line Clamp
T2-4/0 (6/1) ACSR	(T2-Penguin)	23 18 404	23 78 455	23 78 458	17 62 295	17 62 088
T2-336.4 kcmil (18/1) ACSR	(T2-Merlin)	23 18 406	23 78 456	23 78 457	17 62 295	17 62 088
T2-556.5 kcmil (19) AAC	(T2-Dahlia)	23 18 406	17 02 176	23 78 457	17 62 186	17 62 112
T2-954 kcmil (45/7) ACSR	(T2-Rail)	23 18 436	23 78 451	-	17 62 167	17 62 143

Table 7 - Preformed Ties							
Conductor Size	Code Name	Top Tie	Side Tie	Dbl. Top Tie	Dbl. Side Tie	Post Top Tie	Color Code
T2-4/0 (6/1) ACSR	(T2-Penguin)	23 68 344 (C-pin) 23 68 348 (F-neck)	23 68 333 (C-pin) -	23 68 374 (C- and F-neck)	23 68 375 (C- and F-neck)	TBD	TBD
T2-336.4 kcmil (18/1) ACSR	(T2-Merlin)	23 68 349 (F-neck)	23 68 827 (F-neck)	23 68 828 (F-neck)	23 68 829 (F-neck)	TBD	TBD

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This standard covers conduction installation using the sagging method.

Sag tables are divided by ruling span per conductor.

The ruling spans are:

- Super Short =100 ft.
- Short =150 ft.
- Medium =200 ft.
- Long =250 ft.
- Extra Long =300 ft.
- Super Long =350 ft.

All sags given for "Initial Sag" are for stringing of new conductors. For this reason, maximum operating temperature in "Final Sag" tables for All Aluminum Conductor (AAC) is limited to 212° F, and for Aluminum Conductor Steel Reinforced (ACSR) is limited to 248° F.

Sags given for "Final Sag" indicate the maximum sag for a conductor at the particular condition.

The National Electrical Safety Code (NESC) requires that maximum sag (for vertical clearance above ground) be checked at:

- Necessary clearance to structures adjacent to the line:

  a. FINAL: 32° F (0° C) with 0.5" ice, NO wind,OR
  FINAL: 120° F (48.9° C) with 6 psf wind:

  b. Maximum operating design temperature of the line (NO Wind).

- Conductor blowout:

  a. FINAL: 60° F (16° C) FINAL with 6 psf wind.

- Conductor separation during galloping must not be less than the 60 Hz flashover distance at:

  a. FINAL: 32°F (0° C) with 0.5" ice, 2 psf wind.

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Hillside Construcion or Inclined Spans

INSTRUCTION(s):
The sag tables published in the 07 00 07 section of the Distribution Construction Standards are primarily intended for use on level or nearly level terrain where the difference in support elevations of the various spans is relatively minor (Say zero to five foot in most cases, with an occasional maximum difference of 10 ft.).

In hillside construction, care must be taken to prevent conductor uplift on poles, crossarms, etc. This condition may be eliminated by increasing conductor sags, span lengths, raising of the lower support, or relocation of the supports. If none of these remedies are feasible, it may be necessary to deadend the conductors on the lower supports or on both structures.

Normally suspension type insulators should be used with wood cross-arms or fiberglass standoffs on hillside construction rather than clamp type vertical line post insulators because of the limited amount of rotation available in the suspension clamp. Uplift should also be avoided on suspension type strings to prevent insulator curl and radio interference noise. The insulator swing must be checked at:

a) INITIAL: 0° F, 4 psf wind, NO ice, AND
b) FINAL: 60° F, 6 psf wind.

The use of topographical maps, profile plots and conductor sag templates will permit the determination of what will occur throughout the line once the pole elevations and locations are established.

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1/0 AWG (7) AAAC "Azusa"

DE Tension = 1,000 Lbs **RBS = 4,460 Lbs**

Super Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇2◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
15°, 1" ice, 4 psf wind		6	9	12	15	20	24	29	35	41	47	54	1,258
15°, 0.8" ice, 4 psf wind		5	7	10	13	17	21	25	30	35	41	47	1,060
0°, 0.5" ice, 4 psf wind + k		4	6	8	11	14	17	20	24	28	33	38	1,000
0		1	1	1	2	2	3	3	4	4	5	6	647
10		1	1	2	2	3	3	4	4	5	6	7	564
20		1	1	2	2	3	4	4	5	6	7	8	485
30		1	2	2	3	3	4	5	6	7	8	9	410
40		1	2	3	3	4	5	6	7	9	10	12	340
50		2	2	3	4	5	6	8	9	11	12	14	278
60° F, 21 psf wind		5	7	9	12	15	19	23	27	32	37	42	563
60° F, 6 psf wind		3	4	6	7	9	11	14	16	19	22	26	302
60° F, 4 psf wind		2	4	5	6	8	10	12	14	17	20	22	267
60		2	3	4	5	6	8	9	11	13	15	17	225
70		2	3	5	6	8	9	11	14	16	19	21	184
80		3	4	6	7	9	11	14	16	19	22	26	153
90		3	5	7	9	11	13	16	19	23	26	30	131
100		4	5	7	10	12	15	18	22	26	30	34	115

Super Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇2◇						R.S.						
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
-20		1	1	1	1	2	2	3	3	4	4	5	772
0		1	1	2	2	3	3	4	4	5	6	7	554
0°, 0.5" ice, 4 psf wind + k		4	6	8	11	14	17	20	24	28	33	38	1,000
30		2	2	3	4	5	6	8	9	11	13	15	268
32°, 0.5" ice,		4	6	8	11	13	16	20	24	28	32	37	617
32°, 0.5" ice, 2 psf wind		4	6	8	11	14	17	20	24	28	33	38	638
40		2	3	4	5	7	9	10	12	14	17	19	204
50		3	4	5	7	9	11	13	16	18	21	24	162
60		3	5	6	8	10	13	16	19	22	25	29	134
60° F, 6 psf wind		4	5	7	10	12	15	18	22	25	29	34	230
70		4	5	7	10	12	15	18	22	25	29	34	116
80		4	6	8	11	14	17	20	24	29	33	38	103
90		5	7	9	12	15	19	23	27	32	37	42	93
100		5	7	10	13	17	20	25	29	34	40	46	86
120		6	8	11	15	19	23	28	34	40	46	53	75
212		9	12	17	22	28	34	41	49	58	67	77	51

DESIGN NOTE(s):

1. See comments in front of section for conditions including wind and ice.
◇2.◇ Ruling span range is for initial line design between 75' to 124' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

1/0 AWG (7) AAAC "Azusa"

DE Tension = 1,200 Lbs **RBS = 4,460 Lbs**

Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇4◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
15°, 1" ice, 4 psf wind		19	23	28	33	38	43	49	56	62	70	77	1579
15°, 0.8" ice, 4 psf wind		17	20	24	28	33	38	43	48	54	60	67	1315
0°, 0.5" ice, 4 psf wind + k		14	17	20	24	27	32	36	41	45	51	56	1200
0		3	3	4	5	5	6	7	8	9	10	11	649
10		3	4	4	5	6	7	8	9	10	11	12	569
20		4	4	5	6	7	8	9	10	11	13	14	494
30		4	5	6	7	8	9	11	12	13	15	16	424
40		5	6	7	8	9	11	12	14	16	17	19	361
50		6	7	8	10	11	13	15	16	18	21	23	306
60° F, 21 psf wind		15	18	21	25	29	33	38	43	48	53	59	720
60° F, 6 psf wind		9	11	14	16	18	21	24	27	30	34	38	369
60° F, 4 psf wind		8	10	12	14	16	19	21	24	27	30	33	320
60		7	8	10	11	13	15	17	19	22	24	27	261
70		8	9	11	13	15	18	20	23	25	28	31	224
80		9	11	13	15	17	20	23	26	29	32	36	196
90		10	12	14	17	20	23	26	29	32	36	40	174
100		11	13	16	19	22	25	28	32	36	40	44	157

Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇4◇						R.S.						
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
-20		2	3	3	4	5	5	6	7	8	9	10	725
0		3	4	5	6	7	8	9	10	11	12	13	519
0°, 0.5" ice, 4 psf wind + k		14	17	20	24	27	32	36	41	45	51	56	1200
30		6	8	9	11	12	14	16	18	20	23	25	280
32°, 0.5" ice,		13	16	19	22	26	30	34	38	43	48	53	763
32°, 0.5" ice, 2 psf wind		14	16	20	23	27	30	35	39	44	49	54	791
40		8	9	11	13	15	17	19	22	24	27	30	232
50		9	11	13	15	17	20	23	25	29	32	35	198
60		10	12	15	17	20	23	26	29	33	36	40	173
60° F, 6 psf wind		12	14	17	20	23	26	30	34	38	42	47	297
70		11	14	16	19	22	25	29	33	37	41	45	154
80		12	15	18	21	24	28	32	36	40	45	50	140
90		13	16	19	23	26	30	35	39	44	49	54	129
100		15	18	21	25	28	33	37	42	47	52	58	120
120		16	20	24	28	32	37	42	47	53	59	65	106
212		23	28	34	39	46	52	60	67	76	84	93	75

DESIGN NOTE(s):

3. See comments in front of section for conditions including wind and ice.

◇4.◇ Ruling span range is for initial line design between 125' to 174' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

1/0 AWG (7) AAAC "Azusa"

DE Tension = 1,400 Lbs **RBS = 4,460 Lbs**

Medium Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇6◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
15°, 1" ice, 4 psf wind		36	41	47	52	58	65	71	78	86	93	101	1877
15°, 0.8" ice, 4 psf wind		32	36	41	46	51	57	62	69	75	82	89	1558
0°, 0.5" ice, 4 psf wind + k		27	31	35	39	43	48	53	58	64	69	75	1400
0		6	7	7	8	9	10	11	12	13	15	16	680
10		6	7	8	9	10	12	13	14	15	17	18	603
20		7	8	9	11	12	13	14	16	17	19	20	531
30		8	10	11	12	14	15	17	18	20	22	23	464
40		10	11	12	14	16	17	19	21	23	25	27	404
50		11	13	14	16	18	20	22	24	26	29	31	352
60° F, 21 psf wind		27	31	35	39	44	49	54	59	64	70	76	872
60° F, 6 psf wind		18	20	23	25	28	31	35	38	41	45	49	442
60° F, 4 psf wind		16	18	20	22	25	28	31	34	37	40	43	381
60		13	14	16	18	20	23	25	27	30	32	35	308
70		14	16	19	21	23	26	28	31	34	37	40	272
80		16	18	21	23	26	29	32	35	38	41	45	242
90		18	20	23	26	29	32	35	38	42	46	50	219
100		20	22	25	28	32	35	38	42	46	50	55	200

Medium Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇6◇						R.S.						
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
-20		5	6	7	8	9	10	11	12	13	14	15	720
0		7	8	10	11	12	13	15	16	17	19	21	527
0°, 0.5" ice, 4 psf wind + k		27	31	35	39	43	48	53	58	64	69	75	1400
30		12	14	16	18	20	22	24	27	29	32	35	315
32°, 0.5" ice,		25	29	32	36	40	45	49	54	59	64	70	908
32°, 0.5" ice, 2 psf wind		26	29	33	37	41	45	50	55	60	65	71	941
40		14	16	19	21	23	26	28	31	34	37	40	272
50		16	19	21	24	26	29	32	35	39	42	46	239
60		18	21	24	26	29	33	36	39	43	47	51	213
60° F, 6 psf wind		21	24	27	31	34	38	42	46	50	55	59	365
70		20	23	26	29	32	36	40	44	48	52	56	194
80		22	25	28	32	35	39	43	47	52	56	61	178
90		24	27	31	34	38	42	47	51	56	61	66	165
100		25	29	33	37	41	45	50	55	60	65	71	155
120		28	32	36	41	45	50	56	61	67	73	79	138
212		40	45	51	57	64	71	78	86	93	102	110	99

DESIGN NOTE(s):

5. See comments in front of section for conditions including wind and ice.

◇6.◇ Ruling span range is for initial line design between 175' to 224' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

1/0 AWG (7) AAAC "Azusa"

DE Tension = 1,650 Lbs **RBS = 4,460 Lbs**

Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (in)											Tension Lbs
	R.S. Range ◇8◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
15º, 1" ice, 4 psf wind		55	61	67	73	80	86	93	101	108	116	124	2201
15º, 0.8" ice, 4 psf wind		48	53	58	63	69	75	81	87	94	101	108	1839
0º, 0.5" ice, 4 psf wind + k		41	45	49	54	59	64	69	74	80	86	92	1650
0		8	9	10	11	12	13	14	15	16	18	19	831
10		9	10	11	12	13	15	16	17	18	20	21	751
20		10	11	12	14	15	16	17	19	20	22	23	674
30		12	13	14	15	17	18	20	21	23	24	26	601
40		13	14	16	17	19	20	22	24	26	27	29	534
50		15	16	18	20	21	23	25	27	29	31	33	473
60º F, 21 psf wind		40	44	48	53	57	62	67	73	78	84	90	1064
60º F, 6 psf wind		24	27	29	32	35	38	41	44	48	51	55	567
60º F, 4 psf wind		21	23	26	28	31	33	36	39	42	45	48	499
60		17	18	20	22	24	26	28	30	33	35	37	419
70		19	21	23	25	27	29	32	34	37	39	42	372
80		21	23	25	28	30	33	35	38	41	44	47	333
90		23	26	28	31	33	36	39	42	45	49	52	300
100		26	28	31	34	37	40	43	47	50	54	58	273

Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇8◇						R.S.						
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
-20		8	9	10	11	12	13	14	15	16	17	18	856
0		11	12	13	14	15	17	18	19	21	22	24	659
0°, 0.5" ice, 4 psf wind + k		41	45	49	54	59	64	69	74	80	86	92	1650
30		17	18	20	22	24	26	28	30	32	35	37	422
32°, 0.5" ice,		37	41	45	49	53	58	62	67	72	78	83	1097
32°, 0.5" ice, 2 psf wind		38	42	46	50	54	59	64	69	74	79	85	1136
40		19	21	23	25	27	30	32	35	37	40	43	366
50		22	24	26	29	31	34	37	39	42	46	49	321
60		24	27	29	32	35	38	41	44	48	51	55	286
60° F, 6 psf wind		30	33	36	39	43	46	50	54	58	62	67	468
70		27	30	33	36	39	42	46	49	53	57	61	259
80		29	32	36	39	42	46	50	54	58	62	66	237
90		32	35	39	42	46	50	54	58	62	67	72	219
100		34	38	41	45	49	53	58	62	67	72	77	204
120		39	43	47	51	56	60	65	70	76	81	87	181
212		55	61	67	73	79	86	93	100	108	116	124	127

DESIGN NOTE(s):

7. See comments in front of section for conditions including wind and ice.

◇8.◇ Ruling span range is for initial line design between 225' to 274' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

1/0 AWG (7) AAAC "Azusa"

DE Tension = 1,850 Lbs **RBS = 4,460 Lbs**

Extra Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇10◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
15º, 1" ice, 4 psf wind		77	83	90	96	103	111	118	126	134	142	151	2470
15º, 0.8" ice, 4 psf wind		67	72	78	84	90	96	103	109	116	123	131	2070
0º, 0.5" ice, 4 psf wind + k		57	61	66	71	76	82	87	93	99	105	111	1850
0		12	13	14	15	16	17	18	20	21	22	23	916
10		13	14	15	16	17	19	20	21	23	24	25	835
20		14	16	17	18	19	21	22	23	25	27	28	757
30		16	17	19	20	21	23	24	26	28	29	31	683
40		18	19	21	22	24	25	27	29	31	33	35	615
50		20	21	23	25	27	28	30	32	34	37	39	551
60º F, 21 psf wind		54	59	63	68	73	78	84	89	95	100	106	1221
60º F, 6 psf wind		33	35	38	41	44	47	50	54	57	61	64	660
60º F, 4 psf wind		28	31	33	36	38	41	44	46	49	52	56	583
60		22	24	26	28	30	32	34	36	38	41	43	494
70		25	26	29	31	33	35	38	40	43	45	48	444
80		27	29	32	34	37	39	42	45	47	50	53	400
90		30	32	35	38	40	43	46	49	52	55	59	363
100		33	36	38	41	44	47	50	54	57	61	64	332

Extra Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇10◇						R.S.						
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
-20		12	13	14	15	16	17	18	20	21	22	23	912
0		15	16	18	19	20	22	23	25	26	28	30	719
0°, 0.5" ice, 4 psf wind + k		57	61	66	71	76	82	87	93	99	105	111	1850
30		23	24	26	28	30	32	35	37	39	42	44	484
32°, 0.5" ice,		51	55	59	64	68	73	78	83	89	94	100	1245
32°, 0.5" ice, 2 psf wind		52	56	61	65	70	75	80	85	91	96	102	1289
40		26	28	30	32	34	37	39	42	45	47	50	426
50		29	31	34	36	39	41	44	47	50	53	56	378
60		32	35	37	40	43	46	49	52	56	59	63	340
60° F, 6 psf wind		40	43	46	50	53	57	61	65	69	73	78	545
70		35	38	41	44	47	51	54	58	61	65	69	309
80		38	42	45	48	52	55	59	63	67	71	75	283
90		42	45	48	52	56	60	64	68	72	77	81	262
100		44	48	52	56	60	64	68	73	77	82	87	245
120		50	54	58	63	67	72	77	82	87	92	98	218
212		71	77	83	90	96	103	110	117	124	132	140	153

DESIGN NOTE(s):

9. See comments in front of section for conditions including wind and ice.

◇10◇ Ruling span range is for initial line design between 275' to 324' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

1/0 AWG (7) AAAC "Azusa"

DE Tension = 2,200 Lbs **RBS = 4,460 Lbs**

Super Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇12◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
15º, 1" ice, 4 psf wind		96	103	110	117	124	131	139	147	155	163	171	2841
15º, 0.8" ice, 4 psf wind		82	87	93	99	105	111	118	125	131	138	146	2426
0º, 0.5" ice, 4 psf wind + k		69	74	78	83	88	94	99	105	110	116	122	2200
0		12	13	14	15	15	16	17	18	19	20	21	1309
10		13	14	15	15	16	17	18	19	21	22	23	1222
20		14	15	16	17	18	19	20	21	22	23	24	1136
30		15	16	17	18	19	20	21	23	24	25	26	1051
40		16	17	18	20	21	22	23	25	26	27	29	968
50		18	19	20	21	23	24	25	27	28	30	31	888
60º F, 21 psf wind		63	67	71	76	81	85	90	95	101	106	112	1521
60º F, 6 psf wind		33	35	37	40	42	45	47	50	53	55	58	948
60º F, 4 psf wind		27	29	31	33	35	37	39	41	43	46	48	880
60		19	21	22	23	25	26	28	29	31	33	34	811
70		21	23	24	26	27	29	31	32	34	36	38	738
80		23	25	27	28	30	32	34	36	38	40	42	669
90		26	28	29	31	33	35	37	39	41	44	46	606
100		29	31	33	35	37	39	41	43	46	48	51	548

Super Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇12◇						R.S.						
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
-20		12	13	14	15	16	17	18	19	20	21	22	1291
0		14	15	16	17	19	20	21	22	23	24	26	1080
0°, 0.5" ice, 4 psf wind + k		69	74	78	83	88	94	99	105	110	116	122	2200
30		20	21	23	24	26	27	29	30	32	34	35	787
32°, 0.5" ice,		59	63	68	72	76	81	85	90	95	100	105	1537
32°, 0.5" ice, 2 psf wind		61	65	69	74	78	83	88	93	98	103	108	1584
40		22	24	25	27	29	30	32	34	36	38	40	700
50		25	27	29	31	32	34	36	38	40	43	45	620
60		28	30	32	34	37	39	41	43	46	48	51	550
60° F, 6 psf wind		41	44	46	49	52	56	59	62	65	69	73	762
70		32	34	36	39	41	44	46	49	51	54	57	490
80		36	38	41	43	46	49	51	54	57	60	63	439
90		39	42	45	48	51	54	57	60	63	67	70	396
100		43	46	49	52	56	59	62	66	70	73	77	362
120		51	54	58	61	65	69	73	77	81	86	90	309
212		80	85	91	96	102	108	115	121	128	135	142	197

DESIGN NOTE(s):

11. See comments in front of section for conditions including wind and ice.

◇12◇ Ruling span range is for initial line design between 325' to 374' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

110.8 kcmil (12/7) ACSR "Minorca"

DE Tension = 1,000 Lbs **RBS = 11,300 Lbs**

Super Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇14◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
15º, 1" ice, 4 psf wind		6	9	12	15	19	24	29	35	41	47	54	1423
15º, 0.8" ice, 4 psf wind		6	8	11	14	18	22	27	32	38	44	50	1143
0º, 0.5" ice, 4 psf wind + k		5	7	10	13	16	20	24	29	33	39	45	1000
0		3	5	7	9	11	14	17	20	23	27	31	301
10		4	5	7	10	12	15	18	22	26	30	34	275
20		4	6	8	11	13	16	20	24	28	32	37	254
30		4	6	9	11	14	18	21	25	30	35	40	237
40		5	7	9	12	15	19	23	27	32	37	42	222
50		5	7	10	13	16	20	24	29	33	39	45	210
60º F, 21 psf wind		6	8	11	15	19	23	28	34	39	46	52	572
60º F, 6 psf wind		5	8	10	14	17	21	26	31	36	42	48	259
60º F, 4 psf wind		5	8	10	13	17	21	25	30	35	41	47	228
60		5	8	10	13	17	21	25	30	35	41	47	200
70		5	8	11	14	18	22	26	31	37	43	49	191
80		6	8	11	15	18	23	27	33	38	44	51	184
90		6	8	11	15	19	23	28	34	40	46	53	178
100		6	9	12	15	19	24	29	35	41	47	54	173

Super Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇14◇						R.S.						
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
-20		3	4	6	7	9	11	14	16	19	22	26	363
0		4	5	7	9	12	14	17	21	24	28	32	290
0°, 0.5" ice, 4 psf wind + k		5	7	10	13	16	20	24	29	33	39	45	1000
30		5	7	9	12	15	18	22	26	31	36	41	229
32°, 0.5" ice,		5	8	10	13	17	21	25	30	35	41	47	633
32°, 0.5" ice, 2 psf wind		5	8	10	14	17	21	26	30	36	41	48	653
40		5	7	9	12	16	19	23	28	33	38	43	216
50		5	7	10	13	17	20	25	29	34	40	46	204
60		5	8	10	14	17	21	26	31	36	42	48	195
60° F, 6 psf wind		5	8	11	14	18	22	26	31	37	43	49	253
70		6	8	11	14	18	22	27	32	37	43	50	189
80		6	8	11	15	18	23	28	33	39	45	51	183
90		6	8	12	15	19	24	28	34	40	46	53	177
100		6	9	12	15	20	24	29	35	41	47	54	172
120		6	9	12	16	21	25	31	37	43	50	57	163
248		8	12	16	21	27	33	40	47	56	64	74	127

DESIGN NOTE(s):

13. See comments in front of section for conditions including wind and ice.

◇14◇ Ruling span range is for initial line design between 75' to 124' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

110.8 kcmil (12/7) ACSR "Minorca"

DE Tension = 1,500 Lbs **RBS = 11,300 Lbs**

Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇16◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
15º, 1" ice, 4 psf wind		17	20	24	28	32	37	42	48	54	60	66	2064
15º, 0.8" ice, 4 psf wind		15	18	22	26	30	34	39	44	49	54	60	1693
0º, 0.5" ice, 4 psf wind + k		13	16	19	22	26	30	34	38	43	48	53	1500
0		7	9	11	13	15	17	19	21	24	27	30	559
10		8	10	12	14	16	19	21	24	27	30	33	502
20		9	11	13	15	18	21	23	26	30	33	36	457
30		10	12	14	17	19	22	25	29	32	36	40	419
40		11	13	15	18	21	24	27	31	35	39	43	388
50		11	14	17	19	22	26	29	33	37	41	46	363
60º F, 21 psf wind		15	18	21	25	29	33	38	43	48	54	59	899
60º F, 6 psf wind		13	15	18	21	25	29	32	37	41	46	51	434
60º F, 4 psf wind		12	15	18	21	24	28	32	36	40	45	50	386
60		12	15	18	21	24	27	31	35	40	44	49	341
70		13	16	19	22	25	29	33	37	42	47	52	322
80		14	16	20	23	27	31	35	39	44	49	54	306
90		14	17	20	24	28	32	36	41	46	51	57	293
100		15	18	21	25	29	33	38	42	48	53	59	284

Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇16◇						R.S.						
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
-20		6	7	9	10	12	14	16	18	20	22	24	682
0		8	9	11	13	15	18	20	23	25	28	31	532
0°,0.5" ice, 4 psf wind + k		13	16	19	22	26	30	34	38	43	48	53	1500
30		10	13	15	18	20	23	27	30	34	38	42	400
32°, 0.5" ice,		13	16	19	23	26	30	34	39	44	49	54	991
32°, 0.5" ice, 2 psf wind		14	16	20	23	27	30	35	39	44	49	54	1020
40		11	14	16	19	22	25	29	32	36	40	45	372
50		12	14	17	20	23	27	31	35	39	43	48	348
60		13	15	18	21	25	29	32	37	41	46	51	327
60° F, 6 psf wind		13	16	19	22	26	30	34	38	43	47	52	420
70		13	16	19	23	26	30	34	39	43	48	53	312
80		14	17	20	23	27	31	35	40	45	50	55	301
90		14	17	21	24	28	32	37	41	46	52	57	291
100		15	18	21	25	29	33	38	43	48	53	59	282
120		16	19	23	26	31	35	40	45	51	57	63	265
248		21	25	30	35	41	47	53	60	67	75	83	201

DESIGN NOTE(s):

15. See comments in front of section for conditions including wind and ice.

◇16◇ Ruling span range is for initial line design between 125' to 174' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

110.8 kcmil (12/7) ACSR "Minorca"

DE Tension = 2,000 Lbs **RBS = 11,300 Lbs**

Medium Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇18◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
15º, 1" ice, 4 psf wind		29	33	37	41	46	51	56	62	68	74	80	2677
15º, 0.8" ice, 4 psf wind		26	29	33	37	41	46	50	55	60	66	71	2232
0º, 0.5" ice, 4 psf wind + k		22	25	29	32	36	39	44	48	52	57	62	2000
0		10	12	13	15	16	18	20	22	24	26	29	912
10		11	13	15	16	18	20	22	25	27	29	32	820
20		13	14	16	18	20	22	25	27	30	32	35	741
30		14	16	18	20	22	25	27	30	33	36	39	674
40		15	17	20	22	24	27	30	33	36	39	42	617
50		16	19	21	24	26	29	32	35	39	42	46	569
60º F, 21 psf wind		24	27	31	34	38	42	47	51	56	61	66	1253
60º F, 6 psf wind		19	22	24	27	30	34	37	41	44	48	53	654
60º F, 4 psf wind		18	21	23	26	29	33	36	39	43	47	51	590
60		18	20	23	25	28	31	35	38	42	45	49	529
70		19	22	24	27	30	34	37	41	44	48	53	495
80		20	23	26	29	32	36	39	43	47	51	56	465
90		21	24	27	31	34	38	42	46	50	54	59	440
100		22	25	29	32	36	40	44	48	53	57	62	418

Medium Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇18◇						R.S.						
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
-20		9	10	11	12	14	15	17	19	20	22	24	1086
0		11	12	14	16	17	19	21	23	26	28	30	861
0°, 0.5" ice, 4 psf wind + k		22	25	29	32	36	39	44	48	52	57	62	2000
30		15	17	19	21	24	26	29	32	35	38	41	632
32°, 0.5" ice,		22	25	28	31	35	39	43	47	51	56	61	1374
32º, 0.5" ice, 2 psf wind		22	25	28	32	35	39	43	47	52	57	61	1410
40		16	18	21	23	26	29	32	35	38	41	45	580
50		17	20	22	25	28	31	34	38	41	45	49	536
60		19	21	24	27	30	33	37	40	44	48	52	499
60º F, 6 psf wind		20	23	25	29	32	35	39	43	47	51	55	625
70		20	23	26	29	32	36	39	43	47	51	56	468
80		21	24	27	30	34	37	41	45	49	54	58	447
90		22	25	28	31	35	39	43	47	51	56	60	430
100		23	26	29	32	36	40	44	48	53	58	63	415
120		24	27	31	35	39	43	47	52	57	62	67	387
248		33	38	42	48	53	59	65	71	78	85	92	284

DESIGN NOTE(s):

17. See comments in front of section for conditions including wind and ice.

◇18◇ Ruling span range is for initial line design between 175' to 224' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

110.8 kcmil (12/7) ACSR "Minorca"

DE Tension = 2,500 Lbs **RBS = 11,300 Lbs**

Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇20◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
15º, 1" ice, 4 psf wind		42	46	51	55	60	65	71	76	82	88	94	3266
15º, 0.8" ice, 4 psf wind		37	41	45	49	53	58	62	67	72	78	83	2764
0º, 0.5" ice, 4 psf wind + k		32	35	38	42	45	49	53	58	62	66	71	2500
0		12	14	15	16	18	19	21	23	24	26	28	1343
10		14	15	16	18	20	21	23	25	27	29	31	1225
20		15	16	18	20	21	23	25	27	29	31	34	1116
30		16	18	20	22	24	26	28	30	32	34	37	1017
40		18	20	22	24	26	28	30	33	35	38	40	929
50		20	22	24	26	28	30	33	36	38	41	44	851
60º F, 21 psf wind		32	36	39	43	47	51	55	59	64	68	73	1637
60º F, 6 psf wind		24	26	29	31	34	37	40	43	46	50	53	933
60º F, 4 psf wind		22	25	27	30	32	35	38	41	44	47	50	858
60		21	23	26	28	31	33	36	39	42	45	48	784
70		23	25	28	30	33	36	39	42	45	48	51	727
80		25	27	30	33	35	38	42	45	48	52	55	677
90		26	29	32	35	38	41	44	48	51	55	59	634
100		28	31	34	37	40	44	47	51	55	59	63	597

Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇20◇						R.S.						
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
-20		11	12	13	14	16	17	18	20	21	23	24	1536
0		13	14	16	17	19	21	22	24	26	28	30	1264
0°, 0.5" ice, 4 psf wind + k		32	35	38	42	45	49	53	58	62	66	71	2500
30		18	20	21	23	26	28	30	32	35	37	40	939
32°, 0.5" ice,		30	33	36	40	43	47	51	55	59	63	67	1778
32°, 0.5" ice, 2 psf wind		30	34	37	40	44	48	51	55	60	64	68	1819
40		19	21	24	26	28	30	33	35	38	41	44	856
50		21	23	26	28	31	33	36	39	42	45	48	785
60		23	25	28	30	33	36	39	42	45	48	52	724
60° F, 6 psf wind		25	28	30	33	36	39	42	46	49	53	57	878
70		25	27	30	33	36	39	42	45	48	52	56	672
80		26	29	32	35	38	41	45	48	52	56	60	628
90		28	30	33	37	40	43	47	50	54	58	62	602
100		29	32	35	38	41	45	49	52	56	61	65	578
120		31	34	38	41	45	48	52	57	61	65	70	536
248		44	49	53	58	63	69	74	80	86	93	99	379

DESIGN NOTE(s):

19. See comments in front of section for conditions including wind and ice.

◇20◇ Ruling span range is for initial line design between 225' to 274' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

110.8 kcmil (12/7) ACSR "Minorca"

DE Tension = 3,000 Lbs **RBS = 11,300 Lbs**

Extra Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇22◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
15º, 1" ice, 4 psf wind		56	60	65	70	75	80	86	91	97	103	109	3834
15º, 0.8" ice, 4 psf wind		49	52	57	61	65	70	75	79	85	90	95	3289
0º, 0.5" ice, 4 psf wind + k		41	45	48	52	55	59	63	67	72	76	81	3000
0		14	15	17	18	19	21	22	23	25	26	28	1825
10		15	17	18	19	21	22	24	25	27	28	30	1693
20		17	18	19	21	22	24	25	27	29	31	33	1565
30		18	19	21	23	24	26	28	29	31	33	35	1444
40		20	21	23	25	26	28	30	32	34	36	38	1329
50		21	23	25	27	29	31	33	35	37	39	42	1223
60º F, 21 psf wind		41	44	47	51	55	58	62	66	71	75	80	2050
60º F, 6 psf wind		27	29	31	34	36	39	41	44	47	50	53	1283
60º F, 4 psf wind		25	27	29	31	34	36	38	41	44	46	49	1203
60		23	25	27	29	31	33	35	38	40	43	45	1127
70		25	27	29	31	34	36	38	41	44	46	49	1040
80		27	29	31	34	36	39	42	44	47	50	53	963
90		29	31	34	36	39	42	45	48	51	54	57	896
100		31	34	36	39	42	45	48	51	54	57	61	836

Extra Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇22◇						R.S.						
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
-20		13	14	15	16	17	19	20	21	23	24	25	2009
0		15	16	18	19	20	22	23	25	26	28	30	1708
0°, 0.5" ice, 4 psf wind + k		41	45	48	52	55	59	63	67	72	76	81	3000
30		20	21	23	25	27	28	30	32	34	37	39	1314
32°, 0.5" ice,		38	41	44	47	51	54	58	62	66	70	74	2199
32°, 0.5" ice, 2 psf wind		39	42	45	48	52	55	59	63	67	71	75	2244
40		22	23	25	27	29	31	33	35	38	40	42	1203
50		24	26	28	30	32	34	36	39	41	44	46	1103
60		26	28	30	32	34	37	39	42	45	47	50	1014
60° F, 6 psf wind		29	31	34	36	39	42	45	48	51	54	57	1183
70		28	30	32	35	37	40	43	45	48	51	54	936
80		30	32	35	38	40	43	46	49	52	55	59	869
90		32	35	37	40	43	46	49	52	56	59	63	815
100		33	36	39	42	45	48	51	54	58	61	65	781
120		36	39	42	45	49	52	55	59	63	67	71	720
248		53	58	62	67	72	77	82	87	93	98	104	489

DESIGN NOTE(s):

21. See comments in front of section for conditions including wind and ice.

◇22◇ Ruling span range is for initial line design between 275' to 324' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

110.8 kcmil (12/7) ACSR "Minorca"

DE Tension = 3,250 Lbs **RBS = 11,300 Lbs**

Super Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇24◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
15º, 1" ice, 4 psf wind		74	79	84	89	94	100	106	112	118	124	131	4184
15º, 0.8" ice, 4 psf wind		64	68	73	78	82	87	92	97	103	108	114	3586
0º, 0.5" ice, 4 psf wind + k		55	58	62	66	70	74	79	83	88	92	97	3250
0		20	21	22	24	25	27	28	30	31	33	35	1914
10		21	22	24	25	27	28	30	32	34	35	37	1787
20		22	24	26	27	29	31	32	34	36	38	40	1663
30		24	26	28	29	31	33	35	37	39	41	43	1545
40		26	28	30	32	34	36	38	40	42	44	46	1434
50		28	30	32	34	36	38	40	43	45	48	50	1331
60º F, 21 psf wind		53	57	60	64	68	72	76	81	85	90	94	2262
60º F, 6 psf wind		35	38	40	43	45	48	51	54	56	59	63	1410
60º F, 4 psf wind		33	35	37	40	42	45	47	50	52	55	58	1321
60		30	32	34	37	39	41	44	46	49	51	54	1236
70		33	35	37	39	42	44	47	49	52	55	58	1150
80		35	37	40	42	45	48	50	53	56	59	62	1073
90		37	40	42	45	48	51	54	57	60	63	66	1004
100		40	42	45	48	51	54	57	60	64	67	71	943

Super Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇24◇						R.S.						
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
-20		18	19	21	22	23	25	26	28	29	31	32	2062
0		21	22	24	25	27	29	30	32	34	36	37	1773
0°, 0.5" ice, 4 psf wind + k		55	58	62	66	70	74	79	83	88	92	97	3250
30		27	29	30	32	34	36	39	41	43	45	48	1396
32°, 0.5" ice,		50	53	57	60	64	68	72	76	80	84	89	2396
32°, 0.5" ice, 2 psf wind		51	54	58	62	65	69	73	77	82	86	90	2446
40		29	31	33	35	37	39	42	44	47	49	52	1290
50		31	34	36	38	40	43	45	48	50	53	56	1193
60		34	36	38	41	43	46	49	51	54	57	60	1107
60° F, 6 psf wind		38	41	44	46	49	52	55	58	61	65	68	1295
70		36	39	41	44	47	49	52	55	58	61	65	1031
80		39	42	44	47	50	53	56	59	62	66	69	963
90		41	44	47	50	53	56	59	63	66	70	73	908
100		43	46	49	52	55	58	62	65	69	72	76	874
120		46	49	52	56	59	63	66	70	74	78	82	811
248		66	71	76	80	85	90	96	101	107	112	118	564

DESIGN NOTE(s):

23. See comments in front of section for conditions including wind and ice.

◇24◇ Ruling span range is for initial line design between 325' to 374' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

336.4 kcmil (18/1) ACSR "Merlin"

DE Tension = 1,300 Lbs **RBS = 8,680 Lbs**

Super Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇26◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
15º, 1" ice, 4 psf wind		6	8	11	15	18	23	27	33	38	44	51	1737
15º, 0.8" ice, 4 psf wind		5	8	10	13	17	21	25	30	35	41	47	1427
0º, 0.5" ice, 4 psf wind + k		4	6	9	11	14	18	21	26	30	35	40	1300
0		3	4	6	7	9	12	14	17	19	23	26	473
10		3	5	7	9	11	14	16	20	23	27	31	404
20		4	6	8	10	13	15	19	22	26	30	35	355
30		4	6	8	11	14	17	21	25	29	34	39	319
40		5	7	9	12	15	19	23	27	32	37	42	291
50		5	7	10	13	17	20	25	29	34	40	46	269
60º F, 21 psf wind		6	9	12	15	20	24	29	35	41	47	54	778
60º F, 6 psf wind		6	8	11	14	18	22	27	32	38	44	50	338
60º F, 4 psf wind		5	8	11	14	18	22	27	32	37	43	49	294
60		5	8	11	14	18	22	26	31	37	43	49	251
70		6	8	11	15	19	23	28	33	39	45	52	237
80		6	9	12	16	20	24	30	35	41	48	55	224
90		6	9	13	16	21	26	31	37	43	50	58	213
100		7	10	13	17	22	27	33	39	45	53	60	204

Super Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇26◇						R.S.						
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
-20		2	3	4	5	7	8	10	12	14	16	19	652
0		3	5	6	8	10	13	15	18	21	25	28	435
0°, 0.5" ice, 4 psf wind + k		5	7	9	12	15	18	22	26	31	36	41	1277
30		5	7	9	12	15	18	22	26	31	36	41	303
32°, 0.5" ice,		5	8	10	13	17	21	25	30	35	41	47	792
32°, 0.5" ice, 2 psf wind		5	8	10	13	17	21	25	30	35	41	47	813
40		5	7	10	13	16	20	24	28	33	39	44	279
50		5	8	10	14	17	21	26	30	36	41	48	259
60		6	8	11	14	18	23	27	32	38	44	51	243
60° F, 6 psf wind		6	8	11	15	19	23	28	33	39	45	52	328
70		6	9	12	15	19	24	29	34	40	47	54	230
80		6	9	12	16	20	25	30	36	42	49	56	218
90		7	9	13	17	21	26	32	38	44	52	59	208
100		7	10	13	18	22	27	33	40	46	54	62	200
120		7	10	14	19	24	29	35	42	49	57	65	189
248		9	13	17	23	28	35	43	51	59	69	79	156

DESIGN NOTE(s):

25. See comments in front of section for conditions including wind and ice.

◇26◇ Ruling span range is for initial line design between 75' to 124' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

336.4 kcmil (18/1) ACSR "Merlin"

DE Tension = 1,800 Lbs **RBS = 8,680 Lbs**

Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇28◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
15º, 1" ice, 4 psf wind		16	20	24	28	32	37	42	48	53	59	66	2386
15º, 0.8" ice, 4 psf wind		15	18	22	25	29	34	39	43	49	54	60	1988
0º, 0.5" ice, 4 psf wind + k		13	15	18	22	25	29	33	37	41	46	51	1800
0		7	9	11	13	15	17	19	22	24	27	30	732
10		9	10	12	15	17	19	22	25	28	31	35	632
20		10	12	14	17	19	22	25	28	32	35	39	557
30		11	13	16	18	21	25	28	32	35	39	44	500
40		12	15	17	20	24	27	31	35	39	43	48	456
50		13	16	19	22	26	29	33	38	42	47	52	420
60º F, 21 psf wind		16	20	24	28	32	37	42	47	53	59	65	1150
60º F, 6 psf wind		14	17	21	24	28	32	37	42	47	52	58	521
60º F, 4 psf wind		14	17	20	24	28	32	36	41	46	51	57	455
60		14	17	20	24	27	32	36	41	45	51	56	392
70		15	18	22	25	29	34	38	43	48	54	60	368
80		16	19	23	27	31	36	40	46	51	57	63	347
90		17	20	24	28	33	37	43	48	54	60	67	330
100		17	21	25	29	34	39	45	50	57	63	70	315

Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇28◇						R.S.						
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
-20		6	7	9	10	12	14	16	18	20	22	25	893
0		9	10	12	14	17	19	22	25	28	31	34	642
0°, 0.5" ice, 4 psf wind + k		13	16	19	22	26	29	33	38	42	47	52	1767
30		12	14	17	20	23	27	31	35	39	43	48	460
32°, 0.5" ice,		14	17	21	24	28	32	37	42	47	52	58	1148
32°, 0.5" ice, 2 psf wind		15	18	21	25	28	33	37	42	47	52	58	1177
40		13	16	19	22	25	29	33	37	42	47	52	424
50		14	17	20	24	27	31	36	40	45	50	56	394
60		15	18	21	25	29	33	38	43	48	54	59	370
60° F, 6 psf wind		15	18	22	26	30	34	39	44	49	55	61	495
70		16	19	23	26	31	35	40	45	51	57	63	349
80		17	20	24	28	32	37	42	48	54	60	66	332
90		17	21	25	29	34	39	44	50	56	63	69	316
100		18	22	26	31	35	41	46	52	59	65	72	303
120		20	24	28	33	38	44	50	57	63	71	78	281
248		24	29	34	40	47	54	61	69	77	86	96	230

DESIGN NOTE(s):

27. See comments in front of section for conditions including wind and ice.

◇28◇ Ruling span range is for initial line design between 125' to 174' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

336.4 kcmil (18/1) ACSR "Merlin"

DE Tension = 2,300 Lbs **RBS = 8,680 Lbs**

Medium Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇30◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
15º, 1" ice, 4 psf wind		29	34	38	42	47	52	58	63	69	76	82	3002
15º, 0.8" ice, 4 psf wind		27	30	34	38	43	47	52	57	63	68	74	2535
0º, 0.5" ice, 4 psf wind + k		23	26	29	32	36	40	44	48	53	58	63	2300
0		12	13	15	17	19	21	23	25	27	30	32	1064
10		13	15	17	19	21	24	26	29	31	34	37	926
20		15	17	19	22	24	27	30	33	36	39	42	816
30		17	19	22	24	27	30	33	36	40	43	47	729
40		19	21	24	27	30	33	37	40	44	48	52	660
50		20	23	26	29	33	36	40	44	48	52	57	605
60º F, 21 psf wind		27	31	35	40	44	49	54	59	65	70	76	1540
60º F, 6 psf wind		23	26	30	33	37	41	45	50	54	59	64	734
60º F, 4 psf wind		23	26	29	32	36	40	44	48	53	58	63	646
60		22	25	28	32	35	39	43	47	52	56	61	560
70		24	27	30	34	38	42	46	51	56	60	66	523
80		25	29	32	36	40	45	49	54	59	64	70	491
90		27	30	34	38	43	47	52	57	62	68	74	465
100		28	32	36	40	45	50	55	60	66	72	78	442

Medium Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇30◇						R.S.						
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
-20		10	12	13	15	16	18	20	22	24	26	28	1210
0		14	16	18	20	22	24	27	29	32	35	38	898
0°, 0.5" ice, 4 psf wind + k		23	26	29	33	37	41	45	49	54	59	64	2262
30		19	22	25	28	31	34	38	41	45	49	53	643
32°, 0.5" ice,		25	28	31	35	39	44	48	53	58	63	68	1518
32°, 0.5" ice, 2 psf wind		25	28	32	36	40	44	48	53	58	63	69	1555
40		21	24	27	30	33	37	41	45	49	53	58	590
50		22	26	29	32	36	40	44	48	53	58	62	548
60		24	27	31	35	39	43	47	52	56	62	67	513
60° F, 6 psf wind		25	28	32	36	40	44	49	54	59	64	69	679
70		26	29	33	37	41	45	50	55	60	65	71	483
80		27	31	35	39	43	48	53	58	63	69	75	457
90		28	32	36	41	45	50	56	61	67	73	79	435
100		30	34	38	43	48	53	58	64	70	76	82	416
120		32	37	41	46	52	57	63	69	76	82	89	384
248		41	46	52	58	65	72	79	87	95	104	113	305

DESIGN NOTE(s):

29. See comments in front of section for conditions including wind and ice.

◇30◇ Ruling span range is for initial line design between 175' to 224' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

336.4 kcmil (18/1) ACSR "Merlin"

DE Tension = 2,800 Lbs **RBS = 8,680 Lbs**

Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇32◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
15º, 1" ice, 4 psf wind		44	48	53	58	63	68	74	80	86	92	98	3592
15º, 0.8" ice, 4 psf wind		39	43	47	52	56	61	66	71	76	82	88	3071
0º, 0.5" ice, 4 psf wind + k		33	36	40	44	47	51	56	60	65	69	74	2800
0		15	16	18	20	21	23	25	27	29	31	34	1470
10		17	19	20	22	24	26	29	31	33	36	38	1299
20		19	21	23	25	27	30	32	35	37	40	43	1151
30		21	24	26	28	31	33	36	39	42	45	48	1027
40		24	26	29	31	34	37	40	43	47	50	53	924
50		26	29	32	35	38	41	44	48	51	55	59	840
60º F, 21 psf wind		39	43	47	51	56	60	65	70	76	81	87	1950
60º F, 6 psf wind		30	34	37	40	44	48	51	55	60	64	68	988
60º F, 4 psf wind		29	32	36	39	42	46	50	54	58	62	66	879
60		28	31	34	38	41	44	48	52	56	60	64	772
70		31	34	37	41	44	48	52	56	60	64	69	715
80		33	36	40	43	47	51	56	60	64	69	74	667
90		35	39	42	46	50	55	59	64	68	73	79	627
100		37	41	45	49	53	58	63	67	73	78	83	593

Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇32◇						R.S.						
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
-20		14	15	17	18	20	22	23	25	27	29	31	1582
0		18	20	22	24	26	28	31	33	36	38	41	1205
0°, 0.5" ice, 4 psf wind + k		33	37	40	44	48	52	56	61	65	70	75	2766
30		25	28	31	34	37	40	43	46	50	54	57	860
32°, 0.5" ice,		35	38	42	46	50	54	59	63	68	73	78	1905
32°, 0.5" ice, 2 psf wind		35	39	42	46	50	55	59	64	69	74	79	1949
40		28	31	34	37	40	44	47	51	55	59	63	787
50		30	33	37	40	43	47	51	55	59	63	68	727
60		32	36	39	43	47	51	55	59	64	68	73	677
60° F, 6 psf wind		34	37	41	45	49	53	57	62	67	71	76	885
70		35	38	42	46	50	54	58	63	68	73	78	635
80		37	40	44	48	53	57	62	67	72	77	82	600
90		39	43	47	51	56	60	65	70	76	81	87	569
100		40	45	49	54	58	63	68	74	79	85	91	542
120		44	49	53	58	63	69	75	80	86	93	99	498
248		57	63	70	76	83	90	97	105	113	121	129	382

DESIGN NOTE(s):

31. See comments in front of section for conditions including wind and ice.

◇32◇ Ruling span range is for initial line design between 225' to 274' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

336.4 kcmil (18/1) ACSR "Merlin"

DE Tension = 3,300 Lbs **RBS = 8,680 Lbs**

Extra Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇34◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
15º, 1" ice, 4 psf wind		59	64	69	74	80	85	91	97	103	109	116	4158
15º, 0.8" ice, 4 psf wind		52	56	61	65	70	75	80	85	91	96	102	3598
0º, 0.5" ice, 4 psf wind + k		44	47	51	55	59	63	67	72	76	81	86	3300
0		18	19	21	22	24	25	27	29	31	33	35	1941
10		20	21	23	25	26	28	30	32	34	36	38	1749
20		22	24	25	27	29	31	33	36	38	40	43	1571
30		24	26	28	30	33	35	37	40	42	45	48	1410
40		27	29	31	34	36	39	42	44	47	50	53	1269
50		30	32	35	37	40	43	46	49	52	55	58	1149
60º F, 21 psf wind		49	53	58	62	66	71	76	81	86	91	97	2382
60º F, 6 psf wind		36	39	42	45	49	52	56	59	63	67	71	1298
60º F, 4 psf wind		34	37	40	43	46	50	53	56	60	64	67	1172
60		33	35	38	41	44	47	50	54	57	60	64	1047
70		36	38	42	45	48	51	55	58	62	66	70	962
80		38	42	45	48	52	55	59	63	67	71	75	891
90		41	45	48	52	56	59	63	68	72	76	81	830
100		44	48	51	55	59	63	68	72	77	81	86	779

Extra Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇34◇						R.S.						
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
-20		17	18	20	21	23	25	26	28	30	32	33	2002
0		22	24	25	27	29	31	34	36	38	40	43	1566
0°, 0.5" ice, 4 psf wind + k		44	48	51	55	59	63	68	72	77	81	86	3279
30		31	33	36	38	41	44	47	50	53	57	60	1121
32°, 0.5" ice,		28	30	33	35	38	40	43	46	49	52	55	2312
32°, 0.5" ice, 2 psf wind		45	49	53	57	61	65	69	74	79	84	89	2361
40		34	36	39	42	45	48	52	55	59	62	66	1021
50		37	39	43	46	49	53	56	60	64	68	72	938
60		39	43	46	49	53	57	61	65	69	73	77	869
60° F, 6 psf wind		42	45	49	53	57	60	65	69	73	78	82	1118
70		42	46	49	53	57	61	65	69	73	78	83	812
80		45	49	52	56	60	65	69	74	78	83	88	763
90		48	51	55	60	64	68	73	78	83	88	93	721
100		50	54	58	63	67	72	77	82	87	93	98	685
120		55	59	64	69	74	79	84	90	96	102	108	625
248		74	80	87	93	100	107	114	122	130	137	146	481

DESIGN NOTE(s):

33. See comments in front of section for conditions including wind and ice.

◇34◇ Ruling span range is for initial line design between 275' to 324' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

336.4 kcmil (18/1) ACSR "Merlin"

DE Tension = 3,800 Lbs **RBS = 8,680 Lbs**

Super Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇36◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
15º, 1" ice, 4 psf wind		75	80	86	91	97	102	108	115	121	127	134	4703
15º, 0.8" ice, 4 psf wind		65	70	74	79	84	89	94	100	105	111	116	4117
0º, 0.5" ice, 4 psf wind + k		55	58	62	66	70	74	79	83	88	92	97	3800
0		20	21	23	24	26	27	29	30	32	34	36	2460
10		22	23	25	26	28	30	31	33	35	37	39	2261
20		24	25	27	29	31	32	34	36	38	40	42	2068
30		26	28	30	32	34	36	38	40	42	44	47	1883
40		29	31	33	35	37	39	42	44	46	49	51	1710
50		32	34	36	38	41	43	46	48	51	54	56	1553
60º F, 21 psf wind		60	64	68	72	77	81	86	91	96	101	106	2838
60º F, 6 psf wind		40	43	46	49	52	55	58	61	65	68	72	1679
60º F, 4 psf wind		38	40	43	46	48	51	54	57	60	64	67	1545
60		35	37	40	42	45	48	50	53	56	59	62	1413
70		38	41	43	46	49	52	55	58	61	65	68	1292
80		42	44	47	50	53	57	60	63	67	70	74	1187
90		45	48	51	54	58	61	65	68	72	76	80	1097
100		48	52	55	58	62	66	70	73	78	82	86	1021

Super Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇36◇						R.S.						
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
-20		20	21	23	24	26	27	29	30	32	34	36	2458
0		25	27	28	30	32	34	36	38	40	42	44	1975
0°, 0.5" ice, 4 psf wind + k		55	58	62	66	70	74	79	83	88	92	97	3800
30		34	37	39	42	44	47	50	52	55	58	61	1430
32°, 0.5" ice,		54	58	62	66	70	74	78	83	87	92	97	2735
32°, 0.5" ice, 2 psf wind		55	59	63	67	71	75	79	84	88	93	98	2790
40		38	41	43	46	49	52	55	58	61	64	68	1299
50		42	44	47	50	53	57	60	63	67	70	74	1189
60		45	48	51	54	58	61	65	68	72	76	80	1096
60° F, 6 psf wind		49	52	56	59	63	67	70	74	79	83	87	1381
70		48	52	55	59	62	66	70	74	78	82	86	1018
80		52	55	59	63	67	71	75	79	83	88	92	952
90		55	59	63	67	71	75	79	84	88	93	98	896
100		58	62	66	71	75	79	84	89	94	98	104	847
120		64	69	73	78	83	88	93	98	103	109	114	767
248		90	97	103	109	116	123	130	138	145	153	161	547

DESIGN NOTE(s):

35. See comments in front of section for conditions including wind and ice.

◇36◇ Ruling span range is for initial line design between 325' to 374' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 4/0 AWG (6/1) ACSR "Penguin"

DE Tension = 1,000 Lbs **RBS = 16,700 Lbs**

Super Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇38◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
15º, 1" ice, 4 psf wind		8	11	15	20	25	31	38	45	53	61	70	1507
15º, 0.8" ice, 4 psf wind		8	11	15	20	25	30	37	44	52	60	69	1206
0º, 0.5" ice, 4 psf wind + k		7	10	14	18	23	29	35	41	48	56	64	1000
0		6	9	13	17	21	26	31	37	44	51	58	338
10		7	10	13	17	22	27	33	39	46	53	61	323
20		7	10	14	18	23	28	34	41	48	56	64	309
30		7	11	14	19	24	29	36	42	50	58	66	297
40		8	11	15	20	25	31	37	44	52	60	69	286
50		8	11	15	20	25	31	38	45	53	62	71	278
60º F, 21 psf wind		8	12	16	21	27	33	40	48	56	65	75	773
60º F, 6 psf wind		8	12	16	21	26	33	39	47	55	64	73	344
60º F, 4 psf wind		8	12	16	21	26	32	39	47	55	64	73	306
60		8	12	16	21	26	32	39	46	55	63	73	271
70		8	12	16	21	27	33	40	48	56	65	75	264
80		8	12	17	22	28	34	41	49	57	67	76	258
90		9	12	17	22	28	35	42	50	59	68	78	253
100		9	13	17	23	28	35	43	51	59	69	79	249

Super Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇38◇						R.S.						
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
-20		6	9	12	16	20	24	30	35	41	48	55	358
0		7	10	13	17	22	27	33	39	46	53	61	324
0º, 0.5" ice, 4 psf wind + k		7	10	14	19	24	29	35	42	49	57	65	986
30		8	11	15	19	25	30	37	44	51	60	68	288
32º, 0.5" ice,		8	11	15	20	25	31	38	45	53	62	71	702
32º, 0.5" ice, 2 psf wind		8	11	15	20	25	31	38	45	53	62	71	718
40		8	11	15	20	25	31	38	45	53	61	70	279
50		8	12	16	21	26	32	39	46	54	63	72	272
60		8	12	16	21	27	33	40	48	56	65	75	265
60º F, 6 psf wind		8	12	16	21	27	33	40	48	56	65	75	336
70		8	12	17	22	27	34	41	49	57	66	76	259
80		9	12	17	22	28	34	42	49	58	67	77	255
90		9	13	17	22	28	35	42	50	59	68	78	252
100		9	13	17	23	29	35	43	51	60	69	79	248
120		9	13	18	23	29	36	44	52	61	71	82	242
248		10	15	20	27	34	42	51	60	71	82	94	210

DESIGN NOTE(s):

37. See comments in front of section for conditions including wind and ice.

◇38◇ Ruling span range is for initial line design between 75' to 124' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 4/0 AWG (6/1) ACSR "Penguin"

DE Tension = 2,000 Lbs **RBS = 16,700 Lbs**

Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇40◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
15º, 1" ice, 4 psf wind		17	21	25	29	33	38	44	49	55	62	68	2752
15º, 0.8" ice, 4 psf wind		16	19	23	27	32	36	41	47	52	58	64	2281
0º, 0.5" ice, 4 psf wind + k		14	17	21	24	28	32	36	41	46	51	57	2000
0		11	13	16	19	22	25	28	32	36	40	44	796
10		12	15	17	20	24	27	31	35	39	43	48	729
20		13	16	19	22	25	29	33	37	42	46	51	680
30		14	17	20	23	27	31	35	39	44	49	55	639
40		14	17	21	24	28	33	37	42	47	52	58	604
50		15	18	22	26	30	34	39	44	49	55	61	574
60º F, 21 psf wind		18	21	25	30	35	40	45	51	57	64	71	1456
60º F, 6 psf wind		16	20	23	27	32	37	42	47	53	59	65	686
60º F, 4 psf wind		16	19	23	27	32	36	41	47	52	58	64	614
60		16	19	23	27	31	36	41	46	52	58	64	547
70		17	20	24	28	33	38	43	48	54	60	67	524
80		17	21	25	29	34	39	45	50	56	63	70	503
90		18	22	26	30	35	41	46	52	58	65	72	485
100		19	23	27	32	37	42	48	54	61	68	75	468

Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇40◇						R.S.						
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
-20		10	12	14	17	19	22	25	28	32	35	39	891
0		12	14	17	20	23	27	30	34	39	43	48	734
0°, 0.5" ice, 4 psf wind + k		14	17	21	24	28	33	37	42	47	52	58	1973
30		15	18	21	25	28	33	37	42	47	52	58	603
32°, 0.5" ice,		16	19	23	27	31	36	41	46	52	58	64	1373
32°, 0.5" ice, 2 psf wind		16	19	23	27	32	36	41	47	52	58	64	1401
40		15	19	22	26	30	34	39	44	50	55	61	572
50		16	19	23	27	31	36	41	46	52	58	64	545
60		17	20	24	28	33	38	43	49	54	61	67	521
60° F, 6 psf wind		17	21	24	29	33	38	44	49	55	61	68	656
70		17	21	25	30	34	39	45	51	57	63	70	500
80		18	22	26	31	36	41	47	53	59	66	73	481
90		19	23	27	31	36	42	48	54	60	67	74	470
100		19	23	27	32	37	43	49	55	62	69	76	460
120		20	24	28	33	39	45	51	57	64	71	79	443
248		24	29	34	40	47	54	61	69	78	86	96	366

DESIGN NOTE(s):

39. See comments in front of section for conditions including wind and ice.

◇40◇ Ruling span range is for initial line design between 125' to 174' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 4/0 AWG (6/1) ACSR "Penguin"

DE Tension = 3,000 Lbs **RBS = 16,700 Lbs**

Medium Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇42◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
15º, 1" ice, 4 psf wind		27	31	35	39	44	48	53	59	64	70	76	3883
15º, 0.8" ice, 4 psf wind		25	28	32	36	40	44	49	54	59	64	69	3310
0º, 0.5" ice, 4 psf wind + k		21	24	27	31	34	38	42	46	50	55	59	3000
0		13	15	17	19	21	23	25	28	30	33	36	1519
10		14	16	18	21	23	26	28	31	34	37	40	1364
20		16	18	20	23	26	28	31	34	37	41	44	1236
30		17	20	22	25	28	31	34	37	41	45	48	1129
40		19	22	24	27	30	34	37	41	44	48	53	1041
50		20	23	26	29	33	36	40	44	48	52	56	967
60º F, 21 psf wind		27	30	34	38	43	47	52	57	63	68	74	2178
60º F, 6 psf wind		23	26	29	32	36	40	44	48	53	58	63	1111
60º F, 4 psf wind		22	25	28	32	36	39	43	48	52	57	62	1005
60		22	25	28	31	35	39	43	47	51	56	60	905
70		23	26	30	33	37	41	45	50	54	59	64	852
80		24	28	31	35	39	43	48	52	57	62	68	807
90		26	29	33	37	41	46	50	55	60	66	71	767
100		27	31	35	39	43	48	53	58	63	69	75	732

Medium Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇42◇						R.S.						
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
-20		11	13	14	16	18	20	22	24	26	29	31	1752
0		14	16	19	21	23	26	28	31	34	37	40	1360
0°, 0.5" ice, 4 psf wind + k		21	24	28	31	34	38	42	46	50	55	60	2988
30		19	22	25	28	31	34	38	42	45	49	54	1019
32°, 0.5" ice,		24	27	30	34	38	42	46	51	55	60	65	2104
32°, 0.5" ice, 2 psf wind		24	27	30	34	38	42	46	51	56	61	66	2142
40		21	24	27	30	33	37	41	45	49	53	58	946
50		22	25	29	32	36	40	44	48	52	57	62	884
60		24	27	30	34	38	42	46	51	56	60	66	832
60° F, 6 psf wind		24	28	31	35	39	43	48	52	57	62	68	1033
70		25	28	32	36	40	44	49	54	59	64	69	787
80		26	30	34	38	42	47	51	56	62	67	73	749
90		28	31	35	40	44	49	54	59	65	71	77	715
100		29	32	37	41	46	51	56	61	67	73	79	689
120		30	34	38	43	48	53	58	64	70	76	83	660
248		37	42	48	54	60	66	73	80	88	96	104	528

DESIGN NOTE(s):

41. See comments in front of section for conditions including wind and ice.

◇42◇ Ruling span range is for initial line design between 175' to 224' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 4/0 AWG (6/1) ACSR "Penguin"

DE Tension = 4,000 Lbs **RBS = 16,700 Lbs**

Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇44◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
15º, 1" ice, 4 psf wind		38	42	46	50	55	59	64	69	74	80	85	4958
15º, 0.8" ice, 4 psf wind		34	38	41	45	49	53	57	62	67	72	77	4319
0º, 0.5" ice, 4 psf wind + k		28	31	34	38	41	45	48	52	56	60	64	4000
0		14	15	17	18	20	22	24	25	27	29	31	2505
10		15	17	19	20	22	24	26	28	30	32	35	2264
20		17	19	21	23	25	27	29	31	33	36	38	2046
30		19	21	23	25	27	30	32	34	37	40	43	1851
40		21	23	25	27	30	32	35	38	41	44	47	1682
50		23	25	28	30	33	36	38	41	45	48	51	1537
60º F, 21 psf wind		35	38	42	46	50	54	59	63	68	73	78	2962
60º F, 6 psf wind		27	29	32	35	38	42	45	49	52	56	60	1674
60º F, 4 psf wind		26	28	31	34	37	40	43	47	50	54	58	1539
60		25	27	30	33	36	39	42	45	48	52	56	1413
70		27	29	32	35	38	42	45	49	52	56	60	1308
80		29	32	35	38	41	45	48	52	56	60	64	1219
90		31	34	37	40	44	48	52	56	60	64	69	1143
100		32	36	39	43	47	51	55	59	64	68	73	1077

Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇44◇						R.S.						
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
-20		12	14	15	16	18	19	21	23	24	26	28	2824
0		16	17	19	21	23	25	27	29	31	33	36	2207
0°, 0.5" ice, 4 psf wind + k		28	31	34	38	41	45	48	52	56	60	64	4000
30		22	24	27	29	32	35	37	40	43	47	50	1579
32°, 0.5" ice,		30	34	37	40	44	48	52	56	60	64	69	2887
32°, 0.5" ice, 2 psf wind		31	34	37	41	44	48	52	56	60	65	69	2933
40		24	27	29	32	35	38	41	44	48	51	55	1438
50		26	29	32	35	38	41	45	48	52	56	59	1321
60		29	31	35	38	41	45	48	52	56	60	64	1224
60° F, 6 psf wind		30	33	36	40	43	47	51	55	59	63	67	1488
70		31	34	37	40	44	48	52	56	60	64	69	1143
80		33	36	39	43	47	51	55	59	64	68	73	1074
90		34	38	42	46	50	54	58	63	67	72	77	1015
100		36	40	44	48	52	57	61	66	71	76	82	964
120		38	42	47	51	55	60	65	70	75	81	87	909
248		49	54	60	65	71	77	83	90	97	104	111	709

DESIGN NOTE(s):

43. See comments in front of section for conditions including wind and ice.

◇44◇ Ruling span range is for initial line design between 225' to 274' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 4/0 AWG (6/1) ACSR "Penguin"

DE Tension = 5,000 Lbs **RBS = 16,700 Lbs**

Extra Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇46◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
15º, 1" ice, 4 psf wind		49	53	57	61	66	70	75	80	85	90	96	6,001
15º, 0.8" ice, 4 psf wind		43	47	50	54	58	62	66	71	75	80	84	5,320
0º, 0.5" ice, 4 psf wind + k		36	39	42	45	48	51	55	58	62	66	70	5,000
0		15	16	18	19	20	22	23	25	26	28	30	3,589
10		16	18	19	21	22	24	25	27	29	30	32	3,316
20		18	19	21	22	24	26	28	29	31	33	35	3,051
30		20	21	23	24	26	28	30	32	34	36	38	2,797
40		21	23	25	27	29	31	33	35	37	39	42	2,558
50		23	25	27	29	31	34	36	38	41	43	46	2,338
60º F, 21 psf wind		42	46	49	53	57	61	65	69	74	78	83	3,811
60º F, 6 psf wind		29	31	34	36	39	42	44	47	50	53	57	2,414
60º F, 4 psf wind		27	29	32	34	37	39	42	45	47	50	53	2,272
60		26	28	30	32	34	37	39	42	44	47	50	2,139
70		28	30	32	35	37	40	43	46	48	51	55	1,962
80		30	33	35	38	41	44	47	50	53	56	59	1,807
90		33	35	38	41	44	47	50	54	57	60	64	1,672
100		35	38	41	44	47	51	54	57	61	65	69	1,555

Extra Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇46◇						R.S.						
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
-20		14	15	16	18	19	20	22	23	24	26	27	3,907
0		17	19	20	22	23	25	27	28	30	32	34	3,170
0°, 0.5" ice, 4 psf wind + k		36	39	42	45	48	51	55	58	62	66	70	5,000
30		24	26	28	30	32	34	37	39	42	44	47	2,290
32°, 0.5" ice,		37	40	43	47	50	53	57	61	65	69	73	3,711
32°, 0.5" ice, 2 psf wind		37	40	44	47	50	54	58	61	65	69	73	3,762
40		26	29	31	33	36	38	41	43	46	49	52	2,068
50		29	31	34	36	39	42	45	48	51	54	57	1,880
60		32	34	37	40	43	46	49	52	55	59	62	1,722
60° F, 6 psf wind		34	37	40	43	46	49	53	56	60	63	67	2,034
70		34	37	40	43	46	50	53	56	60	64	67	1,588
80		37	40	43	46	50	53	57	61	64	68	73	1,476
90		40	43	46	50	53	57	61	65	69	73	78	1,381
100		42	46	49	53	57	61	65	69	73	78	82	1,299
120		46	50	54	58	62	66	71	75	80	85	90	1,188
248		60	65	70	75	81	87	93	99	105	111	118	909

DESIGN NOTE(s):

45. See comments in front of section for conditions including wind and ice.

◇46◇ Ruling span range is for initial line design between 275' to 324' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 4/0 AWG (6/1) ACSR "Penguin"

DE Tension = 6,000 Lbs **RBS = 16,700 Lbs**

Super Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇48◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
15º, 1" ice, 4 psf wind		60	64	69	73	77	82	87	92	97	102	107	7019
15º, 0.8" ice, 4 psf wind		52	56	59	63	67	71	75	80	84	88	93	6316
0º, 0.5" ice, 4 psf wind + k		43	46	49	52	55	58	62	65	69	72	76	6000
0		17	18	19	20	22	23	24	25	27	28	30	4693
10		18	19	20	22	23	24	26	27	29	30	32	4416
20		19	20	22	23	24	26	27	29	30	32	34	4140
30		20	22	23	25	26	28	29	31	33	34	36	3866
40		22	23	25	26	28	30	31	33	35	37	39	3597
50		24	25	27	28	30	32	34	36	38	40	42	3335
60º F, 21 psf wind		49	52	56	59	63	67	71	75	79	83	87	4719
60º F, 6 psf wind		30	32	34	36	39	41	43	46	48	51	54	3329
60º F, 4 psf wind		28	30	32	34	36	38	40	42	45	47	49	3200
60		25	27	29	31	33	35	37	39	41	43	45	3083
70		28	29	31	33	35	38	40	42	44	47	49	2844
80		30	32	34	36	39	41	43	46	48	51	53	2622
90		33	35	37	39	42	44	47	49	52	55	58	2419
100		35	38	40	43	45	48	51	54	56	59	63	2235

Super Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇48◇						R.S.						
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
-20		16	17	18	19	20	21	23	24	25	27	28	4978
0		19	20	21	23	24	26	27	29	30	32	33	4180
0°, 0.5" ice, 4 psf wind + k		43	46	49	52	55	58	62	65	69	72	76	6000
30		25	27	29	30	32	34	36	38	40	42	45	3131
32°, 0.5" ice,		43	46	49	52	56	59	62	66	69	73	77	4573
32°, 0.5" ice, 2 psf wind		44	47	50	53	56	60	63	67	70	74	78	4627
40		28	30	31	33	36	38	40	42	44	47	49	2837
50		31	33	35	37	39	42	44	46	49	52	54	2575
60		34	36	38	41	43	46	48	51	54	57	60	2347
60° F, 6 psf wind		37	40	43	45	48	51	54	57	60	63	66	2684
70		37	39	42	44	47	50	53	56	59	62	65	2149
80		40	42	45	48	51	54	57	60	64	67	71	1980
90		43	46	49	52	55	58	62	65	69	72	76	1835
100		46	49	52	56	59	63	66	70	74	78	82	1712
120		52	56	59	63	67	71	75	79	83	88	92	1513
248		69	74	79	84	89	94	100	105	111	117	123	1135

DESIGN NOTE(s):

47. See comments in front of section for conditions including wind and ice.

◇48◇ Ruling span range is for initial line design between 325' to 374' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

556.5 kcmil (19) AAC "Dahlia"

DE Tension = 1,000 Lbs **RBS = 9,750 Lbs**

Super Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇50◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
15º, 1" ice, 4 psf wind		8	11	15	19	25	30	37	44	51	60	68	1481
15º, 0.8" ice, 4 psf wind		7	11	14	19	24	29	36	42	50	58	66	1184
0º, 0.5" ice, 4 psf wind + k		7	10	13	17	22	27	33	39	46	53	61	1000
0		6	9	12	16	20	25	30	36	42	48	56	317
10		7	9	13	17	21	26	32	37	44	51	59	301
20		7	10	13	18	22	27	33	39	46	54	62	287
30		7	10	14	18	23	29	35	41	48	56	64	275
40		7	11	15	19	24	30	36	43	50	58	67	264
50		8	11	15	20	25	31	37	44	52	60	69	255
60º F, 21 psf wind		8	12	16	21	27	33	40	48	56	65	75	720
60º F, 6 psf wind		8	12	16	21	26	32	39	46	54	63	72	317
60º F, 4 psf wind		8	12	16	21	26	32	39	46	54	63	72	280
60		8	11	16	20	26	32	39	46	54	63	72	246
70		8	12	16	21	27	33	40	48	56	65	74	238
80		8	12	17	22	28	34	41	49	57	67	76	231
90		9	13	17	22	28	35	42	50	59	68	79	225
100		9	13	18	23	29	36	43	52	61	70	81	219

Super Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇50◇						R.S.						
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
-20		6	8	11	14	18	22	27	32	38	44	50	350
0		6	9	12	16	20	25	30	36	43	49	57	311
0°, 0.5" ice, 4 psf wind + k		7	10	13	17	22	27	33	39	46	53	61	1000
30		7	10	14	19	23	29	35	42	49	57	65	271
32°, 0.5" ice,		8	11	15	19	24	30	36	43	51	59	68	681
32°, 0.5" ice, 2 psf wind		8	11	15	19	24	30	36	43	51	59	68	698
40		8	11	15	19	24	30	36	43	51	59	68	261
50		8	11	15	20	25	31	38	45	53	61	70	252
60		8	12	16	21	26	32	39	46	55	63	73	243
60° F, 6 psf wind		8	12	16	21	26	32	39	47	55	64	73	313
70		8	12	16	21	27	33	40	48	56	65	75	236
80		9	12	17	22	28	34	42	49	58	67	77	229
90		9	13	17	23	29	35	43	51	60	69	79	223
100		9	13	18	23	29	36	44	52	61	71	82	217
120		10	14	19	24	31	38	46	55	64	75	86	206
212		11	16	22	29	37	46	55	66	77	90	103	172

DESIGN NOTE(s):

49. See comments in front of section for conditions including wind and ice.

◇50◇ Ruling span range is for initial line design between 75' to 124' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

556.5 kcmil (19) AAC "Dahlia"

DE Tension = 2,500 Lbs **RBS = 9,750 Lbs**

Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇52◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
15º, 1" ice, 4 psf wind		15	18	21	25	29	33	37	42	47	53	58	3081
15º, 0.8" ice, 4 psf wind		13	16	19	22	26	30	34	38	43	48	53	2638
0º, 0.5" ice, 4 psf wind + k		11	13	16	18	21	24	28	31	35	39	43	2500
0		5	7	8	9	11	12	14	16	18	20	22	1424
10		7	8	9	11	13	15	17	19	21	24	26	1193
20		8	9	11	13	15	17	20	22	25	28	31	1012
30		9	11	13	15	18	20	23	26	29	32	36	875
40		10	12	15	17	20	23	26	29	33	37	41	772
50		11	14	16	19	22	25	29	33	37	41	45	694
60º F, 21 psf wind		15	18	22	26	30	34	39	44	49	54	60	1581
60º F, 6 psf wind		13	16	19	22	25	29	33	37	42	46	51	788
60º F, 4 psf wind		13	15	18	21	25	28	32	37	41	46	51	707
60		12	15	18	21	24	28	32	36	40	45	49	632
70		13	16	19	23	26	30	34	39	44	49	54	583
80		14	17	21	24	28	33	37	42	47	52	58	543
90		15	19	22	26	30	35	39	44	50	55	61	510
100		16	20	23	27	32	37	42	47	53	59	65	482

Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇52◇						R.S.						
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
-20		4	5	6	7	8	10	11	12	14	15	17	1826
0		6	8	9	11	13	15	17	19	21	23	26	1211
0°, 0.5" ice, 4 psf wind + k		11	13	16	18	21	25	28	32	35	39	44	2469
30		10	12	15	17	20	23	26	30	33	37	41	760
32°, 0.5" ice,		13	15	18	22	25	29	33	37	41	46	51	1599
32°, 0.5" ice, 2 psf wind		13	16	19	22	25	29	33	37	42	47	52	1631
40		12	14	17	19	23	26	29	33	37	42	46	682
50		13	15	18	21	25	28	32	37	41	46	51	621
60		14	17	20	23	27	31	35	39	44	49	55	573
60° F, 6 psf wind		14	17	20	24	27	32	36	41	45	51	56	724
70		15	18	21	25	29	33	38	42	48	53	59	534
80		16	19	23	26	31	35	40	45	51	56	63	502
90		17	20	24	28	32	37	42	48	54	60	66	475
100		17	21	25	29	34	39	45	50	56	63	70	451
120		19	23	27	32	37	43	49	55	62	69	76	413
212		25	31	36	43	50	57	65	73	82	91	101	311

DESIGN NOTE(s):

51. See comments in front of section for conditions including wind and ice.

◇52◇ Ruling span range is for initial line design between 125' to 174' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

556.5 kcmil (19) AAC "Dahlia"

DE Tension = 3,500 Lbs **RBS = 9,750 Lbs**

Medium Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇54◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
15º, 1" ice, 4 psf wind		24	28	31	35	39	43	48	53	57	63	68	4126
15º, 0.8" ice, 4 psf wind		22	25	28	31	35	38	42	46	51	55	60	3629
0º, 0.5" ice, 4 psf wind + k		17	20	22	25	28	31	34	37	41	44	48	3500
0		7	8	9	10	11	13	14	15	17	18	20	2476
10		8	9	10	12	13	14	16	17	19	21	23	2167
20		9	11	12	14	15	17	18	20	22	24	26	1880
30		11	12	14	16	17	19	21	23	26	28	30	1624
40		12	14	16	18	20	22	24	27	29	32	35	1408
50		14	16	18	21	23	25	28	31	34	37	40	1231
60º F, 21 psf wind		23	26	30	33	37	41	45	50	54	59	64	2312
60º F, 6 psf wind		18	20	23	25	28	31	34	38	41	45	49	1299
60º F, 4 psf wind		17	19	22	24	27	30	33	36	40	43	47	1192
60		16	18	21	23	26	29	32	35	38	41	45	1090
70		18	21	23	26	29	32	35	39	42	46	50	978
80		20	23	25	29	32	35	39	43	47	51	55	890
90		22	24	28	31	35	38	42	46	51	55	60	818
100		23	26	30	33	37	41	46	50	55	59	65	759

Medium Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇54◇						R.S.						
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
-20		7	8	8	10	11	12	13	14	16	17	18	2650
0		9	11	12	13	15	17	18	20	22	24	26	1895
0°, 0.5" ice, 4 psf wind + k		18	21	24	26	29	33	36	39	43	47	51	3314
30		15	17	19	21	24	27	29	32	35	38	41	1180
32°, 0.5" ice,		21	24	27	30	33	37	40	44	49	53	57	2234
32°, 0.5" ice, 2 psf wind		21	24	27	30	33	37	41	45	49	53	58	2273
40		17	19	22	24	27	30	33	36	40	43	47	1042
50		19	21	24	27	30	33	37	41	44	48	52	935
60		21	24	27	30	33	37	41	45	49	53	58	852
60° F, 6 psf wind		22	24	28	31	35	38	42	46	51	55	60	1058
70		22	26	29	32	36	40	44	48	53	58	62	786
80		24	27	31	35	39	43	47	52	57	62	67	731
90		26	29	33	37	41	46	50	55	60	66	71	686
100		27	31	35	39	44	48	53	59	64	70	76	648
120		30	34	39	43	48	54	59	65	71	77	84	586
212		41	47	53	59	66	73	80	88	96	105	114	431

DESIGN NOTE(s):

53. See comments in front of section for conditions including wind and ice.

◇54◇ Ruling span range is for initial line design between 175' to 224' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

556.5 kcmil (19) AAC "Dahlia"

DE Tension = 4,000 Lbs **RBS = 9,750 Lbs**

Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇56◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
15º, 1" ice, 4 psf wind		38	42	46	50	54	59	64	69	74	79	85	4752
15º, 0.8" ice, 4 psf wind		33	37	40	44	48	52	56	60	65	70	75	4195
0º, 0.5" ice, 4 psf wind + k		27	30	33	36	39	42	46	49	53	57	61	4000
0		11	12	13	15	16	17	19	20	22	23	25	2821
10		12	14	15	16	18	19	21	23	24	26	28	2520
20		14	15	17	19	20	22	24	26	28	30	32	2234
30		16	18	19	21	23	25	27	29	31	33	36	1973
40		18	20	22	24	26	28	30	33	35	38	40	1743
50		20	22	25	27	29	32	34	37	40	43	46	1546
60º F, 21 psf wind		34	38	41	45	49	53	58	62	67	72	77	2787
60º F, 6 psf wind		25	28	30	33	36	39	42	45	49	52	56	1624
60º F, 4 psf wind		24	26	29	31	34	37	40	43	47	50	54	1500
60		23	25	27	30	33	35	38	41	44	48	51	1382
70		25	28	30	33	36	39	42	46	49	53	57	1248
80		28	30	33	36	40	43	47	50	54	58	62	1138
90		30	33	36	40	43	47	51	55	59	63	67	1047
100		32	36	39	43	46	50	55	59	63	68	73	972

Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇56◇						R.S.						
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
-20		11	12	14	15	16	18	19	21	22	24	25	2778
0		15	17	18	20	22	24	26	28	30	32	34	2069
0°, 0.5" ice, 4 psf wind + k		29	32	35	38	41	45	49	52	56	61	65	3754
30		23	25	28	30	33	36	38	41	45	48	51	1381
32°, 0.5" ice,		31	35	38	42	45	49	53	57	62	66	71	2609
32°, 0.5" ice, 2 psf wind		32	35	38	42	46	50	54	58	62	67	71	2654
40		25	28	31	34	36	40	43	46	50	53	57	1238
50		28	31	34	37	40	44	47	51	55	59	63	1124
60		30	33	37	40	44	47	51	55	59	64	68	1032
60° F, 6 psf wind		32	35	38	42	46	50	54	58	62	67	72	1276
70		33	36	40	43	47	51	55	60	64	69	74	957
80		35	39	42	46	50	55	59	64	69	74	79	895
90		37	41	45	49	54	58	63	68	73	78	84	842
100		39	43	48	52	57	61	66	72	77	83	88	797
120		43	48	52	57	62	68	73	79	85	91	97	725
212		59	65	71	78	84	92	99	107	115	123	132	536

DESIGN NOTE(s):

55. See comments in front of section for conditions including wind and ice.

◇56◇ Ruling span range is for initial line design between 225' to 274' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

556.5 kcmil (19) AAC "Dahlia"

DE Tension = 4,500 Lbs **RBS = 9,750 Lbs**

Extra Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇58◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
15º, 1" ice, 4 psf wind		52	57	61	66	71	75	81	86	91	97	103	5348
15º, 0.8" ice, 4 psf wind		46	50	53	57	62	66	70	75	80	85	90	4746
0º, 0.5" ice, 4 psf wind + k		38	41	44	47	50	54	58	61	65	69	74	4500
0		15	16	18	19	21	22	23	25	27	28	30	3213
10		17	18	20	21	23	24	26	27	29	31	33	2916
20		19	20	22	23	25	27	29	30	32	34	36	2631
30		21	22	24	26	28	30	32	34	36	38	41	2362
40		23	25	27	29	31	33	35	38	40	43	45	2117
50		26	28	30	32	35	37	40	42	45	48	50	1900
60º F, 21 psf wind		46	49	53	57	61	66	70	75	79	84	89	3266
60º F, 6 psf wind		32	35	37	40	43	46	49	52	56	59	63	1978
60º F, 4 psf wind		30	33	35	38	41	44	47	50	53	56	59	1841
60		29	31	33	36	38	41	44	47	50	53	56	1712
70		32	34	37	40	42	45	49	52	55	58	62	1552
80		35	37	40	43	46	50	53	57	60	64	68	1418
90		38	41	44	47	50	54	58	61	65	69	74	1305
100		40	44	47	51	54	58	62	66	70	75	79	1211

Extra Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇58◇						R.S.						
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
-20		16	18	19	21	22	24	25	27	29	30	32	2989
0		21	23	25	27	29	31	33	35	37	39	42	2300
0°, 0.5" ice, 4 psf wind + k		40	43	47	50	54	58	62	66	70	74	79	4212
30		31	33	36	38	41	44	47	50	53	57	60	1603
32°, 0.5" ice,		43	46	50	54	58	62	66	70	75	79	84	2994
32°, 0.5" ice, 2 psf wind		43	47	50	54	58	62	66	71	75	80	85	3044
40		34	37	39	42	45	49	52	55	59	62	66	1450
50		37	40	43	46	50	53	57	61	64	68	73	1325
60		40	43	47	50	54	58	62	66	70	74	79	1223
60° F, 6 psf wind		42	46	49	53	57	61	65	69	73	78	82	1504
70		43	47	50	54	58	62	66	71	75	80	84	1138
80		46	50	54	58	62	66	71	75	80	85	90	1067
90		49	53	57	61	66	70	75	80	85	90	96	1006
100		51	56	60	64	69	74	79	84	90	95	101	953
120		57	61	66	71	76	81	87	93	98	105	111	868
212		76	83	89	96	103	110	117	125	133	141	150	644

DESIGN NOTE(s):

57. See comments in front of section for conditions including wind and ice.

◇58◇ Ruling span range is for initial line design between 275' to 324' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

556.5 kcmil (19) AAC "Dahlia"

DE Tension = 4,750 Lbs **RBS = 9,750 Lbs**

Super Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇60◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
15º, 1" ice, 4 psf wind		70	75	80	85	90	96	101	107	113	119	125	5731
15º, 0.8" ice, 4 psf wind		62	66	70	75	79	84	89	94	99	104	110	5073
0º, 0.5" ice, 4 psf wind + k		51	55	58	62	66	70	74	78	82	86	91	4750
0		22	23	25	26	28	30	31	33	35	37	39	3234
10		24	26	27	29	31	33	34	36	38	40	42	2953
20		26	28	30	32	34	36	38	40	42	44	47	2685
30		29	31	33	35	37	39	42	44	46	49	51	2435
40		32	34	36	39	41	43	46	49	51	54	57	2209
50		35	37	40	42	45	48	51	53	56	59	62	2007
60º F, 21 psf wind		60	64	69	73	78	82	87	92	97	102	107	3554
60º F, 6 psf wind		43	46	49	52	55	58	62	65	69	72	76	2128
60º F, 4 psf wind		41	43	46	49	52	55	59	62	65	69	72	1976
60		39	41	44	47	49	52	55	59	62	65	68	1832
70		42	45	48	51	54	57	60	64	67	71	75	1680
80		45	49	52	55	58	62	66	69	73	77	81	1551
90		49	52	56	59	63	67	70	74	79	83	87	1441
100		52	56	60	63	67	71	75	80	84	89	93	1347

Super Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇60◇						R.S.						
	Span (Ft)		310	320	330	340	350	360	370	380	390	400	
-20		24	26	28	30	31	33	35	37	39	41	43	2886
0		31	33	35	37	40	42	45	47	50	52	55	2281
0°, 0.5" ice, 4 psf wind + k		54	58	62	66	70	74	78	83	87	92	97	4466
30		42	45	48	51	54	57	61	64	67	71	75	1676
32°, 0.5" ice,		57	61	65	69	74	78	83	87	92	97	102	3221
32°, 0.5" ice, 2 psf wind		58	62	66	70	74	79	83	88	93	98	103	3277
40		46	49	52	55	59	62	66	70	74	77	82	1538
50		50	53	56	60	64	67	71	75	79	84	88	1424
60		53	57	60	64	68	72	77	81	85	90	95	1328
60° F, 6 psf wind		56	59	63	67	72	76	80	85	89	94	99	1637
70		57	60	64	68	73	77	82	86	91	96	101	1246
80		60	64	68	73	77	82	86	91	96	101	107	1176
90		63	67	72	76	81	86	91	96	101	107	112	1116
100		66	71	76	80	85	90	96	101	107	112	118	1063
120		72	77	82	88	93	99	104	110	116	122	129	975
212		96	103	109	116	123	131	138	146	154	162	171	736

DESIGN NOTE(s):

59. See comments in front of section for conditions including wind and ice.

◇60◇ Ruling span range is for initial line design between 325' to 374' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 336.4 kcmil (18/1) ACSR "Merlin"

DE Tension = 2,000 Lbs **RBS = 17,360 Lbs**

Super Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇62◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
15º, 1" ice, 4 psf wind		5	7	10	13	17	21	25	30	35	40	46	2,564
15º, 0.8" ice, 4 psf wind		5	7	10	12	16	19	24	28	33	38	44	2,152
0º, 0.5" ice, 4 psf wind + k		4	6	8	10	13	16	20	24	28	32	37	2,000
0		3	4	6	8	10	12	15	18	21	24	28	899
10		4	5	7	9	11	14	17	20	24	28	32	775
20		4	6	8	10	13	16	19	23	27	31	36	686
30		4	6	9	11	14	18	21	25	30	35	40	619
40		5	7	9	12	16	19	23	28	33	38	43	568
50		5	7	10	13	17	21	25	30	35	41	47	527
60º F, 21 psf wind		6	9	12	15	19	24	29	35	41	47	54	1,307
60º F, 6 psf wind		6	8	11	14	18	23	27	32	38	44	51	614
60º F, 4 psf wind		6	8	11	14	18	22	27	32	38	44	50	551
60		6	8	11	14	18	22	27	32	38	44	50	493
70		6	8	12	15	19	24	28	34	40	46	53	465
80		6	9	12	16	20	25	30	36	42	49	56	441
90		7	9	13	17	21	26	32	37	44	51	59	421
100		7	10	13	17	22	27	33	39	46	53	61	402

Super Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇62◇						R.S.						
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
-20		2	3	4	6	7	9	11	13	15	17	20	1,226
0		3	5	6	8	11	13	16	19	22	26	30	833
0°, 0.5" ice, 4 psf wind + k		4	6	8	11	14	17	20	24	29	33	38	1,936
30		5	7	9	12	15	19	23	27	31	36	42	590
32°, 0.5" ice,		5	7	10	13	17	21	25	30	35	40	46	1,267
32°, 0.5" ice, 2 psf wind		5	7	10	13	17	21	25	30	35	40	46	1,290
40		5	7	10	13	16	20	24	29	34	40	45	545
50		5	8	11	14	17	22	26	31	37	42	49	509
60		6	8	11	15	19	23	28	33	39	45	52	478
60° F, 6 psf wind		6	8	11	15	19	23	28	33	39	45	52	596
70		6	9	12	16	20	24	29	35	41	48	55	453
80		6	9	12	16	21	25	31	37	43	50	57	431
90		7	10	13	17	22	27	32	38	45	52	60	411
100		7	10	14	18	23	28	34	40	47	55	63	394
120		7	11	14	19	24	29	35	42	49	57	66	375
248		9	13	17	23	29	36	43	51	60	70	80	310

DESIGN NOTE(s):

61. See comments in front of section for conditions including wind and ice.

◇62◇ Ruling span range is for initial line design between 75' to 124' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 336.4 kcmil (18/1) ACSR "Merlin"

DE Tension = 3,000 Lbs **RBS = 17,360 Lbs**

Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇64◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
15º, 1" ice, 4 psf wind		14	17	20	24	28	32	36	41	46	51	57	3,740
15º, 0.8" ice, 4 psf wind		13	16	19	22	26	29	33	38	42	47	52	3,201
0º, 0.5" ice, 4 psf wind + k		11	13	16	18	21	24	28	31	35	39	44	3,000
0		7	8	10	12	14	16	18	20	22	25	28	1,585
10		8	10	12	14	16	18	21	23	26	29	32	1,355
20		9	11	13	16	18	21	24	27	30	34	37	1,182
30		10	13	15	18	20	23	27	30	34	38	42	1,052
40		12	14	17	19	23	26	29	33	37	42	46	952
50		13	15	18	21	25	28	32	36	41	45	50	873
60º F, 21 psf wind		15	19	22	26	30	35	40	45	50	56	62	2,027
60º F, 6 psf wind		14	17	20	23	27	31	35	40	45	50	55	998
60º F, 4 psf wind		14	17	20	23	27	31	35	40	44	49	55	900
60		14	16	20	23	27	30	35	39	44	49	54	810
70		14	17	21	24	28	33	37	42	47	52	58	757
80		15	19	22	26	30	35	39	44	50	55	61	714
90		16	20	23	27	32	36	42	47	53	59	65	676
100		17	21	25	29	33	38	44	49	55	62	68	644

Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇64◇						R.S.						
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
-20		6	7	8	9	11	13	14	16	18	20	22	1,948
0		8	10	11	13	16	18	20	23	26	29	32	1,374
0°, 0.5" ice, 4 psf wind + k		11	14	16	19	22	26	29	33	37	41	45	2,876
30		11	14	16	19	22	26	29	33	37	41	46	958
32°, 0.5" ice,		13	16	19	23	26	30	34	39	43	48	54	1,947
32°, 0.5" ice, 2 psf wind		13	16	19	23	26	30	34	39	44	49	54	1,979
40		12	15	18	21	24	28	32	36	40	45	50	878
50		13	16	19	23	26	30	35	39	44	49	54	814
60		14	17	21	24	28	32	37	42	47	52	58	761
60° F, 6 psf wind		15	18	21	25	29	33	38	42	48	53	59	941
70		15	19	22	26	30	34	39	44	50	55	61	717
80		16	20	23	27	32	36	41	47	52	58	65	301
90		17	21	24	29	33	38	43	49	55	61	68	291
100		18	21	26	30	35	40	45	51	58	64	71	282
120		19	23	28	33	38	43	49	56	62	70	77	265
248		24	29	34	40	46	53	60	68	77	85	95	465

DESIGN NOTE(s):

63. See comments in front of section for conditions including wind and ice.

◇64◇ Ruling span range is for initial line design between 125' to 174' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 336.4 kcmil (18/1) ACSR "Merlin"

DE Tension = 4,000 Lbs **RBS = 17,360 Lbs**

Medium Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇66◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
15º, 1" ice, 4 psf wind		24	28	31	35	39	43	48	53	57	63	68	4,870
15º, 0.8" ice, 4 psf wind		22	25	29	32	36	40	44	48	52	57	62	4,239
0º, 0.5" ice, 4 psf wind + k		18	21	24	26	29	33	36	39	43	47	51	4,000
0		10	12	13	15	16	18	20	22	24	26	28	2,436
10		12	13	15	17	19	21	23	25	27	30	32	2,107
20		13	15	17	19	22	24	26	29	32	34	37	1,836
30		15	17	20	22	24	27	30	33	36	39	42	1,619
40		17	19	22	24	27	30	33	37	40	44	47	1,448
50		19	21	24	27	30	33	37	40	44	48	52	1,312
60º F, 21 psf wind		25	29	32	36	41	45	49	54	59	65	70	2,796
60º F, 6 psf wind		21	24	27	31	34	38	42	46	50	55	59	1,459
60º F, 4 psf wind		21	24	27	30	33	37	41	45	49	53	58	1,326
60		21	23	26	30	33	36	40	44	48	53	57	1,203
70		22	25	28	32	36	39	43	48	52	57	62	1,114
80		24	27	30	34	38	42	46	51	56	61	66	1,041
90		25	29	32	36	40	45	49	54	59	64	70	979
100		27	30	34	38	43	47	52	57	63	68	74	926

Medium Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇66◇						R.S.						
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
-20		9	10	11	13	14	16	17	19	21	23	25	2,772
0		12	14	16	17	19	22	24	26	29	31	34	2,024
0°, 0.5" ice, 4 psf wind + k		23	26	29	32	36	40	44	48	53	58	63	3,817
30		18	20	23	25	28	31	35	38	42	45	49	1,393
32°, 0.5" ice,		22	25	28	32	35	39	43	47	52	57	61	2,661
32°, 0.5" ice, 2 psf wind		22	25	28	32	36	39	43	48	52	57	62	2,701
40		19	22	25	28	31	35	38	42	46	50	54	1,267
50		21	24	27	30	34	38	41	45	50	54	59	1,166
60		23	26	29	33	36	40	45	49	53	58	63	1,084
60° F, 6 psf wind		23	27	30	34	38	42	46	50	55	60	65	1,328
70		24	28	31	35	39	43	48	52	57	62	68	1,015
80		26	29	33	37	41	46	51	55	61	66	72	957
90		27	31	35	39	44	48	53	59	64	70	76	908
100		29	32	37	41	46	51	56	61	67	73	79	865
120		31	35	40	45	50	55	61	67	73	80	86	793
248		40	45	51	57	64	71	78	85	93	102	110	623

DESIGN NOTE(s):

65. See comments in front of section for conditions including wind and ice.

◇66◇ Ruling span range is for initial line design between 175' to 224' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 336.4 kcmil (18/1) ACSR "Merlin"

DE Tension = 5,000 Lbs **RBS = 17,360 Lbs**

Long Span - Feet

Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇68◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
15º, 1" ice, 4 psf wind		35	39	43	47	51	55	60	65	70	75	80	5,963
15º, 0.8" ice, 4 psf wind		32	35	38	42	46	50	54	58	62	67	72	5,265
0º, 0.5" ice, 4 psf wind + k		26	29	32	35	38	41	44	48	51	55	59	5,000
0		13	14	16	17	19	20	22	24	25	27	29	3,401
10		15	16	18	19	21	23	25	26	28	31	33	3,014
20		16	18	20	22	24	26	28	30	32	35	37	2,663
30		19	20	22	25	27	29	31	34	36	39	42	2,356
40		21	23	25	28	30	33	35	38	41	44	47	2,098
50		23	26	28	31	34	36	39	42	46	49	52	1,885
60º F, 21 psf wind		35	38	42	46	50	54	59	63	68	73	78	3,617
60º F, 6 psf wind		27	30	33	36	39	43	46	50	53	57	61	2,025
60º F, 4 psf wind		26	29	32	35	38	41	45	48	52	56	59	1,862
60		26	28	31	34	37	40	43	47	50	54	58	1,710
70		28	31	34	37	40	44	47	51	55	59	63	1,567
80		30	33	37	40	44	47	51	55	59	64	68	1,449
90		32	36	39	43	47	51	55	59	64	68	73	1,351
100		35	38	42	46	50	54	58	63	68	73	78	1,268

Long Span - Feet

Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇68◇						R.S.						
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
-20		12	13	14	16	17	19	20	22	23	25	27	3,649
0		16	17	19	21	23	25	27	29	31	33	36	2,767
0°, 0.5" ice, 4 psf wind + k		27	30	33	36	39	43	46	50	54	58	62	4,765
30		23	25	28	30	33	36	39	42	45	48	52	1,909
32°, 0.5" ice,		31	34	37	40	44	48	52	56	60	64	69	3,409
32°, 0.5" ice, 2 psf wind		31	34	37	41	44	48	52	56	60	65	69	3,457
40		25	28	31	34	37	40	43	46	50	53	57	1,726
50		28	31	34	37	40	43	47	51	54	58	63	1,578
60		30	33	36	40	43	47	51	55	59	63	68	1,457
60° F, 6 psf wind		31	35	38	41	45	49	53	57	61	66	71	1,763
70		32	36	39	43	47	51	55	59	63	68	73	1,357
80		34	38	42	46	50	54	58	63	68	73	78	1,273
90		36	40	44	48	53	57	62	66	72	77	82	1,201
100		38	42	47	51	55	60	65	70	75	81	87	1,140
120		42	47	51	56	61	66	71	77	83	89	95	1,039
248		56	62	68	74	81	88	95	102	110	118	126	784

DESIGN NOTE(s):

67. See comments in front of section for conditions including wind and ice.

◇68◇ Ruling span range is for initial line design between 225' to 274' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 336.4 kcmil (18/1) ACSR "Merlin"

DE Tension = 6,000 Lbs **RBS = 17,360 Lbs**

Extra Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇70◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
15º, 1" ice, 4 psf wind		47	51	55	59	63	68	72	77	82	87	92	7,024
15º, 0.8" ice, 4 psf wind		42	45	49	52	56	60	64	68	73	77	82	6,284
0º, 0.5" ice, 4 psf wind + k		34	37	40	43	46	49	52	56	59	63	67	6,000
0		15	17	18	19	21	22	24	25	27	29	30	4,432
10		17	18	20	21	23	24	26	28	30	31	33	4,025
20		19	20	22	24	25	27	29	31	33	35	37	3,632
30		21	23	24	26	28	30	32	34	37	39	41	3,264
40		23	25	27	29	32	34	36	38	41	43	46	2,928
50		26	28	30	33	35	37	40	43	45	48	51	2,632
60º F, 21 psf wind		44	47	51	55	59	63	67	72	76	81	86	4,490
60º F, 6 psf wind		32	34	37	40	43	46	49	52	55	59	62	2,728
60º F, 4 psf wind		30	33	35	38	41	43	46	49	53	56	59	2,546
60		29	31	34	36	39	42	44	47	50	53	57	2,377
70		32	34	37	40	43	46	49	52	55	59	62	2,160
80		35	37	40	43	47	50	53	57	60	64	68	1,979
90		38	41	44	47	50	54	58	61	65	69	74	1,827
100		40	44	47	51	54	58	62	66	70	75	79	1,700

Extra Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇70◇						R.S.						
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
-20		15	16	17	19	20	22	23	25	26	28	29	4,565
0		19	21	22	24	26	27	29	31	33	35	37	3,586
0°, 0.5" ice, 4 psf wind + k		36	39	42	45	48	51	55	58	62	66	70	5,722
30		27	29	32	34	37	39	42	45	47	50	53	2,513
32°, 0.5" ice,		39	42	45	49	52	56	60	64	68	72	76	4,193
32°, 0.5" ice, 2 psf wind		39	42	46	49	53	56	60	64	68	72	77	4,247
40		30	33	35	38	41	44	47	50	53	56	59	2,265
50		33	36	39	42	45	48	51	54	58	61	65	2,060
60		36	39	42	45	49	52	56	59	63	67	71	1,892
60° F, 6 psf wind		38	41	45	48	51	55	59	63	67	71	75	2,255
70		39	42	46	49	53	56	60	64	68	72	77	1,752
80		42	45	49	53	56	60	64	69	73	78	82	1,634
90		45	48	52	56	60	64	69	73	78	83	88	1,535
100		47	51	55	59	64	68	73	77	82	87	93	1,450
120		52	57	61	66	70	75	80	86	91	97	102	1,312
248		72	78	84	91	97	104	111	119	126	134	142	949

DESIGN NOTE(s):

69. See comments in front of section for conditions including wind and ice.

◇70◇ Ruling span range is for initial line design between 275' to 324' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 336.4 kcmil (18/1) ACSR "Merlin"

DE Tension = 7,000 Lbs **RBS = 17,360 Lbs**

Super Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇72◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
15º, 1" ice, 4 psf wind		59	63	67	71	76	80	85	90	95	100	105	8,059
15º, 0.8" ice, 4 psf wind		52	55	59	63	66	70	74	79	83	87	92	7,294
0º, 0.5" ice, 4 psf wind + k		42	45	48	51	54	57	60	64	67	71	75	7,000
0		18	19	20	22	23	24	26	27	29	30	32	5,501
10		19	21	22	23	25	26	28	29	31	33	34	5,098
20		21	22	24	25	27	29	30	32	34	35	37	4,697
30		23	24	26	28	29	31	33	35	37	39	41	4,302
40		25	27	29	30	32	34	36	38	40	42	45	3,923
50		28	30	31	33	36	38	40	42	44	47	49	3,564
60º F, 21 psf wind		52	56	59	63	67	71	75	79	84	88	93	5,415
60º F, 6 psf wind		35	37	39	42	45	47	50	53	56	59	62	3,586
60º F, 4 psf wind		33	35	37	39	42	44	47	49	52	55	58	3,403
60		31	33	35	37	39	42	44	46	49	52	54	3,235
70		34	36	38	41	43	46	48	51	54	57	60	2,940
80		37	39	42	44	47	50	53	56	59	62	65	2,681
90		40	43	46	49	52	55	58	61	64	68	71	2,457
100		44	47	50	53	56	59	63	66	70	74	77	2,266

Super Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇72◇						R.S.						
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
-20		18	19	20	22	23	24	26	27	29	30	32	5,513
0		22	24	25	27	28	30	32	34	35	37	39	4,465
0°, 0.5" ice, 4 psf wind + k		44	47	50	53	56	60	63	67	70	74	78	6,692
30		31	33	35	37	40	42	44	47	49	52	55	3,209
32°, 0.5" ice,		47	50	53	57	60	64	67	71	75	79	83	5,010
32°, 0.5" ice, 2 psf wind		47	50	54	57	61	64	68	72	76	80	84	5,069
40		34	36	39	41	44	46	49	52	55	58	61	2,892
50		38	40	43	45	48	51	54	57	60	63	67	2,624
60		41	44	47	50	53	56	59	62	66	69	73	2,399
60° F, 6 psf wind		44	47	50	54	57	60	64	67	71	75	79	2,810
70		45	48	51	54	57	61	64	68	72	75	79	2,211
80		48	51	55	58	62	65	69	73	77	81	85	2,052
90		51	55	59	62	66	70	74	78	83	87	92	1,917
100		55	58	62	66	70	75	79	83	88	93	97	1,803
120		61	65	69	74	78	83	88	93	98	103	108	1,618
248		88	94	101	107	113	120	127	134	142	149	157	1,120

DESIGN NOTE(s):

71. See comments in front of section for conditions including wind and ice.

◇72◇ Ruling span range is for initial line design between 325' to 374' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

954.0 kcmil (45/7) ACSR "Rail"

DE Tension = 1,500 Lbs **RBS = 25,900 Lbs**

Super Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇74◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
15º, 1" ice, 4 psf wind		7	10	14	18	23	28	34	40	47	55	63	2099
15º, 0.8" ice, 4 psf wind		7	10	13	18	22	27	33	40	46	54	62	1729
0º, 0.5" ice, 4 psf wind + k		6	9	12	16	21	25	31	36	43	50	57	1500
0		6	9	12	15	19	24	29	34	40	47	54	676
10		6	9	12	16	20	25	30	36	43	49	57	640
20		7	10	13	17	21	27	32	38	45	52	60	609
30		7	10	14	18	22	28	34	40	47	54	62	582
40		7	10	14	18	23	29	35	41	49	56	65	560
50		7	11	15	19	24	30	36	43	50	59	67	541
60º F, 21 psf wind		8	11	15	20	26	32	38	45	53	62	71	1098
60º F, 6 psf wind		8	11	15	20	25	31	37	45	52	61	70	593
60º F, 4 psf wind		8	11	15	20	25	31	37	45	52	61	70	555
60		8	11	15	20	25	31	37	45	52	61	70	523
70		8	11	16	20	26	32	39	46	54	63	72	507
80		8	12	16	21	27	33	40	47	56	64	74	492
90		8	12	17	22	27	34	41	49	57	66	76	478
100		9	12	17	22	28	35	42	50	58	68	78	467

Super Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇74◇						R.S.						
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
-20		5	8	10	13	17	21	25	30	35	41	47	769
0		6	9	12	15	19	24	29	34	40	47	54	676
0°, 0.5" ice, 4 psf wind + k		6	9	12	16	21	25	31	36	43	50	57	1498
30		7	10	14	18	22	28	34	40	47	54	62	582
32°, 0.5" ice,		7	10	14	18	23	29	35	41	48	56	65	1106
32°, 0.5" ice, 2 psf wind		7	10	14	18	23	29	35	41	48	56	65	1121
40		7	10	14	19	23	29	35	42	49	57	65	560
50		7	11	15	19	24	30	36	43	50	59	67	540
60		8	11	15	20	25	31	37	45	52	61	70	523
60° F, 6 psf wind		8	11	15	20	25	31	37	45	52	61	70	593
70		8	11	16	20	26	32	39	46	54	63	72	507
80		8	12	16	21	27	33	40	47	56	64	74	492
90		8	12	17	22	27	34	41	49	57	66	76	478
100		9	12	17	22	28	35	42	50	59	68	78	467
120		9	13	17	23	29	36	43	51	60	70	80	454
248		10	15	20	26	33	41	50	59	70	81	93	394

DESIGN NOTE(s):

73. See comments in front of section for conditions including wind and ice.

◇74◇ Ruling span range is for initial line design between 75' to 124' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

954.0 kcmil (45/7) ACSR "Rail"

DE Tension = 3,000 Lbs **RBS = 25,900 Lbs**

Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇76◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
15º, 1" ice, 4 psf wind		15	18	22	26	30	34	39	44	49	55	61	3858
15º, 0.8" ice, 4 psf wind		15	18	21	25	29	33	37	42	47	53	58	3272
0º, 0.5" ice, 4 psf wind + k		13	15	18	21	25	28	32	37	41	46	51	3000
0		11	13	15	18	21	24	27	30	34	38	42	1539
10		12	14	17	20	23	26	30	34	38	42	47	1391
20		13	15	18	21	25	28	32	36	41	45	50	1280
30		14	16	20	23	27	30	35	39	44	49	54	1189
40		15	18	21	25	28	33	37	42	47	52	58	1115
50		15	19	22	26	30	35	39	44	50	55	61	1051
60º F, 21 psf wind		17	21	25	29	34	39	44	50	56	62	69	2018
60º F, 6 psf wind		16	20	24	28	32	37	42	47	53	59	65	1126
60º F, 4 psf wind		16	20	23	27	32	37	42	47	53	59	65	1057
60		16	20	23	27	32	36	42	47	53	59	65	997
70		17	21	24	29	33	38	44	49	55	61	68	950
80		18	21	26	30	35	40	45	51	58	64	71	909
90		19	22	27	31	36	42	47	53	60	67	74	873
100		19	23	28	33	38	43	49	56	62	70	77	840

Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇76◇						R.S.						
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
-20		9	10	12	14	17	19	22	25	28	31	34	1894
0		11	13	16	18	21	24	28	31	35	39	44	1487
0°, 0.5" ice, 4 psf wind + k		13	16	19	22	25	29	33	37	42	47	52	2938
30		14	17	20	24	27	31	36	40	45	50	56	1161
32°, 0.5" ice,		15	18	22	26	30	34	39	44	49	55	61	2095
32°, 0.5" ice, 2 psf wind		15	18	22	26	30	34	39	44	49	55	61	2122
40		15	18	21	25	29	33	38	43	48	53	59	1092
50		16	19	23	26	31	35	40	45	51	56	63	1032
60		16	20	24	28	32	37	42	48	53	59	66	982
60° F, 6 psf wind		17	20	24	28	33	37	42	48	54	60	66	1108
70		17	21	25	29	34	39	44	50	56	62	69	937
80		18	22	26	30	35	40	46	52	58	65	72	898
90		19	23	27	32	37	42	48	54	61	68	75	863
100		19	23	28	33	38	44	50	56	63	70	78	832
120		21	25	30	35	41	47	53	60	67	75	83	779
248		25	30	36	42	49	56	64	72	81	90	100	650

DESIGN NOTE(s):

75. See comments in front of section for conditions including wind and ice.

◇76◇ Ruling span range is for initial line design between 125' to 174' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

954.0 kcmil (45/7) ACSR "Rail"

DE Tension = 4,000 Lbs **RBS = 25,900 Lbs**

Medium Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇78◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
15º, 1" ice, 4 psf wind		26	30	34	38	42	47	51	56	62	67	73	5053
15º, 0.8" ice, 4 psf wind		25	28	32	36	40	44	48	53	58	63	69	4336
0º, 0.5" ice, 4 psf wind + k		21	24	27	31	34	38	42	46	50	55	59	4000
0		17	19	21	24	27	30	33	36	39	43	46	2180
10		18	21	24	26	29	33	36	39	43	47	51	1977
20		20	23	26	29	32	36	39	43	47	51	56	1812
30		22	25	28	31	35	39	42	47	51	55	60	1678
40		23	26	30	33	37	41	46	50	55	59	65	1566
50		25	28	32	36	40	44	48	53	58	63	69	1472
60º F, 21 psf wind		28	32	37	41	46	51	56	61	67	73	79	2743
60º F, 6 psf wind		26	30	34	38	42	47	52	57	62	68	73	1565
60º F, 4 psf wind		26	30	34	38	42	47	51	56	62	67	73	1472
60		26	30	34	38	42	46	51	56	61	67	73	1392
70		27	31	35	40	44	49	54	59	65	70	76	1322
80		29	33	37	42	46	51	56	62	68	74	80	1262
90		30	34	39	43	48	54	59	65	71	77	84	1208
100		31	36	40	45	50	56	61	67	74	80	87	1161

Medium Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇78◇						R.S.						
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
-20		15	17	19	21	23	26	29	31	34	37	41	2491
0		18	21	23	26	29	32	35	39	43	46	50	2010
0°, 0.5" ice, 4 psf wind + k		22	25	29	32	36	39	44	48	52	57	62	3844
30		23	26	29	33	37	41	45	49	54	59	64	1586
32°, 0.5" ice,		26	29	33	37	41	45	50	55	60	65	71	2795
32°, 0.5" ice, 2 psf wind		26	29	33	37	41	45	50	55	60	65	71	2829
40		24	28	31	35	39	43	48	52	57	62	68	1490
50		26	29	33	37	41	46	51	55	61	66	72	1408
60		27	31	35	39	44	48	53	59	64	70	76	1337
60° F, 6 psf wind		27	31	35	40	44	49	54	59	65	70	76	1505
70		28	32	37	41	46	51	56	61	67	73	79	1275
80		30	34	38	43	48	53	58	64	70	76	83	1221
90		31	35	40	45	50	55	61	67	73	79	86	1173
100		32	37	41	46	52	57	63	69	76	82	89	1130
120		34	39	44	50	55	61	68	74	81	88	96	1055
248		42	48	54	61	68	75	83	91	99	108	117	863

DESIGN NOTE(s):

77. See comments in front of section for conditions including wind and ice.

◇78◇ Ruling span range is for initial line design between 175' to 224' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

954.0 kcmil (45/7) ACSR "Rail"

DE Tension = 5,000 Lbs **RBS = 25,900 Lbs**

Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇80◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
15º, 1" ice, 4 psf wind		38	42	46	50	55	59	64	69	74	80	85	6215
15º, 0.8" ice, 4 psf wind		35	39	43	47	51	55	60	64	69	74	79	5390
0º, 0.5" ice, 4 psf wind + k		30	34	37	40	44	48	51	55	60	64	68	5000
0		22	24	27	29	32	35	38	40	44	47	50	2912
10		24	27	30	32	35	38	41	45	48	51	55	2640
20		27	29	32	35	38	42	45	49	52	56	60	2415
30		29	32	35	38	42	45	49	53	57	61	65	2228
40		31	34	38	41	45	49	53	57	61	66	70	2072
50		33	37	40	44	48	52	56	61	65	70	75	1941
60º F, 21 psf wind		40	44	48	52	57	62	67	72	78	83	89	3499
60º F, 6 psf wind		36	40	43	47	52	56	61	65	70	75	81	2047
60º F, 4 psf wind		36	39	43	47	51	56	60	65	70	75	80	1930
60		35	39	43	47	51	55	60	64	69	74	79	1829
70		37	41	45	49	54	58	63	68	73	78	84	1732
80		39	43	47	52	56	61	66	71	77	82	88	1648
90		41	45	50	54	59	64	69	75	80	86	92	1575
100		43	47	52	57	62	67	72	78	84	90	96	1509

Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇80◇						R.S.						
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
-20		20	23	25	27	29	32	35	37	40	43	46	3161
0		25	28	30	33	36	39	42	46	49	53	56	2576
0°, 0.5" ice, 4 psf wind + k		32	35	39	42	46	50	54	59	63	67	72	4738
30		32	35	38	42	46	50	54	58	62	67	71	2035
32°, 0.5" ice,		36	40	44	48	52	57	61	66	71	76	81	3502
32°, 0.5" ice, 2 psf wind		36	40	44	48	52	57	61	66	71	76	82	3542
40		34	37	41	45	49	53	57	62	66	71	76	1910
50		36	40	43	47	52	56	61	65	70	75	81	1803
60		38	42	46	50	54	59	64	69	74	79	85	1710
60° F, 6 psf wind		38	42	46	51	55	60	65	70	75	80	86	1919
70		40	44	48	52	57	62	67	72	78	83	89	1630
80		41	46	50	55	60	65	70	76	81	87	93	1559
90		43	48	52	57	62	68	73	79	85	91	97	1496
100		43	47	52	57	62	67	72	78	84	90	96	1440
120		48	53	58	64	69	75	81	88	94	101	108	1343
248		60	66	73	79	86	94	101	109	118	126	135	1078

DESIGN NOTE(s):

79. See comments in front of section for conditions including wind and ice.

◇80◇ Ruling span range is for initial line design between 225' to 274' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

954.0 kcmil (45/7) ACSR "Rail"

DE Tension = 7,500 Lbs **RBS = 25,900 Lbs**

Extra Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇82◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
15º, 1" ice, 4 psf wind		50	54	58	63	67	72	77	82	87	92	98	7346
15º, 0.8" ice, 4 psf wind		46	50	54	58	62	66	71	76	80	85	90	6435
0º, 0.5" ice, 4 psf wind + k		40	43	46	50	53	57	61	65	69	73	78	6000
0		27	29	32	34	36	39	42	44	47	50	53	3724
10		30	32	35	37	40	43	46	49	52	55	58	3386
20		33	35	38	41	44	47	50	53	57	60	64	3097
30		35	38	41	44	48	51	54	58	62	65	69	2853
40		38	41	45	48	51	55	59	63	67	71	75	2646
50		41	44	48	51	55	59	63	67	71	76	80	2470
60º F, 21 psf wind		51	55	59	63	68	73	78	83	88	93	99	4287
60º F, 6 psf wind		45	48	52	56	60	64	68	73	78	82	87	2581
60º F, 4 psf wind		44	48	51	55	59	63	68	72	77	81	86	2441
60		44	47	51	55	59	63	67	71	76	80	85	2319
70		46	50	54	58	62	66	71	76	80	85	90	2190
80		49	53	57	61	65	70	75	80	85	90	95	2077
90		51	55	59	64	69	73	78	84	89	94	100	1978
100		53	58	62	67	72	77	82	88	93	99	105	1891

Extra Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇82◇						R.S.						
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
-20		26	28	30	33	35	38	40	43	45	48	51	3861
0		32	34	37	40	43	46	49	52	55	59	62	3176
0°, 0.5" ice, 4 psf wind + k		42	46	49	53	57	61	65	69	73	78	83	5629
30		40	43	47	50	54	58	62	66	70	74	79	2512
32°, 0.5" ice,		47	51	55	59	63	68	72	77	82	87	92	4220
32°, 0.5" ice, 2 psf wind		47	51	55	59	63	68	72	77	82	87	92	4267
40		43	46	50	54	58	62	66	70	75	79	84	2356
50		46	50	54	58	62	66	71	76	80	85	90	2221
60		48	52	56	60	64	69	74	79	83	89	94	2105
60° F, 6 psf wind		49	53	57	61	66	70	75	80	85	90	96	2355
70		50	55	59	63	68	73	78	83	88	93	99	2004
80		53	57	62	66	71	76	81	86	92	98	103	1915
90		55	59	64	69	74	79	85	90	96	102	108	1835
100		57	62	67	72	77	82	88	94	100	106	112	1764
120		62	67	72	77	83	89	95	101	107	114	121	1643
248		78	85	91	98	105	113	120	128	136	145	153	1293

DESIGN NOTE(s):

81. See comments in front of section for conditions including wind and ice.

◇82◇ Ruling span range is for initial line design between 275' to 324' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

954.0 kcmil (45/7) ACSR "Rail"

DE Tension = 6,000 Lbs **RBS = 25,900 Lbs**

Super Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇84◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
15º, 1" ice, 4 psf wind		60	64	68	72	77	81	86	91	96	101	106	8856
15º, 0.8" ice, 4 psf wind		54	58	62	66	70	74	78	82	87	92	96	7900
0º, 0.5" ice, 4 psf wind + k		46	49	52	55	59	62	66	69	73	77	81	7500
0		27	29	31	33	35	37	39	42	44	46	49	5291
10		30	32	34	36	39	41	43	46	48	51	53	4831
20		33	35	37	40	42	45	47	50	53	56	58	4412
30		36	38	41	44	46	49	52	55	58	61	64	4037
40		39	42	45	47	50	53	56	60	63	66	70	3709
50		42	45	48	51	54	58	61	65	68	72	75	3425
60º F, 21 psf wind		57	61	65	69	74	78	83	87	92	97	102	5436
60º F, 6 psf wind		47	51	54	57	61	64	68	72	76	80	84	3488
60º F, 4 psf wind		46	50	53	56	60	63	67	71	75	79	83	3323
60		46	49	52	55	59	62	66	69	73	77	81	3180
70		49	52	56	59	63	67	70	74	79	83	87	2969
80		52	56	59	63	67	71	75	79	84	88	93	2787
90		55	59	63	67	71	75	80	84	89	93	98	2629
100		58	62	66	71	75	79	84	89	94	99	104	2491

Super Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇84◇						R.S.						
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
-20		28	30	32	34	36	38	40	42	45	47	49	5221
0		34	36	39	41	44	46	49	52	54	57	60	4283
0°, 0.5" ice, 4 psf wind + k		49	53	56	60	63	67	71	75	79	83	87	6944
30		44	47	50	53	56	60	63	67	70	74	78	3312
32°, 0.5" ice,		54	58	62	66	70	74	78	82	87	92	96	5261
32°, 0.5" ice, 2 psf wind		54	58	62	66	70	74	78	83	87	92	97	5314
40		47	50	54	57	61	64	68	72	76	80	84	3080
50		50	54	57	61	65	69	73	77	81	85	90	2881
60		54	57	61	65	69	73	77	82	86	91	95	2711
60° F, 6 psf wind		55	59	62	66	71	75	79	84	88	93	98	3009
70		57	61	64	69	73	77	82	86	91	96	101	2563
80		60	64	68	72	77	81	86	91	96	101	106	2434
90		63	67	71	76	81	85	90	95	101	106	111	2320
100		66	70	75	79	84	89	94	100	105	111	116	2219
120		71	76	81	86	91	97	102	108	114	120	126	2049
248		94	100	107	113	120	128	135	143	150	158	167	1554

DESIGN NOTE(s):

83. See comments in front of section for conditions including wind and ice.

◇84◇ Ruling span range is for initial line design between 325' to 374' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 556.5 kcmil (19) AAC "Dahlia"

DE Tension = 2,000 Lbs **RBS = 19,500 Lbs**

Super Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇86◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
15º, 1" ice, 4 psf wind		6	9	12	15	19	24	29	34	40	46	53	2,654
15º, 0.8" ice, 4 psf wind		6	8	11	15	19	23	28	33	39	45	52	2,222
0º, 0.5" ice, 4 psf wind + k		5	7	10	13	16	20	24	29	34	39	45	2,000
0		4	6	9	11	14	18	21	25	30	34	39	897
10		5	7	9	12	16	19	23	28	32	38	43	817
20		5	7	10	13	17	21	25	30	35	41	47	755
30		6	8	11	14	18	22	27	32	38	44	50	704
40		6	9	12	15	19	24	29	34	40	47	53	662
50		6	9	12	16	20	25	30	36	42	49	56	626
60º F, 21 psf wind		7	10	14	18	22	28	34	40	47	54	62	1,445
60º F, 6 psf wind		7	10	13	17	21	27	32	38	45	52	60	712
60º F, 4 psf wind		7	10	13	17	21	27	32	38	45	52	60	650
60		7	10	13	17	21	26	32	38	45	52	59	595
70		7	10	14	18	22	28	33	40	47	54	62	569
80		7	10	14	18	23	29	35	41	49	56	65	545
90		8	11	15	19	24	30	36	43	51	59	68	525
100		8	11	15	20	25	31	38	45	53	61	70	506

Super Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇86◇						R.S.						
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
-20		4	5	7	9	11	14	17	20	24	28	32	1,108
0		5	6	9	12	15	18	22	26	30	35	41	874
0°, 0.5" ice, 4 psf wind + k		5	7	10	13	16	20	24	29	34	39	45	2,000
30		6	8	11	15	18	23	28	33	39	45	51	690
32°, 0.5" ice,		6	9	12	15	20	24	29	35	41	47	54	1,389
32°, 0.5" ice, 2 psf wind		6	9	12	15	20	24	29	35	41	47	54	1,410
40		6	9	12	15	20	24	29	35	41	47	54	650
50		6	9	13	16	21	26	31	37	43	50	58	616
60		7	10	13	17	22	27	32	39	45	52	60	586
60° F, 6 psf wind		7	10	13	17	22	27	33	39	46	53	61	702
70		7	10	14	18	23	28	34	40	47	55	63	561
80		7	10	14	19	24	29	35	42	49	57	66	538
90		8	11	15	19	25	30	37	44	51	60	68	518
100		8	11	15	20	25	31	38	45	53	62	71	500
120		8	12	16	22	27	34	41	48	57	66	76	469
212		10	15	21	27	34	42	51	60	71	82	94	376

DESIGN NOTE(s):

85. See comments in front of section for conditions including wind and ice.

◇86◇ Ruling span range is for initial line design between 75' to 124' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 556.5 kcmil (19) AAC "Dahlia"

DE Tension = 4,000 Lbs **RBS = 19,500 Lbs**

Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇88◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
15º, 1" ice, 4 psf wind		13	16	19	22	26	30	34	38	43	48	53	4,737
15º, 0.8" ice, 4 psf wind		12	15	18	21	24	28	32	36	40	44	49	4,130
0º, 0.5" ice, 4 psf wind + k		10	12	14	17	20	23	26	29	32	36	40	4,000
0		6	8	9	11	12	14	16	18	21	23	25	2,477
10		7	9	11	13	15	17	19	22	24	27	30	2,095
20		9	11	13	15	17	20	22	25	28	31	35	1,804
30		10	12	14	17	19	22	25	29	32	36	40	1,585
40		11	13	16	19	22	25	28	32	36	40	44	1,418
50		12	15	18	21	24	27	31	35	39	44	49	1,289
60º F, 21 psf wind		15	18	22	26	30	34	39	44	49	55	61	2,636
60º F, 6 psf wind		14	16	20	23	27	30	35	39	44	49	54	1,397
60º F, 4 psf wind		13	16	19	23	26	30	34	39	43	48	54	1,286
60		13	16	19	22	26	30	34	38	43	48	53	1,186
70		14	17	21	24	28	32	36	41	46	51	57	1,103
80		15	18	22	26	30	34	39	44	49	55	61	1,034
90		16	19	23	27	32	36	41	47	52	58	64	975
100		17	21	24	29	33	38	43	49	55	61	68	925

Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇88◇						R.S.						
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
-20		5	6	7	8	10	11	13	14	16	18	20	3,198
0		7	9	11	12	14	16	19	21	24	26	29	2,151
0°, 0.5" ice, 4 psf wind + k		10	12	15	17	20	23	26	30	33	37	41	3,878
30		11	13	16	19	22	25	28	32	36	40	44	1,416
32°, 0.5" ice,		13	16	19	22	25	29	33	37	42	46	51	2,600
32°, 0.5" ice, 2 psf wind		13	16	19	22	25	29	33	37	42	47	52	2,634
40		12	15	18	21	24	27	31	35	40	44	49	1,284
50		13	16	19	22	26	30	34	38	43	48	53	1,180
60		14	17	21	24	28	32	37	41	46	52	57	1,096
60° F, 6 psf wind		15	18	21	25	29	33	37	42	47	53	58	1,300
70		15	19	22	26	30	34	39	44	50	55	61	1,027
80		16	20	23	27	32	36	42	47	53	59	65	969
90		17	21	25	29	33	38	44	49	55	62	68	919
100		18	22	26	30	35	40	46	52	58	65	72	876
120		20	24	28	33	38	44	50	56	63	70	78	805
212		26	31	37	43	50	58	66	74	83	93	103	613

DESIGN NOTE(s):

87. See comments in front of section for conditions including wind and ice.

◇88◇ Ruling span range is for initial line design between 125' to 174' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 556.5 kcmil (19) AAC "Dahlia"

DE Tension = 5,000 Lbs **RBS = 19,500 Lbs**

Medium Span - Feet

Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇90◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
15º, 1" ice, 4 psf wind		24	27	31	34	38	42	47	51	56	61	66	5,937
15º, 0.8" ice, 4 psf wind		22	25	28	32	35	39	43	47	52	56	61	5,215
0º, 0.5" ice, 4 psf wind + k		18	21	23	26	29	32	35	39	42	46	50	5,000
0		11	12	14	16	18	19	21	24	26	28	30	3,220
10		13	14	16	18	20	22	25	27	30	32	35	2,792
20		14	16	19	21	23	26	28	31	34	37	40	2,443
30		16	19	21	23	26	29	32	35	38	42	45	2,165
40		18	21	23	26	29	32	36	39	43	46	50	1,946
50		20	23	26	29	32	35	39	43	47	51	55	1,771
60º F, 21 psf wind		26	29	33	37	42	46	51	56	61	66	72	3,471
60º F, 6 psf wind		22	25	29	32	36	40	44	48	53	57	62	1,902
60º F, 4 psf wind		22	25	28	32	35	39	43	47	52	56	61	1,758
60		22	25	28	31	35	39	42	47	51	55	60	1,629
70		23	27	30	34	37	42	46	50	55	60	65	1,513
80		25	28	32	36	40	44	49	54	59	64	69	1,416
90		26	30	34	38	42	47	52	57	62	68	74	1,335
100		28	32	36	40	45	50	55	60	66	72	78	1,265

Medium Span - Feet

Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇90◇						R.S.						
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
-20		10	11	13	14	16	18	20	21	23	26	28	3,537
0		14	16	18	20	22	24	27	30	32	35	38	2,566
0°, 0.5" ice, 4 psf wind + k		19	22	25	28	31	34	38	42	45	49	54	4,661
30		20	22	25	28	31	35	38	42	46	50	54	1,800
32°, 0.5" ice,		23	26	30	33	37	41	45	50	54	59	64	3,266
32°, 0.5" ice, 2 psf wind		23	26	30	33	37	41	45	50	54	59	64	3,307
40		21	24	27	31	34	38	42	46	50	55	59	1,649
50		23	26	30	33	37	41	45	50	54	59	64	1,526
60		25	28	32	36	40	44	49	53	58	63	69	1,425
60° F, 6 psf wind		25	29	32	36	41	45	49	54	59	65	70	1,685
70		26	30	34	38	42	47	52	57	62	67	73	1,341
80		28	32	36	40	45	50	55	60	66	71	77	1,269
90		29	33	38	42	47	52	57	63	69	75	81	1,207
100		31	35	39	44	49	54	60	66	72	78	85	1,152
120		33	38	43	48	53	59	65	72	78	85	92	1,062
212		44	50	56	63	70	77	85	94	102	111	121	814

DESIGN NOTE(s):

89. See comments in front of section for conditions including wind and ice.

◇90◇ Ruling span range is for initial line design between 175' to 224' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 556.5 kcmil (19) AAC "Dahlia"

DE Tension = 6,000 Lbs **RBS = 19,500 Lbs**

Long Span - Feet

Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇92◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
15º, 1" ice, 4 psf wind		35	39	43	47	51	55	60	65	69	74	80	7,098
15º, 0.8" ice, 4 psf wind		32	36	39	43	47	51	55	59	64	68	73	6,282
0º, 0.5" ice, 4 psf wind + k		27	29	32	35	38	42	45	49	52	56	60	6,000
0		16	17	19	21	22	24	26	28	31	33	35	4,032
10		18	19	21	23	25	27	30	32	34	37	40	3,560
20		20	22	24	26	29	31	34	36	39	42	45	3,155
30		22	25	27	29	32	35	38	41	44	47	50	2,817
40		25	27	30	33	36	39	42	45	48	52	56	2,539
50		27	30	33	36	39	42	46	49	53	57	61	2,311
60º F, 21 psf wind		37	41	45	49	53	58	63	67	73	78	83	4,323
60º F, 6 psf wind		31	34	37	41	44	48	52	56	60	65	69	2,456
60º F, 4 psf wind		30	33	36	40	43	47	51	55	59	63	68	2,282
60		30	33	36	39	43	46	50	54	58	62	67	2,125
70		32	35	39	42	46	50	54	58	62	67	72	1,970
80		34	38	41	45	49	53	58	62	67	72	77	1,840
90		36	40	44	48	52	57	61	66	71	76	82	1,730
100		38	42	46	51	55	60	65	70	75	81	86	1,636

Long Span - Feet

Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇92◇						R.S.						
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
-20		16	17	19	21	22	24	26	28	31	33	35	4,021
0		21	23	25	27	30	32	35	38	40	43	46	3,047
0°, 0.5" ice, 4 psf wind + k		29	32	35	39	42	46	49	53	57	62	66	5,474
30		28	31	34	38	41	44	48	52	56	60	64	2,210
32°, 0.5" ice,		34	37	41	45	49	53	57	62	67	71	76	3,944
32°, 0.5" ice, 2 psf wind		34	38	41	45	49	53	57	62	67	72	77	3,993
40		31	34	37	41	44	48	52	56	61	65	69	2,034
50		33	37	40	44	48	52	56	61	65	70	75	1,890
60		35	39	43	47	51	55	60	65	70	75	80	1,769
60° F, 6 psf wind		36	40	44	48	52	57	61	66	71	76	82	2,084
70		38	41	46	50	54	59	64	69	74	79	85	1,667
80		40	44	48	53	57	62	67	73	78	84	90	1,580
90		42	46	51	55	60	65	71	76	82	88	94	1,504
100		44	48	53	58	63	68	74	80	86	92	98	1,438
120		47	52	57	63	68	74	80	86	93	100	107	1,327
212		62	68	75	82	89	97	104	113	121	130	139	1,018

DESIGN NOTE(s):

91. See comments in front of section for conditions including wind and ice.

◇92◇ Ruling span range is for initial line design between 225' to 274' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 556.5 kcmil (19) AAC "Dahlia"

DE Tension = 7,000 Lbs **RBS = 19,500 Lbs**

Extra Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇94◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
15º, 1" ice, 4 psf wind		48	52	56	60	64	69	73	78	83	88	94	8,227
15º, 0.8" ice, 4 psf wind		43	47	51	54	58	62	67	71	76	80	85	7,336
0º, 0.5" ice, 4 psf wind + k		36	39	42	45	48	51	55	59	62	66	70	7,000
0		20	22	23	25	27	29	31	33	35	37	39	4,906
10		22	24	26	28	30	32	34	36	39	41	44	4,399
20		25	27	29	31	33	36	38	41	43	46	49	3,944
30		28	30	32	35	37	40	43	45	48	51	54	3,548
40		31	33	36	38	41	44	47	50	53	56	60	3,210
50		34	36	39	42	45	48	52	55	58	62	66	2,925
60º F, 21 psf wind		48	52	56	60	65	69	74	79	84	89	94	5,197
60º F, 6 psf wind		39	42	45	48	52	55	59	63	67	71	75	3,069
60º F, 4 psf wind		37	40	44	47	50	54	58	61	65	69	73	2,868
60		37	39	43	46	49	53	56	60	64	68	72	2,686
70		40	43	46	50	53	57	61	65	69	73	77	2,485
80		42	46	49	53	57	61	65	69	74	78	83	2,316
90		45	49	53	57	61	65	69	74	79	84	89	2,172
100		48	52	56	60	64	69	74	79	83	89	94	2,049

Extra Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇94◇						R.S.						
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
-20		21	23	25	27	29	31	33	35	37	39	42	4,587
0		27	30	32	34	37	39	42	45	48	51	54	3,575
0°, 0.5" ice, 4 psf wind + k		40	43	46	50	53	57	61	65	69	73	78	6,306
30		37	40	43	47	50	53	57	61	65	69	73	2,647
32°, 0.5" ice,		45	49	53	57	61	65	69	74	79	83	88	4,637
32°, 0.5" ice, 2 psf wind		45	49	53	57	61	65	70	74	79	84	89	4,692
40		40	43	47	50	54	58	62	66	70	74	79	2,443
50		43	47	50	54	58	62	66	71	75	80	85	2,274
60		46	50	54	58	62	66	71	75	80	85	90	2,132
60° F, 6 psf wind		47	51	55	59	64	68	73	77	82	87	93	2,502
70		49	53	57	61	66	70	75	80	85	90	96	2,011
80		52	56	60	65	69	74	79	84	90	95	101	1,906
90		54	58	63	68	73	78	83	89	94	100	106	1,815
100		57	61	66	71	76	81	87	93	99	105	111	1,735
120		61	66	72	77	83	88	94	100	107	113	120	1,601
212		80	87	93	100	108	115	123	131	140	148	157	1,228

DESIGN NOTE(s):

93. See comments in front of section for conditions including wind and ice.

◇94◇ Ruling span range is for initial line design between 275' to 324' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 556.5 kcmil (19) AAC "Dahlia"

DE Tension = 8,000 Lbs **RBS = 19,500 Lbs**

Super Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇96◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
15º, 1" ice, 4 psf wind		61	65	69	74	78	83	87	92	97	103	108	9,324
15º, 0.8" ice, 4 psf wind		55	58	62	66	70	74	79	83	88	92	97	8,378
0º, 0.5" ice, 4 psf wind + k		45	48	51	55	58	61	65	69	72	76	80	8,000
0		24	26	27	29	31	33	35	37	39	41	43	5,836
10		27	28	30	32	34	36	38	41	43	45	47	5,304
20		29	31	33	36	38	40	42	45	47	50	52	4,811
30		32	35	37	39	42	44	47	49	52	55	58	4,364
40		36	38	41	43	46	48	51	54	57	60	63	3,968
50		39	42	44	47	50	53	56	59	63	66	69	3,623
60º F, 21 psf wind		59	63	67	72	76	81	85	90	95	100	105	6,095
60º F, 6 psf wind		45	48	52	55	58	62	65	69	73	77	81	3,752
60º F, 4 psf wind		44	47	50	53	56	60	63	67	70	74	78	3,529
60		42	45	48	51	54	58	61	65	68	72	75	3,327
70		46	49	52	56	59	63	66	70	74	78	82	3,074
80		49	53	56	60	63	67	71	75	79	83	88	2,858
90		53	56	60	64	68	72	76	80	85	89	94	2,673
100		56	60	64	68	72	76	81	85	90	95	100	2,514

Super Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇96◇						R.S.						
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
-20		27	29	31	33	35	37	39	41	43	46	48	5,215
0		34	36	39	41	44	46	49	52	55	58	60	4,149
0°, 0.5" ice, 4 psf wind + k		50	54	57	61	65	69	72	77	81	85	89	7,153
30		45	48	52	55	58	62	65	69	73	77	81	3,115
32°, 0.5" ice,		56	60	64	68	72	77	81	86	90	95	100	5,346
32°, 0.5" ice, 2 psf wind		57	60	64	68	73	77	82	86	91	96	101	5,408
40		49	52	56	59	63	67	71	75	79	83	87	2,880
50		53	56	60	64	68	72	76	80	84	89	94	2,683
60		56	60	64	68	72	76	81	85	90	95	100	2,516
60° F, 6 psf wind		58	62	66	70	74	79	83	88	93	98	103	2,940
70		60	64	68	72	76	81	86	91	95	101	106	2,373
80		63	67	71	76	81	85	90	95	101	106	112	2,250
90		66	70	75	80	85	90	95	100	106	111	117	2,142
100		69	74	79	84	89	94	99	105	111	117	123	2,047
120		75	80	85	91	96	102	108	114	120	127	133	1,888
212		98	105	112	119	126	134	141	149	157	166	174	1,444

DESIGN NOTE(s):

95. See comments in front of section for conditions including wind and ice.

◇96◇ Ruling span range is for initial line design between 325' to 374' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

1272 kcmil (45/7) ACSR "Bittern"

DE Tension = 1,500 Lbs **RBS = 34,100 Lbs**

Super Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇98◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
15º, 1" ice, 4 psf wind		8	12	16	21	26	32	39	46	54	63	72	2098
15º, 0.8" ice, 4 psf wind		8	11	16	20	26	32	38	46	54	62	72	1749
0º, 0.5" ice, 4 psf wind + k		8	11	15	19	24	30	36	43	51	59	68	1500
0		7	10	14	19	23	29	35	42	49	57	65	744
10		8	11	15	19	24	30	36	43	51	59	68	716
20		8	11	15	20	25	31	38	45	53	61	70	691
30		8	12	16	21	26	32	39	46	54	63	72	671
40		8	12	16	21	27	33	40	48	56	65	75	652
50		9	12	17	22	28	34	41	49	58	67	77	634
60º F, 21 psf wind		9	13	17	23	29	35	43	51	60	69	80	1171
60º F, 6 psf wind		9	13	17	22	28	35	42	50	59	68	79	682
60º F, 4 psf wind		9	13	17	22	28	35	42	50	59	68	79	647
60		9	13	17	22	28	35	42	50	59	68	79	618
70		9	13	18	23	29	36	43	51	60	70	80	603
80		9	13	18	23	30	37	44	53	62	72	82	589
90		9	13	18	24	30	37	45	54	63	73	84	576
100		9	14	19	24	31	38	46	55	64	74	85	569

Super Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇98◇						R.S.						
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
-20		7	10	13	17	22	27	32	39	45	52	60	804
0		7	10	14	19	24	29	35	42	49	57	66	739
0°, 0.5" ice, 4 psf wind + k		8	11	15	19	24	30	36	43	51	59	68	1500
30		8	12	16	21	26	32	39	47	55	64	73	667
32°, 0.5" ice,		8	12	16	21	27	33	40	48	56	65	74	1178
32°, 0.5" ice, 2 psf wind		8	12	16	21	27	33	40	48	56	65	74	1191
40		8	12	16	21	27	33	40	48	56	65	75	648
50		9	12	17	22	28	34	41	49	58	67	77	631
60		9	13	17	22	28	35	42	50	59	69	79	615
60° F, 6 psf wind		9	13	17	23	28	35	43	51	59	69	79	678
70		9	13	18	23	29	36	44	52	61	71	81	600
80		9	13	18	24	30	37	44	53	62	72	83	587
90		9	13	18	24	30	37	45	54	63	73	84	576
100		9	14	19	24	31	38	46	55	64	74	85	569
120		10	14	19	25	31	39	47	56	66	76	87	557
248		11	16	22	28	36	44	53	63	74	86	99	492

DESIGN NOTE(s):

97. See comments in front of section for conditions including wind and ice.

◇98◇ Ruling span range is for initial line design between 75' to 124' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

1272 kcmil (45/7) ACSR "Bittern"

DE Tension = 1,500 Lbs **RBS = 34,100 Lbs**

Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇100◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
15º, 1" ice, 4 psf wind		17	21	25	29	34	39	44	50	56	62	69	3929
15º, 0.8" ice, 4 psf wind		17	20	24	28	33	37	43	48	54	60	67	3341
0º, 0.5" ice, 4 psf wind + k		15	18	22	25	29	34	38	43	49	54	60	3000
0		13	16	19	23	26	30	35	39	44	49	54	1595
10		14	17	21	24	28	32	37	42	47	52	58	1496
20		15	18	22	26	30	34	39	44	49	55	61	1413
30		16	19	23	27	31	36	41	46	52	58	64	1342
40		17	20	24	28	33	38	43	49	55	61	67	1279
50		18	21	25	30	34	40	45	51	57	64	70	1224
60º F, 21 psf wind		19	23	27	32	37	43	49	55	62	69	76	2168
60º F, 6 psf wind		18	22	26	31	36	41	47	53	60	66	74	1292
60º F, 4 psf wind		18	22	26	31	36	41	47	53	60	66	74	1229
60		18	22	26	31	36	41	47	53	59	66	73	1176
70		19	23	27	32	37	43	49	55	62	69	76	1132
80		20	24	28	33	39	44	51	57	64	71	79	1093
90		20	25	29	34	40	46	52	59	66	74	81	1058
100		21	25	30	36	41	47	54	61	68	76	84	1026

Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇100◇						R.S.						
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
-20		12	14	17	20	23	26	30	34	38	42	47	1832
0		14	17	20	23	27	31	35	40	45	50	55	1560
0°, 0.5" ice, 4 psf wind + k		15	18	22	25	29	34	38	43	49	54	60	3000
30		16	20	24	28	32	37	42	47	53	59	65	1315
32°, 0.5" ice,		17	21	25	29	34	39	44	50	56	62	69	2253
32°, 0.5" ice, 2 psf wind		17	21	25	29	34	39	44	50	56	62	69	2276
40		17	21	25	29	34	39	44	50	56	62	69	1255
50		18	22	26	30	35	40	46	52	58	65	72	1202
60		19	23	27	32	37	42	48	54	60	67	75	1155
60° F, 6 psf wind		19	23	27	32	37	42	48	54	61	68	75	1271
70		19	23	28	33	38	44	50	56	63	70	77	1113
80		20	24	29	34	39	45	51	58	65	72	80	1075
90		21	25	30	35	41	47	53	60	67	75	83	1041
100		21	26	31	36	42	48	55	62	69	77	86	1010
120		22	27	32	38	44	50	57	64	72	80	89	969
248		26	32	38	44	51	59	67	76	85	94	105	827

DESIGN NOTE(s):

99. See comments in front of section for conditions including wind and ice.

◇100◇ Ruling span range is for initial line design between 125' to 174' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

1272 kcmil (45/7) ACSR "Bittern"

DE Tension = 1,500 Lbs **RBS = 34,100 Lbs**

Medium Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇102◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
15º, 1" ice, 4 psf wind		27	31	35	39	43	48	53	58	63	69	75	5636
15º, 0.8" ice, 4 psf wind		26	29	33	37	41	46	50	55	60	66	71	4879
0º, 0.5" ice, 4 psf wind + k		22	26	29	32	36	40	44	48	53	58	62	4500
0		18	21	24	27	30	33	36	40	43	47	51	2624
10		20	23	26	29	32	36	39	43	47	51	56	2418
20		22	25	28	31	35	38	42	46	51	55	60	2246
30		23	26	30	33	37	41	45	50	54	59	64	2102
40		25	28	31	35	39	44	48	53	58	63	68	1979
50		26	29	33	37	41	46	51	56	61	66	72	1874
60º F, 21 psf wind		29	33	38	42	47	52	57	63	69	75	81	3180
60º F, 6 psf wind		27	31	35	40	44	49	54	59	65	70	76	1950
60º F, 4 psf wind		27	31	35	39	44	49	54	59	64	70	76	1859
60		27	31	35	39	44	48	53	59	64	70	76	1782
70		28	32	37	41	46	51	56	61	67	73	79	1702
80		30	34	38	43	48	53	58	64	70	76	83	1630
90		31	35	40	45	50	55	61	67	73	79	86	1567
100		32	37	41	46	52	57	63	69	76	82	89	1510

Medium Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇102◇						R.S.						
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
-20		16	18	21	23	26	29	32	35	38	41	45	2994
0		20	22	25	28	31	35	38	42	46	50	54	2470
0°, 0.5" ice, 4 psf wind + k		23	26	29	33	37	41	45	49	54	58	63	4442
30		24	28	31	35	39	43	48	52	57	62	68	1995
32°, 0.5" ice,		26	30	34	38	42	47	52	57	62	68	73	3307
32°, 0.5" ice, 2 psf wind		26	30	34	38	42	47	52	57	62	68	73	3339
40		26	29	33	37	41	46	50	55	60	66	71	1884
50		27	31	35	39	44	48	53	58	64	69	75	1788
60		28	32	37	41	46	51	56	61	67	73	79	1705
60° F, 6 psf wind		29	33	37	41	46	51	56	62	67	73	80	1870
70		30	34	38	43	48	53	58	64	70	76	83	1632
80		31	35	40	45	50	55	61	67	73	79	86	1567
90		32	37	41	46	52	57	63	69	76	82	89	1509
100		33	38	43	48	53	59	65	72	78	85	92	1457
120		36	40	46	51	57	63	70	76	83	91	99	1366
248		43	48	55	61	68	76	83	91	100	109	118	1143

DESIGN NOTE(s):

101. See comments in front of section for conditions including wind and ice.

◇102◇ Ruling span range is for initial line design between 175' to 224' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

1272 kcmil (45/7) ACSR "Bittern"

DE Tension = 1,500 Lbs **RBS = 34,100 Lbs**

Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇104◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
15º, 1" ice, 4 psf wind		37	41	45	49	53	58	63	68	73	78	83	7280
15º, 0.8" ice, 4 psf wind		35	38	42	46	50	54	59	63	68	73	78	6396
0º, 0.5" ice, 4 psf wind + k		30	33	36	40	43	47	51	55	59	63	68	6000
0		22	25	27	30	32	35	38	41	44	47	50	3832
10		25	27	30	33	35	38	42	45	48	52	55	3503
20		27	29	32	35	38	42	45	49	52	56	60	3225
30		29	32	35	38	41	45	49	52	56	61	65	2989
40		31	34	37	41	44	48	52	56	61	65	69	2789
50		33	36	40	43	47	51	56	60	64	69	74	2619
60º F, 21 psf wind		39	43	47	52	56	61	66	71	76	82	88	4243
60º F, 6 psf wind		35	39	43	47	51	55	60	65	69	74	80	2689
60º F, 4 psf wind		35	39	42	46	51	55	59	64	69	74	79	2571
60		35	38	42	46	50	54	59	64	68	73	78	2471
70		37	41	45	49	53	57	62	67	72	77	83	2343
80		39	43	47	51	56	60	65	70	76	81	87	2232
90		40	45	49	53	58	63	68	74	79	85	91	2133
100		42	46	51	56	61	66	71	77	83	89	95	2045

Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇104◇						R.S.						
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
-20		21	23	25	27	30	32	35	38	40	43	46	4175
0		25	28	31	33	36	39	43	46	50	53	57	3405
0°, 0.5" ice, 4 psf wind + k		31	34	38	41	45	49	53	57	61	65	70	5782
30		32	35	39	42	46	50	54	58	63	67	72	2694
32°, 0.5" ice,		36	39	43	47	52	56	60	65	70	75	81	4331
32°, 0.5" ice, 2 psf wind		36	40	43	47	52	56	61	65	70	75	81	4371
40		34	38	41	45	49	53	58	62	67	72	77	2529
50		36	40	44	48	52	56	61	66	71	76	81	2388
60		38	42	46	50	55	59	64	69	75	80	86	2267
60° F, 6 psf wind		38	42	46	51	55	60	65	70	75	81	86	2479
70		40	44	48	53	57	62	67	73	78	84	90	2161
80		42	46	50	55	60	65	70	76	82	88	94	2067
90		43	48	53	57	63	68	73	79	85	91	98	1984
100		45	50	55	60	65	71	76	82	89	95	102	1910
120		48	53	59	64	70	76	82	88	95	102	109	1782
248		59	65	72	78	85	93	100	108	116	124	133	1459

DESIGN NOTE(s):

103. See comments in front of section for conditions including wind and ice.

◇104◇ Ruling span range is for initial line design between 225' to 274' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

1272 kcmil (45/7) ACSR "Bittern"

DE Tension = 1,500 Lbs **RBS = 34,100 Lbs**

Extra Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇106◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
15º, 1" ice, 4 psf wind		48	51	55	60	64	68	73	78	83	88	93	8882
15º, 0.8" ice, 4 psf wind		44	48	51	55	59	63	68	72	77	81	86	7903
0º, 0.5" ice, 4 psf wind + k		38	41	44	47	50	54	58	61	65	69	74	7500
0		26	28	30	33	35	37	40	42	45	48	51	5187
10		28	31	33	36	38	41	44	46	49	52	56	4746
20		31	33	36	39	41	44	47	51	54	57	60	4360
30		33	36	39	42	45	48	51	55	58	62	65	4024
40		36	39	42	45	48	52	55	59	63	67	71	3735
50		39	42	45	48	52	56	59	63	67	71	76	3485
60º F, 21 psf wind		48	52	56	61	65	69	74	79	84	89	95	5368
60º F, 6 psf wind		42	46	49	53	57	61	65	69	73	78	82	3531
60º F, 4 psf wind		42	45	49	52	56	60	64	68	72	77	82	3390
60		41	45	48	52	55	59	63	67	72	76	81	3269
70		44	47	51	55	59	63	67	72	76	81	86	3082
80		46	50	54	58	62	66	71	76	80	85	90	2918
90		49	52	57	61	65	70	75	79	85	90	95	2775
100		51	55	59	64	68	73	78	83	89	94	100	2648

Extra Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇106◇						R.S.						
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
-20		25	27	29	31	34	36	39	41	44	46	49	5361
0		31	33	36	39	41	44	47	50	54	57	60	4380
0°, 0.5" ice, 4 psf wind + k		40	43	46	50	53	57	61	65	69	74	78	7080
30		39	42	46	49	53	56	60	64	68	72	77	3432
32°, 0.5" ice,		45	49	53	57	61	65	70	74	79	84	89	5358
32°, 0.5" ice, 2 psf wind		45	49	53	57	61	65	70	74	79	84	89	5405
40		42	45	49	53	56	60	64	69	73	78	82	3210
50		45	48	52	56	60	64	69	73	78	82	87	3021
60		47	51	55	59	63	68	72	77	82	87	92	2858
60° F, 6 psf wind		48	52	56	60	64	69	73	78	83	88	94	3115
70		50	54	58	62	67	71	76	81	86	92	97	2716
80		52	56	61	65	70	75	80	85	91	96	102	2591
90		54	59	63	68	73	78	84	89	95	100	106	2481
100		57	61	66	71	76	81	87	93	99	105	111	2382
120		61	66	71	76	82	88	94	100	106	113	119	2214
248		76	82	88	95	102	109	117	124	132	140	149	1779

DESIGN NOTE(s):

105. See comments in front of section for conditions including wind and ice.

◇106◇ Ruling span range is for initial line design between 275' to 324' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

1272 kcmil (45/7) ACSR "Bittern"

DE Tension = 1,500 Lbs **RBS = 34,100 Lbs**

Super Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇108◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
15º, 1" ice, 4 psf wind		58	62	66	70	75	79	84	88	93	98	103	10455
15º, 0.8" ice, 4 psf wind		53	57	60	64	68	72	77	81	85	90	95	9405
0º, 0.5" ice, 4 psf wind + k		45	48	51	54	58	61	65	68	72	76	80	9000
0		29	31	33	35	37	40	42	44	47	49	52	6639
10		32	34	36	38	41	43	46	48	51	53	56	6117
20		34	37	39	42	44	47	50	52	55	58	61	5640
30		37	40	42	45	48	51	54	57	60	63	66	5210
40		40	43	46	49	52	55	58	61	64	68	71	4828
50		43	46	49	52	55	59	62	66	69	73	77	4492
60º F, 21 psf wind		57	61	65	69	73	77	82	86	91	96	101	6557
60º F, 6 psf wind		48	51	54	58	61	65	69	72	76	80	85	4494
60º F, 4 psf wind		47	50	53	57	60	64	67	71	75	79	83	4334
60		46	49	53	56	59	63	67	70	74	78	82	4196
70		49	53	56	60	63	67	71	75	79	83	87	3938
80		52	56	59	63	67	71	75	79	84	88	93	3712
90		55	59	63	67	71	75	79	84	89	93	98	3513
100		58	62	66	70	75	79	84	88	93	98	103	3337

Super Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇108◇						R.S.						
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
-20		30	32	34	36	38	40	43	45	48	50	53	6546
0		36	38	41	44	46	49	52	55	58	61	64	5391
0°, 0.5" ice, 4 psf wind + k		48	52	55	59	62	66	70	74	78	82	86	8352
30		46	49	52	56	59	63	66	70	74	78	82	4215
32°, 0.5" ice,		55	58	62	66	70	74	79	83	88	92	97	6394
32°, 0.5" ice, 2 psf wind		55	58	62	66	70	75	79	83	88	93	97	6446
40		49	53	56	60	63	67	71	75	79	83	88	3933
50		52	56	60	63	67	71	76	80	84	89	93	3692
60		56	59	63	67	71	76	80	85	89	94	99	3484
60° F, 6 psf wind		57	60	64	68	73	77	82	86	91	96	101	3783
70		59	63	67	71	75	80	85	89	94	99	104	3302
80		62	66	70	75	79	84	89	94	99	104	110	3144
90		65	69	73	78	83	88	93	98	104	109	115	3003
100		67	72	77	82	87	92	97	102	108	114	120	2879
120		73	78	83	88	93	99	105	111	117	123	129	2667
248		92	99	105	112	119	126	133	140	148	156	164	2105

DESIGN NOTE(s):

107. See comments in front of section for conditions including wind and ice.

◇108◇ Ruling span range is for initial line design between 325' to 374' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 954.0 kcmil (45/7) ACSR "Rail"

DE Tension = 2,500 Lbs **RBS = 51,800 Lbs**

Super Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇110◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
15º, 1" ice, 4 psf wind		7	10	13	17	22	27	33	39	46	53	61	3,287
15º, 0.8" ice, 4 psf wind		7	10	13	17	22	27	32	38	45	52	60	2,805
0º, 0.5" ice, 4 psf wind + k		6	9	12	16	20	24	30	35	41	48	55	2,500
0		6	8	12	15	19	24	28	34	40	46	53	1,376
10		6	9	12	16	20	25	30	36	42	49	56	1,301
20		7	9	13	17	21	26	32	38	44	51	59	1,236
30		7	10	13	18	22	27	33	39	46	54	62	1,180
40		7	10	14	18	23	28	34	41	48	56	64	1,135
50		7	11	14	19	24	30	36	43	50	58	66	1,094
60º F, 21 psf wind		8	11	15	20	25	31	38	45	53	61	70	1,922
60º F, 6 psf wind		8	11	15	20	25	31	37	44	52	60	69	1,155
60º F, 4 psf wind		8	11	15	20	25	31	37	44	52	60	69	1,102
60		8	11	15	20	25	31	37	44	52	60	69	1,057
70		8	11	15	20	26	32	38	45	53	62	71	1,024
80		8	12	16	21	26	33	39	47	55	64	73	994
90		8	12	16	21	27	33	41	48	57	66	75	966
100		9	12	17	22	28	34	42	49	58	67	77	942

Super Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇110◇						R.S.						
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
-20		5	7	10	13	17	21	25	30	35	40	46	1,574
0		6	8	12	15	19	24	28	34	40	46	53	1,376
0°, 0.5" ice, 4 psf wind + k		6	9	12	16	20	24	30	35	41	48	55	2,498
30		7	10	13	18	22	27	33	39	46	54	62	1,180
32°, 0.5" ice,		7	10	14	18	23	28	34	41	48	55	63	1,947
32°, 0.5" ice, 2 psf wind		7	10	14	18	23	28	34	41	48	55	63	1,964
40		7	10	14	18	23	29	35	41	48	56	64	1,134
50		7	11	14	19	24	30	36	43	50	58	66	1,093
60		8	11	15	20	25	31	37	44	52	60	69	1,057
60° F, 6 psf wind		8	11	15	20	25	31	37	44	52	60	69	1,154
70		8	11	15	20	26	32	38	45	53	62	71	1,024
80		8	12	16	21	26	33	39	47	55	64	73	994
90		8	12	16	21	27	33	41	48	57	66	75	966
100		9	12	17	22	28	34	42	49	58	67	77	941
120		9	13	17	23	29	35	43	51	60	69	79	916
248		10	15	20	26	33	41	50	59	69	80	92	793

DESIGN NOTE(s):

109. See comments in front of section for conditions including wind and ice.

◇110◇ Ruling span range is for initial line design between 75' to 124' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 954.0 kcmil (45/7) ACSR "Rail"

DE Tension = 4,000 Lbs **RBS = 51,800 Lbs**

Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇112◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
15º, 1" ice, 4 psf wind		17	21	25	29	34	39	44	50	56	62	69	5,168
15º, 0.8" ice, 4 psf wind		17	20	24	28	33	38	43	49	55	61	67	4,448
0º, 0.5" ice, 4 psf wind + k		15	19	22	26	30	34	39	44	50	55	61	4,000
0		14	17	20	24	28	32	36	41	46	51	57	2,274
10		15	18	22	26	30	34	39	44	49	55	61	2,131
20		16	19	23	27	31	36	41	46	52	58	64	2,012
30		17	20	24	28	33	38	43	49	55	61	67	1,916
40		18	21	25	30	35	40	45	51	57	64	71	1,832
50		18	22	26	31	36	41	47	53	60	66	74	1,758
60º F, 21 psf wind		20	24	28	33	38	44	50	57	64	71	79	3,037
60º F, 6 psf wind		19	23	28	32	38	43	49	55	62	69	77	1,845
60º F, 4 psf wind		19	23	28	32	38	43	49	55	62	69	77	1,762
60		19	23	27	32	37	43	49	55	62	69	76	1,692
70		20	24	28	33	39	45	51	57	64	71	79	1,632
80		20	25	29	35	40	46	52	59	66	74	82	1,579
90		21	26	30	36	41	48	54	61	68	76	84	1,530
100		22	26	31	37	43	49	56	63	71	79	87	1,485

Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇112◇						R.S.						
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
-20		12	15	18	21	24	28	31	35	40	44	49	2,626
0		14	17	21	24	28	32	37	41	46	52	57	2,254
0°, 0.5" ice, 4 psf wind + k		15	19	22	26	30	35	40	45	50	56	62	3,960
30		17	21	24	29	33	38	44	49	55	61	68	1,901
32°, 0.5" ice,		18	21	25	30	35	40	45	51	57	64	71	3,094
32°, 0.5" ice, 2 psf wind		18	21	25	30	35	40	45	51	57	64	71	3,120
40		18	21	26	30	35	40	45	51	58	64	71	1,820
50		19	22	27	31	36	42	47	53	60	67	74	1,748
60		19	23	28	32	38	43	49	55	62	69	77	1,683
60° F, 6 psf wind		19	23	28	33	38	43	49	56	62	70	77	1,835
70		20	24	29	34	39	45	51	57	64	72	80	1,625
80		21	25	30	35	40	46	53	59	67	74	82	1,573
90		21	26	31	36	42	48	54	61	69	77	85	1,525
100		22	26	31	37	43	49	56	63	71	79	87	1,481
120		23	28	33	39	45	52	59	67	75	83	92	1,404
248		27	32	39	45	53	60	69	78	87	97	107	1,208

DESIGN NOTE(s):

111. See comments in front of section for conditions including wind and ice.

◇112◇ Ruling span range is for initial line design between 125' to 174' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 954.0 kcmil (45/7) ACSR "Rail"

DE Tension = 5,500 Lbs **RBS = 51,800 Lbs**

Medium Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇114◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
15º, 1" ice, 4 psf wind		29	33	37	41	46	51	56	62	67	73	80	6,986
15º, 0.8" ice, 4 psf wind		28	32	36	40	45	49	55	60	65	71	77	6,060
0º, 0.5" ice, 4 psf wind + k		25	28	32	36	40	45	49	54	59	64	70	5,500
0		23	26	29	33	36	40	44	49	53	58	63	3,203
10		24	28	31	35	39	43	47	52	57	62	67	2,997
20		26	29	33	37	41	46	50	55	60	66	71	2,830
30		27	31	35	39	43	48	53	58	64	69	75	2,685
40		28	32	37	41	46	51	56	61	67	73	79	2,559
50		30	34	38	43	48	53	58	64	70	76	83	2,449
60º F, 21 psf wind		32	37	41	46	52	57	63	69	76	83	90	4,165
60º F, 6 psf wind		31	35	40	45	50	55	61	67	73	80	86	2,559
60º F, 4 psf wind		31	35	40	45	50	55	61	67	73	79	86	2,446
60		31	35	40	45	50	55	61	67	73	79	86	2,350
70		32	37	41	46	52	57	63	69	76	82	89	2,263
80		33	38	43	48	53	59	65	72	78	85	92	2,184
90		34	39	44	50	55	61	67	74	81	88	96	2,112
100		36	40	46	51	57	63	70	77	84	91	99	2,047

Medium Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇114◇						R.S.						
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
-20		20	23	26	29	32	36	40	44	48	52	56	3,590
0		24	27	30	34	38	42	46	51	55	60	65	3,082
0°, 0.5" ice, 4 psf wind + k		26	29	33	37	41	46	50	55	60	66	71	5,346
30		28	32	36	40	45	49	55	60	65	71	77	2,611
32°, 0.5" ice,		29	33	38	42	47	52	58	63	69	75	82	4,196
32°, 0.5" ice, 2 psf wind		29	33	38	42	47	52	58	63	69	75	82	4,229
40		29	33	37	42	47	52	57	63	69	75	81	2,495
50		30	35	39	44	49	54	60	65	71	78	84	2,393
60		32	36	41	45	51	56	62	68	74	81	88	2,302
60° F, 6 psf wind		32	36	41	46	51	56	62	68	75	81	88	2,506
70		33	37	42	47	53	58	64	70	77	84	91	2,220
80		34	39	44	49	54	60	66	73	80	87	94	2,146
90		35	40	45	50	56	62	69	75	82	90	97	2,079
100		36	41	46	52	58	64	71	78	85	92	100	2,017
120		38	43	49	55	61	68	75	82	90	98	106	1,908
248		45	51	58	65	73	80	89	97	106	116	126	1,612

DESIGN NOTE(s):

113. See comments in front of section for conditions including wind and ice.

◇114◇ Ruling span range is for initial line design between 175' to 224' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 954.0 kcmil (45/7) ACSR "Rail"

DE Tension = 7,000 Lbs **RBS = 51,800 Lbs**

Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇116◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
15º, 1" ice, 4 psf wind		41	45	49	54	58	63	69	74	79	85	91	8,764
15º, 0.8" ice, 4 psf wind		39	43	47	52	56	61	66	71	77	82	88	7,658
0º, 0.5" ice, 4 psf wind + k		35	39	42	46	50	55	59	64	68	73	79	7,000
0		31	34	37	41	44	48	52	56	60	65	69	4,198
10		33	36	40	43	47	51	56	60	64	69	74	3,928
20		35	39	42	46	50	55	59	64	68	73	79	3,698
30		37	41	45	49	53	58	62	67	72	78	83	3,500
40		39	43	47	51	56	61	66	71	76	82	87	3,328
50		41	45	49	54	59	64	69	74	80	86	92	3,177
60º F, 21 psf wind		45	50	54	59	65	70	76	82	88	94	101	5,316
60º F, 6 psf wind		43	47	52	57	62	67	72	78	84	90	96	3,307
60º F, 4 psf wind		43	47	52	56	61	67	72	78	84	90	96	3,164
60		42	47	51	56	61	66	72	77	83	89	96	3,043
70		44	49	54	59	64	69	75	81	87	93	100	2,924
80		46	51	56	61	66	72	78	84	90	97	103	2,817
90		48	52	58	63	68	74	80	87	93	100	107	2,721
100		49	54	59	65	71	77	83	90	96	103	111	2,633

Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇116◇						R.S.						
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
-20		28	31	34	38	41	45	48	52	56	60	64	4,526
0		33	36	40	43	47	51	56	60	64	69	74	3,932
0°, 0.5" ice, 4 psf wind + k		37	40	44	48	53	57	62	67	72	77	82	6,698
30		39	43	47	51	56	61	66	71	76	82	87	3,333
32°, 0.5" ice,		41	46	50	55	60	65	70	75	81	87	93	5,291
32°, 0.5" ice, 2 psf wind		41	46	50	55	60	65	70	76	81	87	93	5,331
40		41	45	49	54	59	63	69	74	80	85	91	3,182
50		42	47	51	56	61	66	72	77	83	89	95	3,049
60		44	49	53	58	63	69	75	80	86	93	99	2,931
60° F, 6 psf wind		44	49	54	59	64	69	75	81	87	93	100	3,187
70		46	50	55	61	66	72	77	83	90	96	103	2,824
80		47	52	57	63	68	74	80	86	93	100	107	2,728
90		49	54	59	65	71	77	83	89	96	103	110	2,641
100		51	56	61	67	73	79	85	92	99	106	114	2,561
120		53	59	65	71	77	84	90	97	105	112	120	2,420
248		64	71	78	85	93	101	109	117	126	135	145	2,012

DESIGN NOTE(s):

115. See comments in front of section for conditions including wind and ice.

◇116◇ Ruling span range is for initial line design between 225' to 274' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 954.0 kcmil (45/7) ACSR "Rail"

DE Tension = 9,000 Lbs **RBS = 51,800 Lbs**

Extra Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range 118	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
15º, 1" ice, 4 psf wind		51	55	59	64	68	73	78	83	88	94	99	10,956
15º, 0.8" ice, 4 psf wind		48	52	56	61	65	69	74	79	84	89	95	9,687
0º, 0.5" ice, 4 psf wind + k		43	46	50	53	57	61	65	70	74	79	83	9,000
0		35	38	41	44	47	51	54	58	61	65	69	5,734
10		38	41	44	48	51	55	58	62	66	70	74	5,317
20		41	44	47	51	55	59	63	67	71	75	80	4,963
30		43	47	51	54	58	62	67	71	76	80	85	4,659
40		46	50	54	58	62	66	71	75	80	85	90	4,398
50		48	52	56	61	65	70	74	79	84	90	95	4,171
60º F, 21 psf wind		55	60	64	69	74	79	85	90	96	102	108	6,765
60º F, 6 psf wind		51	56	60	64	69	74	79	84	89	95	101	4,302
60º F, 4 psf wind		51	55	60	64	69	74	79	84	89	94	100	4,123
60		51	55	59	64	68	73	78	83	89	94	100	3,972
70		53	58	62	67	72	77	82	87	93	98	104	3,796
80		56	60	65	70	75	80	85	91	97	103	109	3,640
90		58	62	67	72	78	83	89	94	100	107	113	3,500
100		60	65	70	75	81	86	92	98	104	111	117	3,374

Extra Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range 118						R.S.						
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
-20		34	36	39	42	45	48	52	55	59	62	66	6,007
0		39	42	46	49	53	56	60	64	68	72	77	5,150
0°, 0.5" ice, 4 psf wind + k		45	49	53	57	61	65	70	74	79	84	89	8,440
30		47	51	55	59	63	68	72	77	82	87	92	4,290
32°, 0.5" ice,		51	56	60	64	69	74	79	84	90	95	101	6,664
32°, 0.5" ice, 2 psf wind		52	56	60	65	69	74	79	84	90	95	101	6,712
40		50	54	58	62	67	71	76	81	86	92	97	4,078
50		52	56	61	65	70	75	80	85	90	96	102	3,891
60		54	59	63	68	73	78	83	89	94	100	106	3,725
60° F, 6 psf wind		55	59	64	69	74	79	84	90	95	101	107	4,041
70		56	61	66	71	76	81	87	92	98	104	111	3,578
80		59	63	68	73	79	84	90	96	102	108	115	3,446
90		61	66	71	76	82	87	93	100	106	112	119	3,326
100		63	68	73	79	85	90	97	103	109	116	123	3,218
120		67	72	78	84	90	96	103	109	116	123	131	3,028
248		82	89	96	103	111	119	127	135	144	152	162	2,455

DESIGN NOTE(s):

117. See comments in front of section for conditions including wind and ice.

118. Ruling span range is for initial line design between 275' to 324' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

T2 - (2) 954.0 kcmil (45/7) ACSR "Rail"

DE Tension = 12,000 Lbs **RBS = 51,800 Lbs**

Super Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇120◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
15º, 1" ice, 4 psf wind		57	61	65	69	74	78	83	87	92	97	102	13,929
15º, 0.8" ice, 4 psf wind		54	57	61	65	69	73	77	82	86	91	95	12,556
0º, 0.5" ice, 4 psf wind + k		46	49	52	55	59	62	66	70	74	77	82	12,000
0		34	36	38	41	43	46	49	51	54	57	60	8,594
10		37	39	42	45	47	50	53	56	59	62	66	7,877
20		40	43	46	48	51	54	58	61	64	68	71	7,249
30		43	46	49	52	56	59	62	66	69	73	77	6,705
40		47	50	53	56	60	63	67	71	75	79	83	6,237
50		50	53	57	60	64	68	72	76	80	84	89	5,833
60º F, 21 psf wind		61	65	69	73	78	83	87	92	97	103	108	8,854
60º F, 6 psf wind		54	58	61	65	69	73	78	82	87	91	96	5,893
60º F, 4 psf wind		53	57	61	65	69	73	77	81	86	90	95	5,671
60		53	57	60	64	68	72	76	81	85	90	94	5,483
70		56	60	64	68	72	76	81	85	90	95	100	5,180
80		59	63	67	72	76	81	85	90	95	100	105	4,914
90		62	66	71	75	80	84	89	94	100	105	110	4,681
100		65	69	74	79	83	88	94	99	104	110	116	4,474

Super Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇120◇						R.S.						
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
-20		34	36	38	41	43	46	49	51	54	57	60	8,608
0		40	43	46	49	52	55	58	61	65	68	72	7,201
0°, 0.5" ice, 4 psf wind + k		50	54	57	61	65	68	72	76	81	85	89	10,953
30		50	54	57	61	65	68	72	76	81	85	89	5,782
32°, 0.5" ice,		57	61	65	69	74	78	83	87	92	97	102	8,602
32°, 0.5" ice, 2 psf wind		57	61	65	69	74	78	83	87	92	97	102	8,660
40		53	57	61	65	69	73	77	81	86	90	95	5,438
50		57	60	64	68	73	77	81	86	91	96	100	5,140
60		60	64	68	72	77	81	86	91	96	101	106	4,880
60° F, 6 psf wind		60	64	69	73	78	82	87	92	97	102	107	5,269
70		63	67	71	76	80	85	90	95	100	106	111	4,651
80		65	70	74	79	84	89	94	99	105	110	116	4,449
90		68	73	78	82	88	93	98	104	109	115	121	4,268
100		71	76	81	86	91	96	102	108	114	120	126	4,107
120		76	81	86	92	98	103	109	116	122	128	135	3,828
248		98	104	111	118	126	133	141	149	157	165	174	2,981

DESIGN NOTE(s):

119. See comments in front of section for conditions including wind and ice.

◇120◇ Ruling span range is for initial line design between 325' to 374' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	11/06/15	ZSD	

This Standard provides sag and tension at 50ft ruling span (RS) for all applications on distribution circuits and sub-transmission lines. The unguyed (self-sustaining) composite pole is covered in DCS **02 00 04 02**.

The below tables show the sags to which conductors are to be strung and clearances to be verified.

Table 1 - 50ft Ruling Span Tensions

Conductor	Tension (Lbs)							
	DE	Initial (Stringing)			Final (Clearance)			
		30° F	60° F	90° F	0° F	60° F	212° F	248° F
1/0 AWG (7) AAAC "Azusa"	175	18	17	17	19	17	14	-
110.8 kcmil (12/7) ACSR "Minorca"	207	43	42	41	45	42	-	37
336.4 kcmil (18/1) ACSR "Merlin"	243	56	54	52	58	54	-	48
T2 - (2) 4/0 AWG (6/1) ACSR "Penguin"	293	87	84	82	90	83	-	75
556.5 kcmil (19) AAC "Dahlia"	285	80	77	74	83	77	65	-
T2 - (2) 336.4 kcmil (18/1) ACSR "Merlin"	342	111	107	105	115	107	-	96
954.0 kcmil (45/7) ACSR "Rail"	403	165	158	154	172	158	-	141
T2 - (2) 556.5 kcmil (19) AAC "Dahlia"	425	160	154	148	167	160	130	-
1272 kcmil (45/7) ACSR "Bittern"	462	213	206	202	222	206	-	186
T2 - (2) 954.0 kcmil (45/7) ACSR "Rail"	627	318	307	302	332	307	-	277

Table 2 - Initial Sag for 50ft RS

Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)										
	R.S. Range ◇2◇	Not Recommended			R.S.					Not Recommended		
	Span (Ft)	0	10	20	30	40	50	60	70	80 ◇1◇	90 ◇1◇	100 ◇1◇
0°, 0.5" ice, 4 psf wind + k		0	1	4	9	15	24	34	46	61	77	95
0		0	1	4	8	15	24	34	46	60	76	94
30		0	1	4	9	16	25	36	49	64	81	100
60		0	1	4	9	17	26	37	51	66	84	103
90		0	1	4	10	17	27	38	52	68	86	106
100		0	1	4	10	17	27	39	52	69	87	107

DESIGN NOTE(s):

◇1.◇ Horizontal configuration is not recommended on span length greater than 75 feet.

◇2.◇ Ruling span range is for initial line design between 25' to 74' for conductor sag accuracy.

3. Automatic deadends or splices shall **ONLY** be installed on full tension spans. Automatic dead-ends or splices shall **NOT** be installed on slack spans, partial tension, or NESC Grade B crossing (highways, rivers, railroads). For slack span, partial tensions, or NESC Grade B crossing (highways, rivers, railroads) applications use bolted deadends or compression splices

4. Ameren defines a highway as a roadway with 2 or more through lanes in each direction, divided or undivided, with partial access control at a minimum.

REV	DATE	ENG	DESCRIPTION
5	07/01/23	PER	Converted to new format
4	10/01/20	KSP	

Table 3 - Final Sag for 50ft RS												
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)										
		R.S.										
	Span (Ft)	0	10	20	30	40	50	60	70	80 <5>	90 <5>	100 <5>
0		0	1	4	8	15	24	34	46	60	76	94
30		0	1	4	9	16	25	36	49	64	81	100
32°, 0.5" ice,		0	1	4	9	16	25	36	49	65	82	101
60		0	1	4	9	17	26	37	51	67	84	104
90		0	1	4	10	17	27	38	52	68	86	106
100		0	1	4	10	17	27	38	52	68	86	107
120		0	1	4	10	17	27	39	53	69	87	108
212		0	1	5	11	19	30	43	58	76	96	118
248		0	1	5	11	19	30	43	59	77	98	120

DESIGN NOTE(s):

<5> Horizontal configuration is not recommended on span length greater than 75 feet.

6. Ruling span range is for initial line design between 25' to 74' for conductor sag accuracy.

7. Automatic deadends or splices shall **ONLY** be installed on full tension spans. Automatic dead-ends or splices shall **NOT** be installed on slack spans, partial tension, or NESC Grade B crossing (highways, rivers, railroads). For slack span, partial tensions, or NESC Grade B crossing (highways, rivers, railroads) applications use bolted deadends or compression splices

8. Ameren defines a highway as a roadway with 2 or more through lanes in each direction, divided or undivided, with partial access control at a minimum.

This Standard sag & tension values at varying span lengths for 48-ct and 72-ct ADSS conductor (see DCS section 18 for additional conductor information and installation).

Table 1 - 48-ct ADSS properties						
Conductor ◇1	STK #	Diameter	Maximum Rated Conductor Limit (MRCL)	Weight	Weight ½" Ice, 4psf Wind K=0.30	Weight 1" ice
DNA-28144 48−count ADSS	16 16 274	0.528"	2960	0.093 lbs/ft	1.192 lbs/ft	1.993 lbs/ft

Table 2 - 48-ct ADSS Sag & Tension				
100' Span				
Temperature	Ice	Wind	Sag (ft)	Tension (lbs)
0°	½"	4psf + k	1	1615
32°F	1"	0	1.7	1675
60°F	0	0	0.1	1482
200' Span				
Temperature	Ice	Wind	Sag (ft)	Tension (lbs)
0°	½"	4psf + k	3.8	1759
32°F	1"	0	5.4	1974
60°F	0	0	0.1	1482
300' Span				
Temperature	Ice	Wind	Sag (ft)	Tension (lbs)
0°	½"	4psf + k	7.5	1934
32°F	1"	0	10.3	2285
60°F	0	0	0.9	1481
400' Span				
Temperature	Ice	Wind	Sag (ft)	Tension (lbs)
0°	½"	4psf + k	12	2117
32°F	1"	0	16	2585
60°F	0	0	1.5	1479
500' Span				
Temperature	Ice	Wind	Sag (ft)	Tension (lbs)
0°	½"	4psf + k	17	2299
32°F	1"	0	22.4	2871
60°F	0	0	2.35	1478

DESIGN NOTE(s):

◇1. The 48-ct ADSS tables are to be used to check clearance with existing ADSS installations. All new ADSS installation shall be 72-ct ADSS.

REV	DATE	ENG	DESCRIPTION
2	07/01/23	PER	Converted to new format
1	10/01/20	KR	

Table 3 - 72-ct ADSS properties						
Conductor ◇2	STK #	Diameter	Maximum Rated Conductor Limit (MRCL)	Weight	½" Ice, 4psf Wind K=0.30	Weight 1" ice
DNA−27718 72-count ADSS	27 59 084	0.559"	3150	0.108 lbs/ft	1.226 lbs/ft	2.217 lbs/ft

Table 4 - 72-ct ADSS Sag & Tension				
100' Span				
Temperature (°F)	Ice (in)	Wind	Sag (ft)	Tension (lbs)
0	0.5	4 psf + k	1	1672
32	0.5	2	0.6	1587
60	0	0	0.1	1511
200' Span				
Temperature (°F)	Ice (in)	Wind	Sag (ft)	Tension (lbs)
0	0.5	4 psf + k	3.4	1822
32	0.5	2	2.4	1666
60	0	0	0.4	1511
300' Span				
Temperature (°F)	Ice (in)	Wind	Sag (ft)	Tension (lbs)
0	0.5	4 psf + k	6.9	2005
32	0.5	2	5.1	1774
60	0	0	0.8	1510
400' Span				
Temperature (°F)	Ice (in)	Wind	Sag (ft)	Tension (lbs)
0	0.5	4 psf + k	11	2194
32	0.5	2	9	1893
60	0	0	1.4	1508
500' Span				
Temperature (°F)	Ice (in)	Wind	Sag (ft)	Tension (lbs)
0	0.5	4 psf + k	16	2384
32	0.5	2	12.6	2019
60	0	0	2.24	1507

DESIGN NOTE(s):

◇2. The 48-ct ADSS tables are to be used to check clearance with existing ADSS installations. All new ADSS installation shall be 72-ct ADSS.

This Standard provides sag & tension values at varying span lengths for 72-ct OPGW conductor (see DCS Section 18 for additional conductor information and installation).

DE Tension = 250 Lbs

RBS = 19,800 Lbs

Slack Span - 50 feet							
Temp. Deg. F	Condition						Tension Lbs
	R.S. Range ◇2◇			R.S.			
	Span (Ft)	30	40	50	60	70	
15º, 1" ice, 4 psf wind		14	18	22	26	31	413
0º, 0.5" ice, 4 psf wind + k		13	17	21	25	30	250
0		13	17	21	25	30	63
30		14	17	22	26	31	61
60		14	18	22	27	32	59
90		15	19	23	28	33	57

DE Tension = 500 Lbs

RBS = 19,800 Lbs

Slack Span - 100 feet							
Temp. Deg. F	Condition						Tension Lbs
	R.S. Range ◇2◇			R.S.			
	Span (Ft)	80	90	100	110	120	
15º, 1" ice, 4 psf wind		28	35	44	53	63	819
0º, 0.5" ice, 4 psf wind + k		27	34	42	51	61	500
0		26	33	41	50	59	128
30		26	33	41	50	59	123
60		28	36	44	53	64	119
90		29	37	46	55	66	115

DESIGN NOTE(s):

1. See DCS **07 00 07 03** for conditions including wind and ice.

◇2.◇ Ruling span range for initial line design between 75' and 124' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
2	07/01/23	PER	Converteed to new format
1	07/01/20	NH	

DE Tension = 1,900 Lbs

RBS = 19,800 Lbs

Super Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇4◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
15º, 1" ice, 4 psf wind		4	6	8	10	13	16	19	23	27	32	36	2,242
15º, 0.8" ice, 4 psf wind		3	5	7	9	11	14	17	20	24	27	31	1,961
0º, 0.5" ice, 4 psf wind + k		3	4	5	7	9	11	13	16	19	22	25	1,933
0		1	1	2	2	3	4	5	6	6	8	9	1,469
10		1	2	2	3	3	4	5	6	7	8	10	1,297
20		1	2	2	3	4	5	6	7	8	10	11	1,133
30		1	2	3	4	5	6	7	8	10	11	13	979
40		2	2	3	4	5	7	8	10	11	13	15	840
50		2	3	4	5	6	8	9	11	13	15	18	720
60º F, 21 psf wind		3	5	7	9	11	14	16	20	23	27	31	1,066
60º F, 6 psf wind		2	4	5	6	8	10	12	14	17	19	22	688
60º F, 4 psf wind		2	3	5	6	8	9	11	14	16	19	21	653
60		2	3	4	6	7	9	11	13	15	18	20	621
70		3	4	5	7	8	10	12	15	17	20	23	543
80		3	4	6	8	10	12	14	17	20	23	26	481
90		3	5	6	8	11	13	16	19	22	26	29	432
100		4	5	7	9	12	14	17	21	24	28	32	394

Super Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇4◇						R.S.						
	Span (Ft)	50	60	70	80	90	100	110	120	130	140	150	
-20		1	1	2	2	3	3	4	5	5	6	7	1,756
0		1	2	2	3	3	4	5	6	7	8	9	1,346
0º, 0.5" ice, 4 psf wind + k		3	4	6	7	9	11	14	16	19	22	25	1,900
30		2	2	3	4	6	7	8	10	12	13	15	824
32º, 0.5" ice,		3	4	6	8	10	12	14	17	20	23	27	1,264
32º, 0.5" ice, 2 psf wind		3	4	6	8	10	12	15	17	20	24	27	1,285
40		2	3	4	5	7	8	10	12	14	16	18	696
50		2	3	5	6	8	9	11	14	16	19	21	595
60		3	4	5	7	9	11	13	16	18	21	25	518
60º F, 6 psf wind		3	4	6	7	9	12	14	17	19	23	26	591
70		3	4	6	8	10	12	15	18	21	24	28	459
80		3	5	7	9	11	14	16	20	23	27	31	414
90		4	5	7	10	12	15	18	21	25	29	33	378
100		4	6	8	10	13	16	19	23	27	32	36	349
120		5	7	9	12	15	18	22	26	31	36	41	306
212		7	11	15	19	24	30	36	43	50	58	67	190

DESIGN NOTE(s):

3. See comments in front of section for conditions including wind and ice.

◇4.◇ Ruling span range is for initial line design between 75' to 124' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
2	07/01/23	PER	Converteed to new format
1	07/01/20	NH	

DE Tension = 2,200 Lbs

RBS = 19,800 Lbs

Short Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇6◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
15º, 1" ice, 4 psf wind		13	16	19	22	26	29	33	38	42	47	52	2,754
15º, 0.8" ice, 4 psf wind		12	14	17	19	23	26	29	33	37	42	46	2,374
0º, 0.5" ice, 4 psf wind + k		9	11	14	16	19	21	24	27	31	34	38	2,248
0		4	5	5	6	7	8	10	11	12	13	15	1,507
10		4	5	6	7	8	9	11	12	13	15	17	1,350
20		5	6	7	8	9	11	12	14	15	17	19	1,204
30		5	6	8	9	10	12	14	15	17	19	21	1,070
40		6	7	9	10	12	13	15	17	19	21	24	952
50		7	8	10	11	13	15	17	19	21	24	26	849
60º F, 21 psf wind		11	13	15	18	21	24	27	31	35	39	43	1,352
60º F, 6 psf wind		8	10	12	14	16	18	20	23	26	29	32	852
60º F, 4 psf wind		8	9	11	13	15	17	20	22	25	28	31	805
60		7	9	11	12	14	17	19	21	24	27	29	762
70		8	10	12	14	16	18	21	24	26	29	33	690
80		9	11	13	15	18	20	23	26	29	32	36	630
90		10	12	14	16	19	22	25	28	31	35	39	580
100		10	13	15	18	20	24	27	30	34	38	42	538

Short Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇6◇						R.S.						
	Span (Ft)	100	110	120	130	140	150	160	170	180	190	200	
-20		3	4	5	6	6	7	8	10	11	12	13	1,694
0		4	5	6	7	8	10	11	12	14	15	17	1,327
0º, 0.5" ice, 4 psf wind + k		10	12	14	16	19	22	25	28	31	35	39	2,200
30		6	8	9	11	12	14	16	18	20	23	25	899
32º, 0.5" ice,		10	12	14	17	19	22	25	29	32	36	39	1,524
32º, 0.5" ice, 2 psf wind		10	12	14	17	20	22	26	29	32	36	40	1,552
40		7	9	10	12	14	16	18	20	23	25	28	798
50		8	10	11	13	15	18	20	23	26	28	32	715
60		9	11	13	15	17	20	22	25	28	31	35	647
60º F, 6 psf wind		9	11	13	16	18	21	23	27	30	33	37	742
70		9	11	14	16	19	21	24	27	31	34	38	592
80		10	12	15	17	20	23	26	30	33	37	41	547
90		11	13	16	19	22	25	28	32	36	40	44	510
100		12	14	17	20	23	27	30	34	38	43	47	478
120		13	16	19	22	26	30	34	38	43	48	53	428
212		20	24	29	34	40	45	52	58	65	73	81	279

DESIGN NOTE(s):

5. See comments in front of section for conditions including wind and ice.

◇6◇ Ruling span range is for initial line design between 125' to 174' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
2	07/01/23	PER	Converteed to new format
1	07/01/20	NH	

DE Tension = 2,500 Lbs

RBS = 19,800 Lbs

Medium Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇8◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
15º, 1" ice, 4 psf wind		25	29	32	36	40	45	49	54	59	64	70	3,227
15º, 0.8" ice, 4 psf wind		22	25	29	32	36	39	44	48	52	57	62	2,762
0º, 0.5" ice, 4 psf wind + k		19	21	24	27	30	33	37	40	44	48	52	2,560
0		8	9	10	12	13	14	16	17	19	21	22	1,578
10		9	10	11	13	14	16	17	19	21	23	25	1,435
20		10	11	12	14	16	17	19	21	23	25	27	1,302
30		11	12	14	15	17	19	21	23	25	27	30	1,181
40		12	13	15	17	19	21	23	25	28	30	33	1,074
50		13	15	17	19	21	23	25	28	30	33	36	980
60º F, 21 psf wind		20	23	26	29	32	36	40	43	47	52	56	1,615
60º F, 6 psf wind		15	17	20	22	24	27	30	33	36	39	42	1,008
60º F, 4 psf wind		15	17	19	21	24	26	29	32	34	37	41	950
60		14	16	18	20	23	25	28	30	33	36	39	899
70		15	17	20	22	24	27	30	33	36	39	42	829
80		16	19	21	24	26	29	32	35	39	42	46	769
90		18	20	23	25	28	31	35	38	42	45	49	717
100		19	21	24	27	30	33	37	41	44	48	52	673

Medium Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇8◇						R.S.						
	Span (Ft)	150	160	170	180	190	200	210	220	230	240	250	
-20		7	9	10	11	12	13	15	16	18	19	21	1,687
0		9	11	12	13	15	17	18	20	22	24	26	1,362
0º, 0.5" ice, 4 psf wind + k		19	22	25	28	31	34	38	41	45	49	53	2,500
30		13	14	16	18	20	23	25	27	30	32	35	995
32º, 0.5" ice,		19	22	25	28	31	34	37	41	45	49	53	1,771
32º, 0.5" ice, 2 psf wind		19	22	25	28	31	34	38	42	45	49	54	1,805
40		14	16	18	20	22	25	27	30	33	36	39	906
50		15	17	20	22	24	27	30	33	36	39	42	831
60		16	19	21	24	26	29	32	35	39	42	46	768
60º F, 6 psf wind		17	20	22	25	28	31	34	37	41	44	48	883
70		18	20	23	25	28	31	35	38	42	45	49	715
80		19	22	24	27	30	34	37	41	44	48	53	669
90		20	23	26	29	32	36	39	43	47	51	56	630
100		21	24	27	31	34	38	42	46	50	54	59	597
120		23	27	30	34	38	42	46	50	55	60	65	541
212		35	40	45	50	56	62	68	75	82	89	97	364

DESIGN NOTE(s):

7. See comments in front of section for conditions including wind and ice.

◇8.◇ Ruling span range is for initial line design between 175' to 224' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
2	07/01/23	PER	Converteed to new format
1	07/01/20	NH	

DE Tension = 2,800 Lbs

RBS = 19,800 Lbs

Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇10◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
15º, 1" ice, 4 psf wind		39	43	47	52	57	61	66	72	77	83	88	3,679
15º, 0.8" ice, 4 psf wind		35	38	42	46	50	54	59	63	68	73	78	3,138
0º, 0.5" ice, 4 psf wind + k		30	33	36	39	43	46	50	54	58	62	67	2,871
0		13	15	16	18	19	21	23	24	26	28	30	1,683
10		15	16	18	19	21	23	25	26	28	31	33	1,548
20		16	17	19	21	23	25	27	29	31	33	36	1,424
30		17	19	21	23	25	27	29	31	34	36	39	1,310
40		19	21	23	25	27	29	32	34	37	39	42	1,208
50		20	22	24	27	29	31	34	37	39	42	45	1,118
60º F, 21 psf wind		31	34	38	41	45	48	52	57	61	65	70	1,870
60º F, 6 psf wind		23	26	28	31	34	36	39	43	46	49	53	1,165
60º F, 4 psf wind		23	25	27	30	32	35	38	41	44	47	51	1,098
60		22	24	26	29	31	34	37	39	42	46	49	1,038
70		23	26	28	31	34	36	39	42	46	49	52	968
80		25	27	30	33	36	39	42	45	49	52	56	906
90		26	29	32	35	38	41	45	48	52	56	59	853
100		28	31	34	37	40	44	47	51	55	59	63	805

Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇10◇						R.S.						
	Span (Ft)	200	210	220	230	240	250	260	270	280	290	300	
-20		13	14	16	17	19	20	22	24	25	27	29	1,731
0		16	17	19	21	23	24	26	29	31	33	35	1,437
0º, 0.5" ice, 4 psf wind + k		30	34	37	40	44	48	52	56	60	64	69	2,800
30		20	22	25	27	29	32	34	37	40	43	46	1,105
32º, 0.5" ice,		30	33	36	40	43	47	50	54	59	63	67	2,013
32º, 0.5" ice, 2 psf wind		30	33	37	40	43	47	51	55	59	63	68	2,053
40		22	24	27	29	32	34	37	40	43	46	50	1,022
50		24	26	29	31	34	37	40	43	47	50	53	950
60		25	28	31	34	36	40	43	46	50	53	57	888
60º F, 6 psf wind		27	29	32	35	38	42	45	49	52	56	60	1,021
70		27	30	33	36	39	42	46	49	53	57	61	835
80		29	31	35	38	41	45	48	52	56	60	64	788
90		30	33	36	40	43	47	51	55	59	63	68	747
100		32	35	38	42	46	49	53	58	62	67	71	711
120		35	38	42	46	50	54	58	63	68	73	78	651
212		50	55	61	67	72	79	85	92	99	106	113	448

DESIGN NOTE(s):

9. See comments in front of section for conditions including wind and ice.

◇10◇ Ruling span range is for initial line design between 225' to 274' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
2	07/01/23	PER	Converteed to new format
1	07/01/20	NH	

DE Tension = 3,100 Lbs

RBS = 19,800 Lbs

Extra Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇12◇	Not Recommended					R.S.			Not Recommended			
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
15º, 1" ice, 4 psf wind		55	59	64	69	74	79	84	90	95	101	107	4,117
15º, 0.8" ice, 4 psf wind		49	53	57	61	65	70	75	80	85	90	95	3,506
0º, 0.5" ice, 4 psf wind + k		42	45	49	53	56	60	64	69	73	78	82	3,183
0		19	21	23	24	26	28	30	32	34	36	38	1,815
10		21	23	24	26	28	30	32	34	36	39	41	1,685
20		23	24	26	28	30	32	35	37	39	42	44	1,565
30		24	26	28	30	33	35	37	40	42	45	47	1,455
40		26	28	30	33	35	37	40	43	45	48	51	1,354
50		28	30	32	35	37	40	43	46	48	51	55	1,264
60º F, 21 psf wind		43	46	50	54	57	61	66	70	74	79	84	2,121
60º F, 6 psf wind		32	35	37	40	43	46	49	52	56	59	63	1,326
60º F, 4 psf wind		31	33	36	39	41	44	47	51	54	57	60	1,251
60		30	32	35	37	40	43	46	49	52	55	58	1,183
70		32	34	37	40	43	46	49	52	55	59	62	1,112
80		34	36	39	42	45	48	52	55	59	62	66	1,048
90		36	38	41	45	48	51	55	58	62	66	70	991
100		37	40	44	47	50	54	58	61	65	69	73	940

Extra Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇12◇						R.S.						
	Span (Ft)	250	260	270	280	290	300	310	320	330	340	350	
-20		19	21	23	24	26	28	30	32	34	36	38	1,812
0		23	25	27	29	31	33	35	37	40	42	45	1,538
0º, 0.5" ice, 4 psf wind + k		43	47	50	54	58	62	66	70	75	80	84	3,100
30		29	31	34	36	39	41	44	47	50	53	56	1,224
32º, 0.5" ice,		42	45	49	52	56	60	64	68	73	77	82	2,254
32º, 0.5" ice, 2 psf wind		42	46	49	53	57	61	65	69	73	78	83	2,299
40		31	33	36	39	41	44	47	50	54	57	60	1,143
50		33	36	38	41	44	47	50	54	57	61	64	1,072
60		35	38	41	44	47	50	54	57	61	64	68	1,010
60º F, 6 psf wind		37	40	43	46	49	53	56	60	64	68	72	1,160
70		37	40	43	46	50	53	57	60	64	68	72	955
80		39	42	45	49	52	56	60	64	68	72	76	907
90		41	44	48	51	55	59	63	67	71	75	80	864
100		43	46	50	54	57	61	66	70	74	79	84	826
120		46	50	54	58	62	67	71	76	81	86	91	761
212		66	72	77	83	89	95	102	108	115	122	130	533

DESIGN NOTE(s):

11. See comments in front of section for conditions including wind and ice.

◇12◇ Ruling span range is for initial line design between 275' to 324' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
2	07/01/23	PER	Converteed to new format
1	07/01/20	NH	

DE Tension = 3,400 Lbs

RBS = 19,800 Lbs

Super Long Span - Feet													
Temp. Deg. F	Condition	INITIAL (Stringing) SAG (inches)											Tension Lbs
	R.S. Range ◇14◇	Not Recommended					R.S.				Not Recommended		
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
15º, 1" ice, 4 psf wind		72	76	81	87	92	97	103	109	115	121	127	4,544
15º, 0.8" ice, 4 psf wind		64	68	72	77	82	87	92	97	102	107	113	3,869
0º, 0.5" ice, 4 psf wind + k		55	59	62	66	71	75	79	84	88	93	98	3,496
0		26	27	29	31	33	35	37	39	41	44	46	1,968
10		28	29	31	33	35	37	40	42	44	46	49	1,841
20		29	31	34	36	38	40	42	45	47	50	52	1,722
30		31	34	36	38	40	43	45	48	50	53	56	1,612
40		34	36	38	41	43	46	48	51	54	57	60	1,511
50		36	38	41	43	46	49	51	54	57	60	63	1,420
60º F, 21 psf wind		55	59	62	66	71	75	79	84	88	93	98	2,374
60º F, 6 psf wind		41	44	47	49	53	56	59	62	66	69	73	1,495
60º F, 4 psf wind		39	42	45	48	51	54	57	60	63	67	70	1,412
60		38	40	43	46	49	52	55	58	61	64	67	1,337
70		40	43	46	49	52	55	58	61	64	68	71	1,262
80		42	45	48	51	54	58	61	65	68	72	75	1,195
90		45	48	51	54	57	61	64	68	72	76	79	1,134
100		47	50	53	57	60	64	68	71	75	79	83	1,080

Super Long Span - Feet													
Temp. Deg. F	Condition	FINAL (Clearance) SAG (inches)											Tension Lbs
	R.S. Range ◇14◇						R.S.						
	Span (Ft)	300	310	320	330	340	350	360	370	380	390	400	
-20		26	28	30	32	34	36	38	40	42	45	47	1,920
0		31	33	35	37	39	42	44	47	49	52	54	1,657
0º, 0.5" ice, 4 psf wind + k		57	60	64	68	73	77	81	86	91	96	100	3,400
30		37	40	43	45	48	51	54	57	60	63	67	1,351
32º, 0.5" ice,		54	58	62	66	70	74	78	83	87	92	97	2,495
32º, 0.5" ice, 2 psf wind		55	59	62	66	70	75	79	83	88	93	97	2,545
40		40	43	45	48	51	54	57	61	64	67	71	1,270
50		42	45	48	51	54	58	61	64	68	72	75	1,198
60		45	48	51	54	57	61	64	68	72	76	79	1,135
60º F, 6 psf wind		47	50	53	57	60	64	68	71	75	79	84	1,302
70		47	50	53	57	60	64	68	71	75	79	84	1,078
80		49	53	56	60	63	67	71	75	79	83	88	1,027
90		52	55	59	63	66	70	74	79	83	87	92	982
100		54	58	61	65	69	73	78	82	86	91	96	941
120		58	62	66	70	75	79	84	89	93	98	103	871
212		82	88	94	100	106	112	118	125	132	139	146	617

DESIGN NOTE(s):

13. See comments in front of section for conditions including wind and ice.

◇14◇ Ruling span range is for initial line design between 325' to 374' for conductor sag accuracy.

REV	DATE	ENG	DESCRIPTION
2	07/01/23	PER	Converteed to new format
1	07/01/20	NH	

INSTRUCTION(s):

Preformed line guards and armor rods shall be used to protect ACSR, AAAC, and AAC conductors from damage at an insulator or in suspension and angle clamps as indicated below. Armor rods and line guards do not need to be installed when preformed ties are used. Therefore, preformed ties should be used in all possible applications.

The following guidelines shall apply:

1. Line Guards shall be used:
   - A) In all hand tied applications where the conductor spans less than 300' in length (on either side of the pin insulator).
2. Armor Rods shall be used:
   - A) In all hand tied applications and suspension clamps where the conductor spans exceeds 300' in length (on either side of the insulator).
   - B) In all clamp top post insulators and suspension clamps where the conductor spans exceed 300' in length (on either side or the insulator).

Line Guards and armor rods may be used as patch rods (with a hot line clamp) are acceptable. However, they should not be installed for the sole purpose of making a tap. A stirrup clamp should be used for this application.

CONSTRUCTION NOTE(s):

◇1. These Copperweld line guards shall be used to protect #6 copper conductors on 2.4/4. 16kV circuits that are being converted to 7.2/12.47kV operation. They shall be installed at the time of conversion. These guards shall not be installed hot on circuits energized at 12kV.

The following size Line Guards are available:

Table 1 - Line Guards

Wire Size		Rod O.D. (Inches)	No. Rods Per Set	Length (Inches)	Color Code	STK #
6 ◇1	Solid Cu.	0.102	7	19	Green	17 59 076
4 ACSR	7/1 Str.	0.121	8	19	Orange	17 59 032
2 ACSR	7/1 Str.	0.121	9	21	Red	17 59 033
1/0 ACSR	6/1 Str.	0.121	12	25	Yellow	17 59 034
3/0 ACSR	6/1 Str.	0.121	14	29	Orange	17 59 035
336.4 ACSR	18/1 Str.	0.146	15	35	Blue	17 59 036
336.4 ACSR	26/7 Str.	0.146	16	37	Green	17 59 044
477 ACSR	18/1 Str.	0.146	18	41	Purple	17 59 037
556.5 AAC	19 Str.	0.146	19	41	Blue	17 59 071
795 AAC	37 Str.	0.182	18	47	Brown	17 59 084
954 AAC	37 Str.	0.250	15	49	Orange	17 59 059
954 ACSR	45/7 Str.	0.250	15	51	Purple	17 59 104

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	10/01/20	DCG	

Table 2 - Armor Rods							
Wire Size	Rod O.D.(Inches)	# of Rods Per Set	Length (Inches)		Color Code	STK #	
			Single	Double		Single	Double
3#7 A.W. (3)	0.114	10	46	–	Black	17 59 085	–
#4 ACSR (7/1)	0.146	7	40	–	Orange	17 59 020	–
#2 ACSR (7/1)	0.146	9	44	–	Red	17 59 021	–
1/0 AAAC (7)	0.167	9	52	64	Yellow	17 59 022	17 59 025
1/0 ACSR (6/1)	0.167	9	52	64	Yellow	17 59 022	17 59 025
110.8 ACSR (29/7)	0.167	10	54	-	Green	17 59 164	-
3/0 ACSR (6/1)	0.167	11	56	68	Orange	17 59 023	17 59 026
4/0 ACSR (6/1)	0.182	11	60	-	Red	17 59 039	-
336.4 kcmil ACSR (18/1)	0.204	12	68	–	Blue	17 59 040	–
336.4 kcmil ACSR (26/7)	0.204	12	72	–	Green	17 59 028	–
477 kcmil ACSR (18/1)	0.25	11	76	–	Blue	17 59 061	–
556.5 kcmil AAC (19)	0.25	12	70	–	Blue	17 59 061	–
954 kcmil ACSR (45/7)	0.31	13	100	-	Red	17 59 125	-
1272 kcmil ACSR (45/7)	0.365	13	100	-	Yellow	17 59 161	-

REV	DATE	ENG	DESCRIPTION
6	07/01/23	PER	Converted to new format
5	10/01/20	DCG	

This standard covers various conductor materials for standard conductors.

Table 1 - Splices and Sleeves

Conductor	STK #	Conductor OD (in)	Automatic Splices 2	Compression Sleeves	
				Full Tension	Jumper or Loop
1/0 AAAC (7) - Bare	18 05 060	0.398	17 60 340	17 60 260	-
110.8 kcmil ACSR (12/7) - Bare	18 05 117	0.481	-	17 60 389	-
336.4 kcmil ACSR (18/1) - Bare	18 05 036	0.684	17 60 333	17 60 254	17 60 209
556.5 kcmil AAC (19) - Bare	18 05 047	0.856	17 60 327	17 60 195	17 60 196
954 kcmil ACSR (45/7) Bare	18 05 173	1.165	-	17 60 700	17 60 291
1272 kcmil ACSR (45/7) Bare	18 05 246	1.345	-	17 60 434	17 60 475

CONSTRUCTION NOTE(s):

1. Use 1/0 AAAC or 110.8 (12/7) ACSR for new static wire construction.

2. Automatic deadends or splices or shall **ONLY** be installed on full tension spans. Automatic deadends or splices shall **NOT** be installed on slack spans, partial tensions, or NESC Grade B crossings (highways, rivers, railroads). For slck span, partial tensions, or NESC Grade B crossings (highways, rivers, railroads) applications use bolted deadends or compression splices.

3. Ameren defines a highway as a roadway with 2 or more through lanes in each direction, divided or undivided, with partial access control at a minimum.

4. This die for full tension sleeves only. All other dies work on both full tension and loop sleeves for a given conductor.

5. Policy for splice installation:

   a) New conductor installations - Maximum of 1 splice per mile per phase.

   b) Existing/Emergency conductor repair - Maximum of 3 splices per phase per span.

   c) Minimum of 3x the splice length between the conductor support and first splice.

   d) Minimum of 3x the splice length between splices.

   e) All new or existing conductors shall be wire brushed before splicing or installing connectors or clamps.

REV	DATE	ENG	DESCRIPTION
5	07/01/23	PER	Converted to new format
4	10/01/20	NH	

Table 2 - Clamps

Conductor	STK #	Conductor OD (in)	Deadends		Angle Clamps	Armor Rod		Line Guard ◇11◇	Stirrup Clamp	Hot Line Clamp
			Automatic ◇8◇	Bolted		Single	Double			
						17 59		17 59	17 62	
1/0 AAAC (7) Bare	18 05 060	0.398	23 78 362	23 18 294	23 18 040 ◇10◇	22	25	34	166	088 ◇12◇
110.8 kcmil ACSR (12/7) Bare	18 05 117	0.481	-	23 18 397	23 78 401	-	-	127	166	183
336.4 kcmil ACSR (18/1) Bare	18 05 036	0.684	-	23 18 292	23 18 264 ◇10◇	40	-	36	167	112 ◇11◇
556.5 kcmil AAC (19) Bare	18 05 047	0.856	-	23 18 292	23 18 302 ◇10◇	61	-	71	167	-
954.0 kcmil ACSR (45/7) Bare	18 05 173	1.165	-	23 68 368		125	-	104	167	-
1272 kcmil (45/7) ACSR Bare	18 05 246	1.345	-	23 18 411		161	-	110	-	-

CONSTRUCTION NOTE(s):

6. Use 1/0 AAAC or 110.8 (12/7) ACSR for new static wire construction.

7. Performed grip.

◇8◇ Automatic deadends or splices shall **ONLY** be installed on full tension spans. Automatic deadends or splices shall **NOT** be installed on slack spans, partial tensions, or NESC Grade B Crossings (highways, rivers, railroads). For slack span, partial tensions, or NESC Grade B Crossings (highways, rivers, railroads) applications use bolted or compression splices.

9. Ameren defines a highway as a roadway with 2 or more through lanes in each direction, divided or undivided, with partial access control at a minimum.

◇10◇ Also suitable for suspension construction.

◇11◇ May be used for repairing conductor where less than 25% of strands are damaged.

◇12◇ For use with stirrup clamps.

REV	DATE	ENG	DESCRIPTION
5	07/01/23	PER	Converted to new format
4	10/01/20	NH	

Table 1 - Splices and Sleeves					
Conductor	STK #	Conductor OD (in)	Automatic Splices ◇1	Compression Sleeves	
				Full Tension	Jumper or Loop
#6 Bare Cu, SOL	18 02 010	0.162	17 63 038	17 60 006	-
#6 Poly Cu, SOL	18 01 012	0.23			-
#4 Bare Cu, SOL	18 02 017	0.204	17 63 040	17 60 103	-
#4 Poly Cu, SOL	18 01 017	0.27			-
#2 Bare Cu, SOL	18 02 020	0.258	17 63 043	17 60 104	-
#2 Poly Cu, SOL	18 01 020	0.35			-
#1/0 Bare Cu (7)	18 02 022	0.368	17 63 044	17 60 121	17 60 207
#1/0 Poly Cu (7)	18 01 022	0.49			
#4/0 Bare Cu (7)	18 02 027	0.522	17 63 046	17 60 123	17 60 155
#4/0 Poly Cu (7)	18 01 025	0.64			
350 kcmil Bare Cu (12)	18 02 064	0.71	-	17 60 124	-
#4 ACSR (7/1) - Bare	18 05 005	0.257	17 60 332	17 60 258	-
#4 ACSR (7/1) - Poly	18 05 068	0.317			-
1/0 AAAC (7) - Poly	18 05 067	0.518	17 60 340	17 60 260	-
1/0 ACSR (6/1) - Bare	18 05 113	0.398			-
3/0 ACSR (6/1)	18 05 010	0.502	17 60 354	17 60 253	17 60 270
4/0 ACSR (6/1) - Bare	18 05 011	0.563	17 60 354	17 60 626	17 60 420
336.4 kcmil (19) AAC - Poly	18 05 052	0.665	-	17 60 170	17 60 209
336.4 kcmil (26/7) ACSR	18 05 014	0.72	17 60 769	AL 17 60 565	-
				ST 17 60 133	
477 kcmil (18/1) ACSR	18 05 035	0.814	17 60 327	AL 17 60 169	17 60 732
				ST 17 60 134	
556.5 kcmil AAC (37) - Poly	18 05 053	0.992		-	17 60 196
795 kcmil AAC (37) - Bare	18 05 032	1.026	17 60 335	17 60 286	17 60 287
954 kcmil AAC (37) - Bare	18 05 043	1.124	17 60 753	17 60 185	17 60 291
3 #7AW (1)	27 09 099	0.311	-	17 60 272	-

CONSTRUCTION NOTE(s):

◇1. Automatic deadends or splices shall **ONLY** be installed on full tension spans. Automatic deadends or splices shall **NOT** be installed on slack spans, partial tensions, or NESC Grade B Crossings (highways, rivers, railroads). For slack span, partial tensions, or NESC Grade B Crossings (highways, rivers, railroads) applications use bolted or compression splices.

2. Ameren defines a highway as a roadway with 2 or more through lanes in each direction, divided or undivided, with partial access control at a minimum.

3. Refer to DCS #**07 00 09 01** Table 1 Note 5 for spacing policy.

Table 2 - Clamps

Conductor	STK #	Conductor OD (in)	Deadends			Angle Clamp	Armor Rod ◇8◇		Line Guard ◇8◇	Stirrup Clamp	Hot Line Clamp
			Automatic ◇4◇	Straight	Quadrant		Single	Double			
							17 59		17 59	17 62	
#6 Bare Cu, SOL	18 02 010	0.162	23 78 375	23 18 394	23 68 670	17 02 016	-	–	–	165	23 78 183 ◇9◇
#6 Poly Cu, SOL	18 01 012	0.23					-	–	–		
#4 Bare Cu, SOL	18 02 017	0.204	23 78 374				-	–	–		
#4 Poly Cu, SOL	18 01 017	0.27					-	–	–		
#2 Bare Cu, SOL	18 02 020	0.258	23 78 373				-	–	–		
#2 Poly Cu, SOL	18 01 020	0.35					-	–	–		
#1/0 Bare Cu (7)	18 02 022	0.368	–				79	–	–		
#1/0 Poly Cu (7)	18 01 022	0.49	–					–	–		
#4/0 Bare Cu (7)	18 02 027	0.522	–	23 18 395		17 62 006 ◇7◇	–	–	–	153	
#4/0 Poly Cu (7)	18 01 025	0.64	–				046 ◇6◇	–	–		
350 kcmil Bare Cu (12)	18 02 064	0.71	–		23 78 050 ◇6◇	–	–	–	–	–	–
#4 ACSR (7/1) - Bare	18 05 005	0.257	23 78 365	-	23 18 294	17 02 016 ◇6◇	20	-	32	166	17 62 088 ◇9◇
#4 ACSR (7/1) - Poly	18 05 068	0.317		-			-	-	-		
1/0 ACSR (6/1) - Bare	18 05 113	0.398	-	-			-	-	-	-	-
1/0 AAAC (7) - Poly	18 05 067	0.518	23 78 362	-	23 18 290 ◇6◇	–	-	-	-	-	-
3/0 ACSR (6/1)	18 05 010	0.502	–	23 18 292	–	23 18 040 ◇6◇	23	26	35	167	17 62 088 ◇9◇
4/0 ACSR (6/1) - Bare	18 05 011.	0.563	-		-		-	-	128	-	
336.4 kcmil (19) AAC - Poly	18 05 052	0.665	-		-		-	-	-	167	
336.4 kcmil (26/7) ACSR	18 05 014	0.72	–		–	23 18 264 ◇6◇	40	–	44		
477 kcmil (18/1) ACSR	18 05 035	0.814	–		–		58	–	37		
556.5 kcmil AAC (37) - Poly	18 05 053	0.992	-		-	23 18 040 ◇7◇	-	-	-		-
795 kcmil AAC (37) - Bare	18 05 032	1.026	-		-	23 18 302 ◇6◇	-	-	84		17 62 143 ◇10◇
954 kcmil AAC (37) - Bare	18 05 043	1.124	-	23 68 637	-		-	-	59		
3 #7AW (1)	27 09 099	0.311	-	23 68 325 ◇6◇	-	17 02 016	-	-	85	-	-

REV	DATE	ENG	DESCRIPTION
5	07/01/23	PER	Converted to new format
4	10/01/20	NH	

CONSTRUCTION NOTE(s):

4. Automatic deadends or splices shall **ONLY** be installed on full tension spans. Automatic deadends or splices shall **NOT** be installed on slack spans, partial tensions, or NESC Grade B Crossings (highways, rivers, railroads). For slack span, partial tensions, or NESC Grade B Crossings (highways, rivers, railroads) applications use bolted or compression splices.

5. Ameren defines a highway as a roadway with 2 or more through lanes in each direction, divided or undivided, with partial access control at a minimum.

6. Use with tension over 4,000 lbs.

7. Suitable for suspension construction also.

8. Preformed line guards and patch rods preferred for repairing conductors.

9. For use with stirrup clamp.

10. For use over bare conductor.

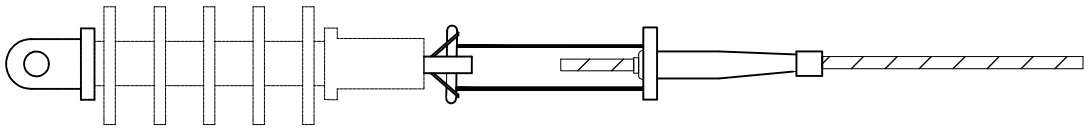


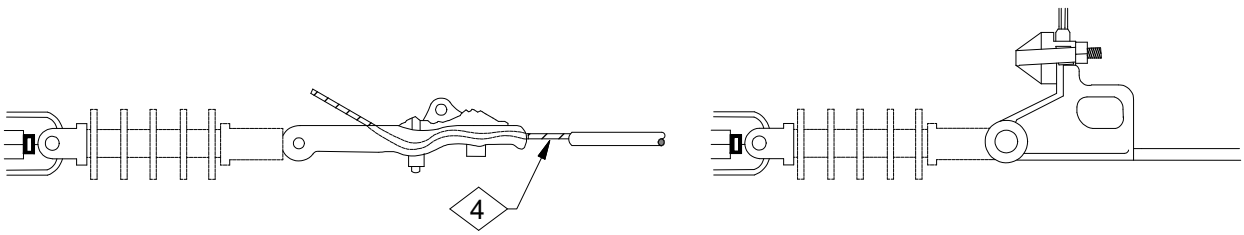
Table 1 - Automatic Deadends		
STK #	DESCRIPTION	NEW (N)/ MAINTENANCE (M)
23 78 365	Clamp, Deadend, Auto, #4 ACSR	N
23 78 364	Clamp, Deadend, Auto, #2 ACSR	N
23 78 362	Clamp, Deadend, Auto, 1/0 AAAC	N
23 78 375	Clamp, Deadend, Auto, #6 CU	M
23 78 374	Clamp, Deadend, Auto, #4 CU	M
23 78 373	Clamp, Deadend, Auto, #2 CU	M

CONSTRUCTION NOTE(s):

1. The wire shall be fed completely through the automatic deadend chuck. The jaws of the deadend shall be set by applying a sharp heavy pull on the line conductor. Do not strike deadend body to set the deadend chuck.

2. Automatic deadends or splices shall **ONLY** be installed on full tension spans. Automatic deadends or splices shall **NOT** be installed on slack spans, partial tensions, or NESC Grade B Crossings (highways, rivers, railroads). For slack span, partial tensions, or NESC Grade B Crossings (highways, rivers, railroads) applications use bolted or compression splices.

3. Ameren defines a highway as a roadway with 2 or more through lanes in each direction, divided or undivided, with partial access control at a minimum.



STYLE A

STYLE B

Table 2 - Bolted Deadends			
STK #	DESCRIPTION	NEW (N)/ MAINTENANCE (M)	STYLE
23 18 394	Clamp, Deadend, 3 #7 A.W.	M	A
	Clamp, Deadend, #6 CU	M	A
	Clamp, Deadend, #4 CU	M	A
	Clamp, Deadend, #2 CU	M	A
	Clamp, Deadend, #1/0 CU	M	A
23 18 395	Clamp, Deadend, #4/0 CU	M	A
	Clamp, Deadend, 350 CU	M	A
	Clamp, Deadend, 500 CU	M	A
23 18 399	Clamp, Deadend, 750 CU	M	A
	Clamp, Deadend, 1000 CU	M	A
23 18 394	Clamp, Deadend, 6A CWC	M	A
	Clamp, Deadend, 4A CWC	M	A
	Clamp, Deadend, 2A CWC	M	A
23 18 400	Clamp, Deadend, #4 ACSR	M	B
	Clamp, Deadend, #2 ACSR	M	B
	Clamp, Deadend, 1/0 ACSR or 1/0 AAAC	N	B
23 18 292	Clamp, Deadend, 3/0 ACSR	N	A
	Clamp, Deadend, 4/0 ACSR	N	A
	Clamp, Deadend, 110 ACSR	N	A
	Clamp, Deadend, 336 ACSR	N	A
	Clamp, Deadend, 477 ACSR	N	A
	Clamp, Deadend, 556 AA	N	A
23 18 404	Clamp, Deadend, 335.6 ACSR T−2	N	B
	Clamp, Deadend, 432−2 ACSR T−2	N	B
23 68 637	Clamp, Deadend, 795 AA	N	A
	Clamp, Deadend, 954 AA	N	A

CONSTRUCTION NOTE(s):

4. Tape according to DCS **07 00 27 00**.

REV	DATE	ENG	DESCRIPTION
9	07/01/23	PER	Converted to new format
8	10/01/20	NH	

This Standard covers the application and installation of Air Flow Spiolers (AFS), which are used to help eliminate known galloping of conductors.

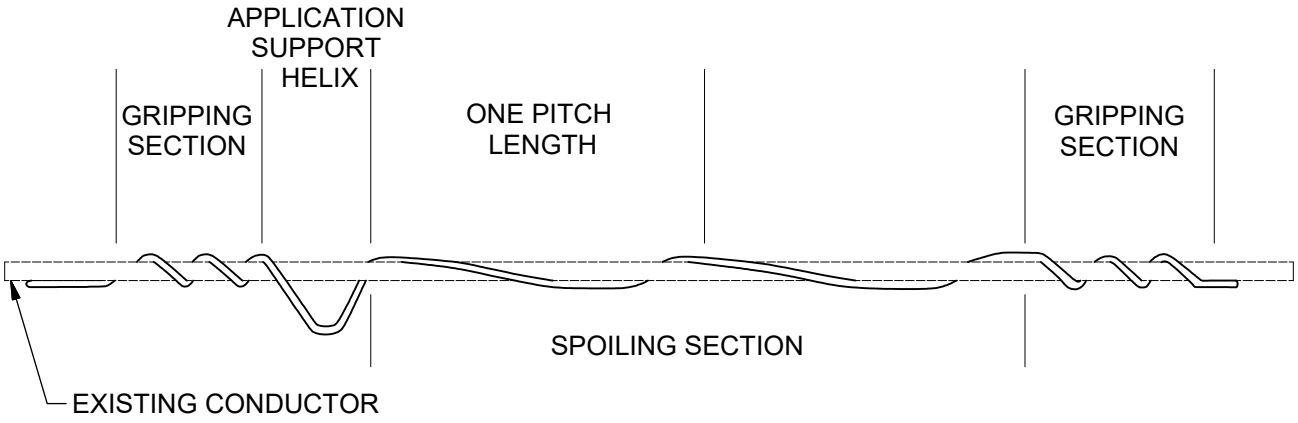


Table 1 - Number of Spoilers per Span			
SPAN LENGTH (FT)	SPOILERS / SPAN	SPAN LENGTH (FT)	SPOILERS / SPAN
<140	3	431 - 480	10
141 - 190	4	481 - 530	11
191 - 240	5	531 - 575	12
241 − 290	6	576 - 625	13
291 - 335	7	626 - 670	14
336 - 380	8	671 - 720	15
381 - 430	9	721 - 770	16

TABLE 2							
STK #	DESCRIPTION	01	02	03	04	06
17 63 181	Spoiler, Airflow 1/0 AAAC (7) or 1/0 ACSR (6/1)	#	-	-	-	-
17 63 240	Spoiler, Airflow 3/0 (6/1), 4/0 (6/1), or 110.8 (12/7) ACSR	-	-	-	-	#
17 63 182	Spoiler, Airflow 336.4 ACSR (18/1)	-	#	-	-	-
17 63 183	Spoiler, Airflow 556.5 AAC (19)	-	-	#	-	-
17 63 184	Spoiler, Airflow 795 (37) AAC, 954 (37) AAC or 954 (45/7) ACSR	-	-	-	#	-
296	Operation Code	#	#	#	#	#

REV	DATE	ENG	DESCRIPTION
5	07/01/23	PER	Converted to new format
4	05/10/12	DCG	

INSTRUCTION(s):

1. Leave 15' between each AFS.

2. Each AFS is approximately 15' in length.

3. For a span requiring an EVEN number of AFS, install per Figure 1.

4. For a span requiring an ODD number of AFS, install per Figure 2.

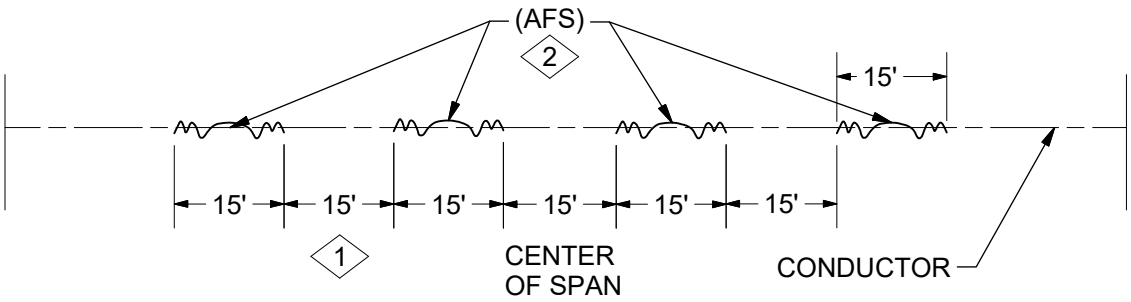


Figure 1 - EVEN Number of AFS 3

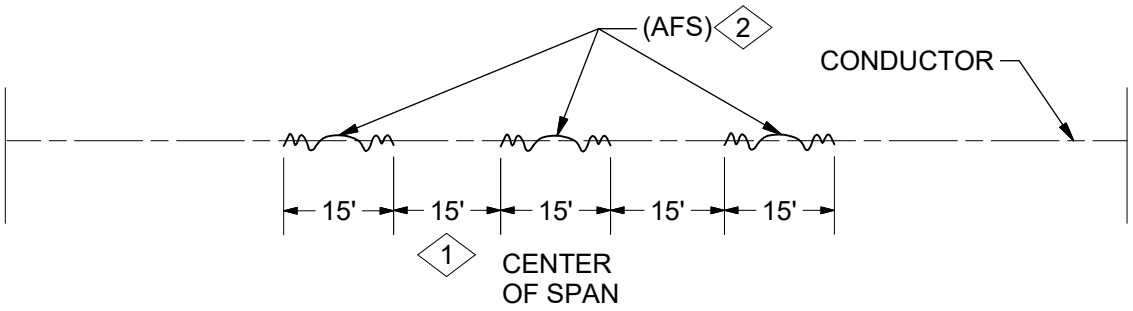
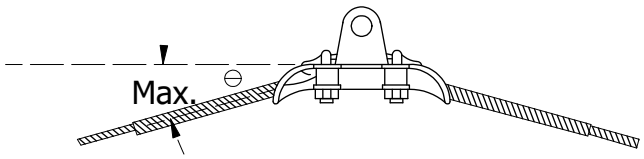


Figure 2 - ODD Number of AFS 4

REV	DATE	ENG	DESCRIPTION
5	07/01/23	PER	Converted to new format
4	05/10/12	DCG	



Max.Θ = 30°
Up to 477 ACSR

Max.Θ = 22.5°
For 556 and larger

SPANS 300' AND SHORTER

Table 1 - Spans < 300’	
STK #	DESCRIPTION
23 78 417	Clamp, Susp., #2 CU
	Clamp, Susp., #1/0 CU
	Clamp, Susp., #2/0 CU
	Clamp, Susp., #4/0 CU
	Clamp, Susp., #6A CWC
	Clamp, Susp., #4A CWC
	Clamp, Susp., #2A CWC
	Clamp, Susp., 3-#7 AW
23 18 342	Clamp, Susp., #4 ACSR
	Clamp, Susp., #2 ACSR
	Clamp, Susp., 3/0 ACSR
	Clamp, Susp., 4/0 ACSR
23 78 414	Clamp, Susp., 335.6 ACSR T-2
23 78 402	Clamp, Susp., 477 ACSR

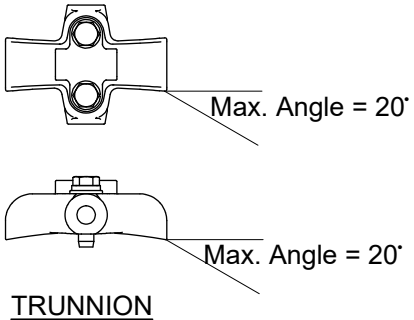
SPANS GREATER THAN 300'

Table 2 - Spans > 300	
STK #	DESCRIPTION ◇1
23 18 342	Clamp, Susp. #4 ACSR
17 59 020	Rod, Armor, #4 ACSR
23 18 342	Clamp, Susp. #2 ACSR
17 59 021	Rod, Armor, #2 ACSR
23 78 402	Clamp, Susp. 3/0 ACSR
17 59 023	Rod, Armor, 3/0 ACSR
23 18 372	Clamp, Susp. 4/0 ACSR
17 59 039	Rod, Armor, 4/0 ACSR
23 18 302	Clamp, Susp. 477 ACSR
17 59 058	Rod, Armor, 477 ACSR
23 18 302	Clamp, Susp. 795 AA
17 59 068	Rod, Armor, 795 AA

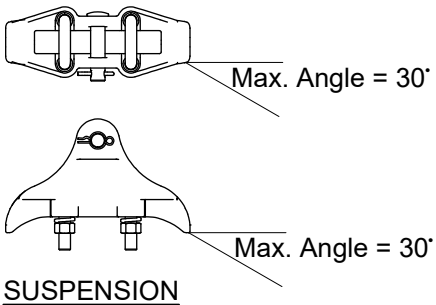
DESIGN NOTE(s):

◇1. Armor rods not required for spans 300' and shorter.

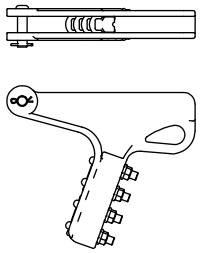
REV	DATE	ENG	DESCRIPTION
5	07/01/23	PER	Converted to new format
7	10/01/20	MJ	



TRUNNION



SUSPENSION



DEADEND

Table 1 - Trunnion Clamps		
Conductor	Span ≤ 300'	Span > 300'
	STK #	STK #
Clamp, Trunnion, 1/0 AAAC	23 78 401	23 78 401
Rod, Armor, 1/0 AAAC	-	17 59 022
Clamp, Trunnion, 336.4 ACSR	23 78 331	23 78 332
Rod, Armor, 336.4 ACSR	-	17 59 125
Clamp, Trunnion, 556 AAC	23 78 331	23 78 332
Rod, Armor, 556 AAC	-	17 59 061
Clamp, Trunnion, 954 ACSR	23 78 332	23 78 330
Rod, Armor, 954 ACSR	-	17 59 125
Clamp, Trunnion, 1272 ACSR	23 78 332	-
Rod, Armor, 1272 ACSR	-	17 59 161
Clamp, Trunnion, T2, 4/0 ACSR	23 78 458	
Clamp, Trunnion, T2, 336.4 ACSR	23 78 457	
Clamp, Trunnion, T2, 556 AAC	23 78 457	
Clamp, Trunnion, T2, 954 ACSR	-	

Table 2 - Suspension Clamps		
Conductor	Span ≤ 300'	Span > 300'
	STK #	STK #
Clamp, Suspension, 1/0 AAAC	23 18 342	23 78 402
Rod, Armor, 1/0 AAAC	-	17 59 022
Clamp, Suspension, 110.8 ACSR	23 18 342	23 78 311
Rod, Armor, 110.8 ACSR	-	17 59 164
Clamp, Suspension, 556 AAC	23 18 372	23 18 302
Rod, Armor, 556 AAC	-	17 59 061
Clamp, Suspension, 954 ACSR	23 18 302	23 18 396
Rod, Armor, 954 ACSR	-	17 59 125
Clamp, Suspension, 1272 ACSR	23 18 302	23 68 688
Rod, Armor, 1272 ACSR	-	17 59 161
Clamp, Suspension, T2, 4/0 ACSR	23 78 455	
Clamp, Suspension, T2, 336.4 ACSR	23 78 456	
Clamp, Suspension, T2, 556 AAC	17 02 176	
Clamp, Suspension, T2, 954 ACSR	23 78 451	

REV	DATE	ENG	DESCRIPTION
4	07/01/23	PER	Converted to new format
3	02/23/16	KSP	

Table 3 - Deadend Clamps	
Conductor	All Spans
	STK #
Clamp, Deadend, 1/0 AAAC	23 68 529
Clamp, Deadend, 110.8 ACSR	23 68 529
Clamp, Deadend, 336.4 ACSR	23 18 405
Clamp, Deadend, 556 AAC	23 18 405
Clamp, Deadend, 954 ACSR	23 18 436
Clamp, Deadend, 1272 ACSR	23 68 676
Clamp, Deadend, T2, 4/0 ACSR	23 18 404
Clamp, Deadend, T2, 336.4 ACSR	23 18 406
Clamp, Deadend, T2, 556 AAC	
Clamp, Deadend, T2, 954 ACSR (x2)	23 18 436

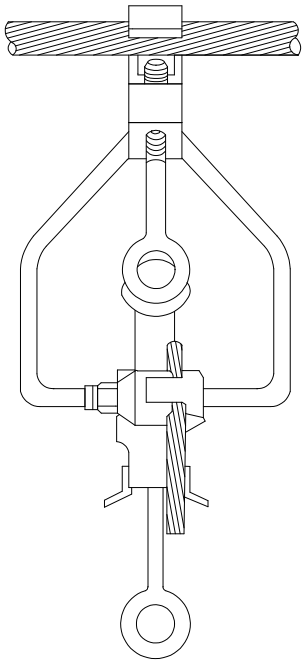
REV	DATE	ENG	DESCRIPTION
4	07/01/23	PER	Converted to new format
3	02/23/16	KSP	

Hot line clamps shall be used to make connections on lines rated over 5000 volts phase to phase where the connection must be made "hot" or where it is likely that the connection will have to be disconnected and reconnected with some degree of frequency. **Avoid the use of hot line clamps where currents exceed 250 amps** (i.e. 1/0 AAAC taps maximum), except with T-2 conductors.

Bronze hot line clamps shall be installed on aluminum stirrup clamps. Aluminum hot line clamps shall be installed on line conductors protected with existing armor rod or line guard. (Do not install additional rods or guards; use a new stirrup clamp). However, aluminum and bronze hot line clamps shall be connected directly to unprotected line conductors of like material (Al. to Al. or Cu. to Cu.) **when making no load taps**. This includes switches and lightning arresters.

INSTALLATION OF HOT LINE CLAMPS AND STIRRUP CLAMPS

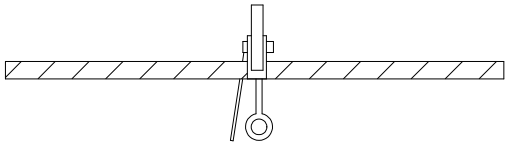
a. Use the proper size and type of clamps as shown in the following tables.
b. Install the hot line clamps over armor rods where present (keeping the clamps at least one loop (or pitch) length in from the end of the rods), or onto bails of stirrup clamps.
c. Wire brush aluminum conductors and supply corrosion resistance inhibitor STK #31 59 058 prior to installing stirrup hot line clamps. Wire brush copper conductors prior to installation.
d. Stirrup clamps in combination with hot line clamps are acceptable for use on conductors 1/0 and smaller.



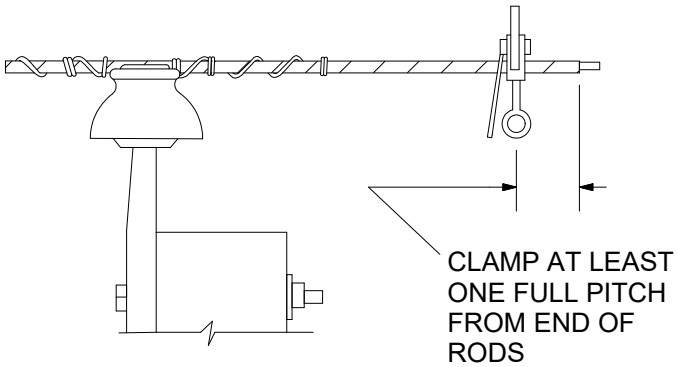
REV	DATE	ENG	DESCRIPTION
10	07/01/23	PER	Converted to new format
9	10/01/20	DCG	

Table 1 - Clamp on Stirrup	
STK #	DESCRIPTION
17 62 165 23 78 394	Clamp, Stirrup, #6 Cu
	Clamp, Hot Line, Cu.
	Clamp, Stirrup, #4 Cu
	Clamp, Hot Line,Cu.
	Clamp, Stirrup, #2 Cu
	Clamp, Hot Line, Cu.
	Clamp, Stirrup, 1/0 Cu
	Clamp, Hot Line, Cu.
17 62 153 23 78 394	Clamp, Stirrup, 4/0 Cu
	Clamp, Hot Line, Cu.
	Clamp, Stirrup, 350 Cu
	Clamp, Hot Line, Cu.
	Clamp, Stirrup, 500 Cu
	Clamp, Hot Line, Cu.
17 62 166 23 78 394	Clamp, Stirrup, #4 Al.
	Clamp, Hot Line, Cu.
	Clamp, Stirrup, #2 Al.
	Clamp, Hot Line, Cu.
	Clamp, Stirrup, 1/0 Al.
	Clamp, Hot Line, Cu.
	Clamp, Stirrup, 2/0 ACSR
	Clamp, Hot Line, Cu.
	Clamp, Stirrup, 3/0 ACSR
	Clamp, Hot Line, Cu.
	Clamp, Stirrup, 4/0 ACSR
	Clamp, Hot Line, Cu.
17 62 186 23 78 394	Clamp, Stirrup, 335.6 ACSR T−2
	Clamp, Hot Line, Cu.
	Clamp, Stirrup, 336 ACSR
	Clamp, Hot Line, Cu.
	Clamp, Stirrup, 477 ACSR
	Clamp, Hot Line, Cu.
	Clamp, Stirrup, 556 AA
	Clamp, Hot Line, Cu.
17 62 167 23 78 394	Clamp, Stirrup, 795 AA
	Clamp, Hot Line, Cu.
	Clamp, Stirrup, 954 AA

REV	DATE	ENG	DESCRIPTION
10	07/01/23	PER	Converted to new format
9	10/01/20	DCG	



FOR NO LOAD TAPS -
FUSED SWITCHES AND
LIGHTNING ARRESTORS



EXISTING ARMOR

Table 2 - Clamp on Bare Conductor	
STK #	DESCRIPTION
23 78 394	Clamp, Hot Line, #6 Cu, BARE
	Clamp, Hot Line, #4 Cu, BARE
	Clamp, Hot Line, #2 Cu, BARE
	Clamp, Hot Line, 1/0 Cu, BARE
23 78 183	Clamp, Hot Line, 4/0 Cu, BARE
	Clamp, Hot Line, 350 Cu, BARE
17 62 088	Clamp, Hot Line, #4 ACSR, BARE
	Clamp, Hot Line, #2 ACSR, BARE
	Clamp, Hot Line, 1/0 AL, BARE
	Clamp, Hot Line, 2/0 ACSR, BARE
	Clamp, Hot Line, 3/0 ACSR, BARE
	Clamp, Hot Line, 4/0 ACSR, BARE
	Clamp, Hot Line, 336 ACSR, BARE
17 62 190	Clamp, Hot Line, 335.6 ACSR T - 2
17 62 112	Clamp, Hot Line, 477 ACSR, BARE
	Clamp, Hot Line, 556 AA, BARE
17 62 143	Clamp, Hot Line, 795 AA, BARE

Table 3 - Clamp on Conductor with Existing Armor Rods.	
STK #	DESCRIPTION
17 62 088	Clamp, Hot Line, #4 ACSR, w/Armor
	Clamp, Hot Line, #2 ACSR, w/ Armor
	Clamp, Hot Line, 1/0 AL, w/Armor
	Clamp, Hot Line, 2/0 ACSR, w/Armor
	Clamp, Hot Line, 3/0 ACSR, w/Armor
17 62 143	Clamp, Hot Line, 4/0 ACSR, w/Armor
	Clamp, Hot Line, 336 ACSR, w/Armor
	Clamp, Hot Line, 477 ACSR, w/Armor
	Clamp, Hot Line, 556 AA, w/Armor

REV	DATE	ENG	DESCRIPTION
10	07/01/23	PER	Converted to new format
9	10/01/20	DCG	

This section covers the various connectors to be used in making copper to copper, aluminum to aluminum, and aluminum to copper connections. Each connector shall be used only on the types and ranges of conductors for which it is shown.

a. **Copper to Copper Connectors**

The following sizes of split bolt and two bolt connectors shall be standard for use in making copper to copper conductor connections.

Table 1 - Copper to Copper connectors

Stock #	Type of Connector	Conductor Range		Alternative options to Split Bolt
		Main	Tap	Vice connectors
17 54 001	Split Bolt	10 Str	12 Sol	–
17 54 002	Split Bolt	8 Str	10 Sol	–
17 54 003	Split Bolt	6 Sol	10 sol	–
17 54 004	Split Bolt	4 Sol	8 Sol	17 54 962
17 54 005	Split Bolt	2 Sol	6 Sol	17 04 251
17 54 182	Split Bolt	2 Str	4 Sol	
17 54 145	Two Bolt	4 AWG − 1/0	8 AWG − 1/0	17 04 252
17 54 139	Two Bolt	3 AWG − 2/0	8 AWG − 2/0	
17 54 140	Two Bolt	1 AWG − 4/0	8 AWG − 4/0	–
17 54 132	Two Bolt	2/0 − 350	8 AWG − 350	–
17 54 141	Two Bolt	3/0 − 500	8 AWG − 500	–
17 54 142	Two Bolt	500 − 1000	8 AWG − 1000	–

b. **Aluminum to Aluminum and Aluminum to Copper Connectors**

The table below lists the appropriate parallel grove clamps to be used for aluminum to aluminum or aluminum to copper connections as required. In no instance shall these connectors be used for making copper to copper connections. When making aluminum to copper connections the copper wire should be on the low side to prevent soluble copper salts from eroding the aluminum connector.

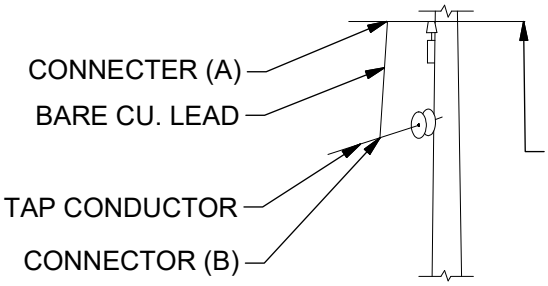
Table 2 - Al to Al, and Al to Cu Connectors

Stock #	Conductor Range			
	Main (ACSR & AAC)		Tap (ACSR, AAC, & Cu)	
	ACSR	AWG & CM	ACSR	AWG & CM
17 51 032	06/01/2000	6 Sol - 1/0 Str	06/01/2000	6 Sol - 1/0 Str
17 51 137	1/0 - 336.4 kcmil	1/0 Str - 350 kcmil	06/01/2000	6 Sol - 1/0 Str
17 51 138	1/0 - 336.4 kcmil	1/0 Str - 350 kcmil	1/0 - 336.4 kcmil	1/0 Str - 350 kcmil
17 51 139	336.4 - 795 kcmil	397.5 - 954 kcmil	06/02/2000	6 Sol - 2/0 Str
17 51 136	397.5 - 795 kcmil	400 - 1000 kcmil	3/0 - 397.5 kcmil	3/0 Str - 350 kcmil
17 51 135	397.5 - 795 kcmil	400 - 1000 kcmil	397.5 - 795 kcmil	400 - 1000 kcmil

c. **Applications**

The following shall be used to select both the line (A) and tap (B) connectors when making a tap, connecting a loop (over or around), or connecting switch. The table below also indicates the copper lead wire to be used. However, this must be indicated with the appropriate Stock # following DCS # 07 00 80 00 (bare conductor) or DCS # 07 00 81 00 (covered conductor).

Where a small tap to a large line combination has no connector shown (such as a 1/0 AAAC tap from a 954 AAC line), use the next larger lead wire. For example, use a 4/0 cu. rather than 1/0 cu. for 1/0 AAAC to 954 AAC).



CONNECTER (A)	STOCK NUMBER
CONNECTER (B)	STOCK NUMBER

Table 3

Conductor Size - TAP	Wire Size Bare S.D. Cu. Lead	Conductor Size - MAIN						
		954 AAC	795 AAC	556 AAC	477 ACSR	336 ACSR	1/0 AAAC or 1/0 ACSR	4 ACSR
4 ACSR	4	-	-	1751139	1751139	1751137	1751032	1751032
Bare or Poly				1751032	1751032	1751032	1751032	1751032
1/0 AAAC, ACSR	1/0	-	-	1751139	1751139	1751137	1751032	1751032
Bare or Poly				1751032	1751032	1751032	1751032	1751032
336 ACSR	350	1751136	1751136	1751136	1751136	1751138	-	-
Bare or Poly		1751138	1751138	1751138	1751138	1751138		
477 ACSR	350	1751136	1751136	1751136	1751136	1751138	-	-
Bare or Poly		1751136	1751136	1751136	1751136	1751136		
556 AA Bare or Poly	350	1751136	1751136	1751136	1751136	-	-	-
		1751136	1751136	1751136	1751136			
795 AA Bare or Poly	500	1751135	1751135	1751135	-	-	-	-
		1751135	1751135	1751135				
954 AA Bare or Poly	750	1751135	1751135	-	-	-	-	-
		1751135	1751135					
6 Cu.	4	-	-	1751139	1751139	1751137	1751032	1751032
Bare or Poly				1754004	1754004	1754004	1754004	1754004
4 Cu.	4	-	-	1751139	1751139	1751137	1751032	1751032
Bare or Poly				1754004	1754004	1754004	1754004	1754004
2 Cu.	2	-	-	1751139	1751139	1751137	1751032	1751032
Bare or Poly				1754005	1754005	1754005	1754005	1754005
1/0 Cu. Bare or Poly	Jan-00	-	-	1751136	1751136	1751137	1751032	1751032
				1754145	1754145	1754145	1754145	1754145
4/0 Cu. Bare or Poly	Apr-00	1751136	1751136	1751136	1751136	1751138	1751137	-
		1754140	1754140	1754140	1754140	1754140	1754140	
350 Cu. Bare or Poly	350	1751136	1751136	1751136	1751136	1751138	-	-
		1754132	1754132	1754132	1754132	1754132		
500 Cu. Bare or Poly	500	1751135	1751135	1751135	1751135	-	-	-
		1754141	1754141	1754141	1754141			

CONSTRUCTION NOTE(s):

1. Where there is a choice of clamps available for a specific connection, the smallest clamp shall be selected.

2. A Service Entrance Clamp, Stock #17 51 146 (not listed above) shall be used for connecting #6 ACSR Duplex cable to #10 Cu Pole & Bracket Cable.

1. **Use of Rubber Tape**

There are two standard types of rubber tape as follows:

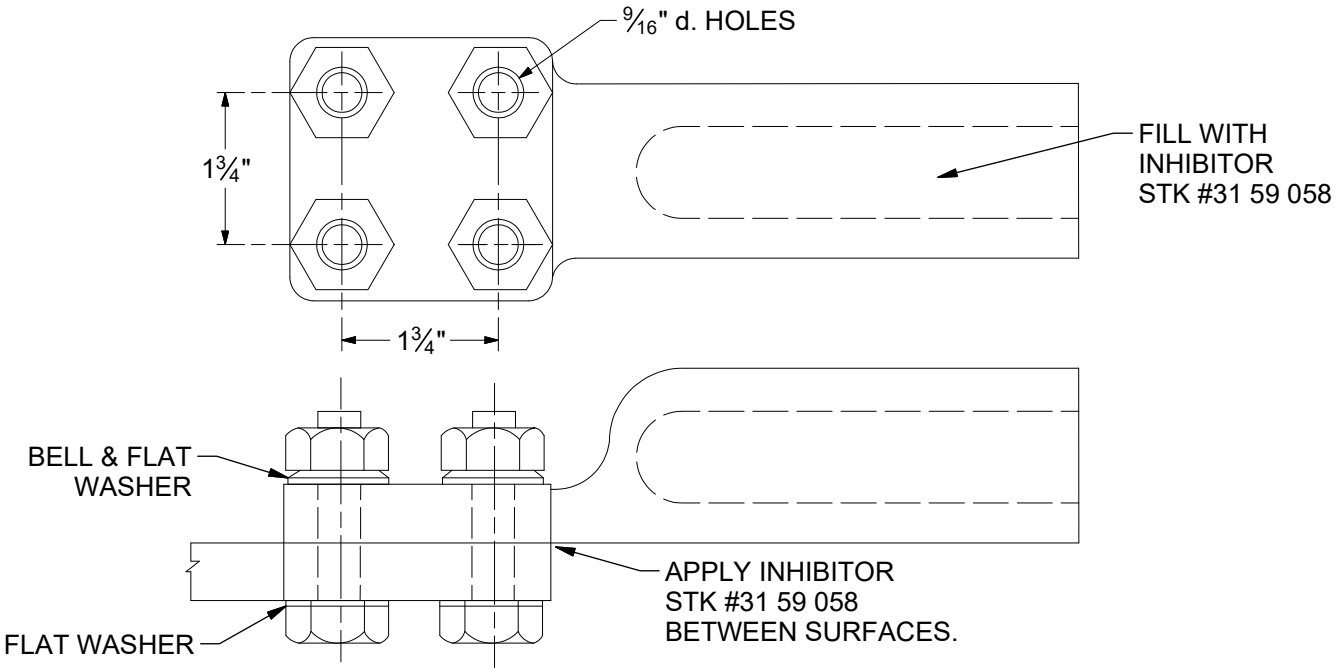
Rubber Base - Stock #25 53 080 used for voltages of 1000 Volts or less between phases. Its normal application is with rubber insulated wire. Use two layers half lapped and cover with same amount of friction tape.

Oil Base - Stock #25 53 070 (1" wide) or Stock #25 53 027 (1-1/2" wide) used for voltages 1000 Volts or more between phases. This tape is normally used with rubber insulated wire such as primary leads to transformers and for cable joints and terminals. Specific instructions for the use of this tape accompany standards on splices, joints, terminals, etc.

2. **Use of Friction Tape**

Friction tape Stock #25 53 003 (3/4" wide) or Stock #25 53 074 (1-1/2" wide) shall be used to cover taps, splices, etc., within the climbing and working spaces on Overhead Construction 5kV and below where weatherproof conductors are used. Apply two layers half lapped.

Tape will not adhere to corrosion resisting lubricant; therefore on aluminum taps it will be necessary to wipe the excess lubricant from the connection before taping. The tape must be securely anchored to the polyethylene jacket before taping over the coated connection.



STK#	Description	Note
17 55 311	Lug, Connecting, 1/0 ACSR, 2 Hole	1
17 55 315	Lug, Connecting, 335.5 ACSR T-2, 2 Hole	1
17 55 318	Lug, Connecting, 336 ACSR, 2 Hole	1
17 55 324	Lug, Connecting, 447 ACSR, 2 Hole	2
17 55 327	Lug, Connecting, 556 AA, 2 Hole	2
17 55 192	Lug, Connecting, 556 AA, 4 Hole	1
17 55 193	Lug, Connecting, 795 AA, 4 Hole	2
17 55 194	Lug, Connecting, 795 ACSR, 45/7, 4 Hole	2
17 55 211	Lug, Connecting, 954 AA, 4 Hole	2

DESIGN NOTE(s):

1. Install with 12 Ton Press and Burndy Die.
2. Install with 60 Ton Press and Alcoa Die.

REV	DATE	ENG	DESCRIPTION
7	07/01/23	PER	Converted to new format
6	10/01/20	JMW	

Preformed Ties

The preferred method of attaching aluminum conductors under tension to pin type or post type insulators on lines through 34kV is with preformed ties. Preformed top, side, double top, and double-sided ties are available for the following conductors listed in Table 1 below. Pads, when supplied with these ties must be used to insure a proper fit between the tie and conductor. For 600V conductors with polyethylene coating, the ties can be installed over the insulation.

Table 1 - Preformed Ties

Conductor Size	OD Range (in)	Top Tie (F-Neck)	Top Tie (C-Neck)	Side Tie (C-Neck)	Dbl. Top Tie (F- & C-Neck)	Dbl. Side Tie (F- & C-Neck)	Color Code
2/0 (6/1) ACSR, Bare	0.406 - 0.459	23 68 743	23 68 387	23 68 565	23 68 569	-	Blue
1/0 AAAC, Poly Covered	0.460 - 0.520	-	23 68 351	23 68 339	23 68 551	-	Orange
3/0 (7) AAAC, Bare							
3/0 (6/1) ACSR, Bare							
110.8 ACSR, Bare							
#4 ACSR, Tree Wire	0.521 - 0.588	23 68 506	23 68 390	23 68 331	23 68 383	23 68 392	Red
4/0 (6/1) ACSR, Bare							
1/0 AAAC, Tree Wire	0.666 - 0.755	23 68 362	23 68 343	23 68 332	23 68 395	23 68 391	Brown
336.4 (18/1) ACSR, Bare							
336.4 (25/7) ACSR, Bare							
477 (18/1) ACSR, Bare	0.756 - 0.858	-	23 68 491	23 68 492	23 68 494	23 68 493	Red
477 (26/7) ACSR, Bare							
556.5 (19) AAC, Bare							
556.5 (26/7) ACSR, Bare	0.859 - 0.968	23 68 348	23 68 344	23 68 338	23 68 374	23 68 375	Blue
556 AAC, Poly Covered	0.969 - 1.096	23 68 349	23 68 354	23 68 333	-	-	Green
795 (37) AAC, Bare							
954 (37) AAC, Bare	1.097 - 1.240	23 68 356	-	-	-	23 68 379	Yellow
954 (45/7) ACSR, Bare							
T2-3/0 or T2-335.6 (6/1) ACSR, Bare	0.859 - 0.968	23 68 348	23 68 344	23 68 338	23 68 374	23 68 375	Blue
T2-4/0 (6/1) ACSR, Bare							

REV	DATE	ENG	DESCRIPTION
8	07/01/23	PER	Converted to new format
7	10/01/20	DCG	

Conventional Hand Ties

Conventional hand ties are to be used only for those conductors on lines up through 34kV for which preformed ties are not specified, such as copper conductors, slack installations, and miscellaneous wire sizes and types which may be encountered on existing lines. Table II below specifies the correct tie wire for each type of conductor.

Table 2 - Hand Ties

Conductor Type/Size	Tie Wire	STK #	Unit	Top Tie	Side Tie	Dbl. Side Tie
Aluminum − AA, AAAC, ACSR Bare or Covered	#4 Al., Bare	18 55 028	Ft.	10	10	16
Copper−Bare, CW or CWC #6 thru 500 kcmil	#6 Cu, Bare, S.D. or	18 52 019	Ft.	10	10	16
	#8 Cu, Bare, S.D.	18 52 068				
Copper−Bare, CW or CWC #6 thru 500 kcmil	#6 Cu, Bare, S.D., 42” UE Only	18 52 009	Ea	1	1	2
Copper − Covered: #6 thru #2	#4 Cu, Poly, SD, SOL.	18 51 025	Ft.	5	5	10
#6 thru #2	#4 Al, Poly, 42” (MO Only)	18 55 040	Ea	1	1	2
1/0 thru 500 kcmil	#6 Cu, Poly, SD, SOL.	18 51 021	Ft.	5	5	10

1. Armor Rods or Line Guards are required for all bare aluminum hand ties.

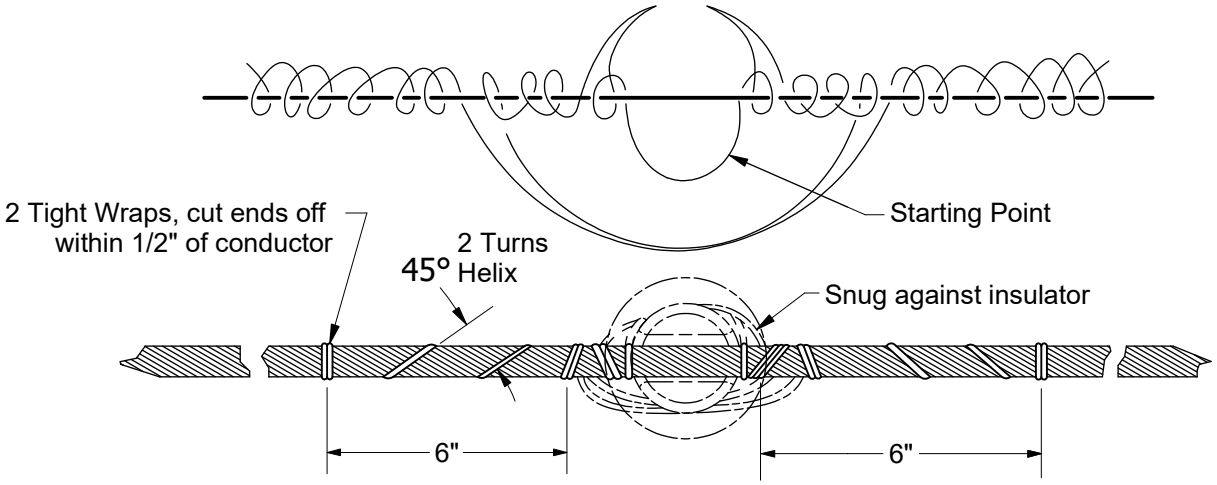
Conductor	Armor Rod Stock #
#4 ACSR	17 59 020
1/0 AAAC	17 59 022
336.4 ACSR	17 59 040
556.5 AA	17 59 071

2. On aluminum conductor make the tie as snug and tight as possible by hand up to the last two turns (buttons), and then use pliers to cinch these last two buttons continuously. Use the flat face of the pliers against the conductor and avoid nicking the tie wire by using a continuous cinch rather than a bite.

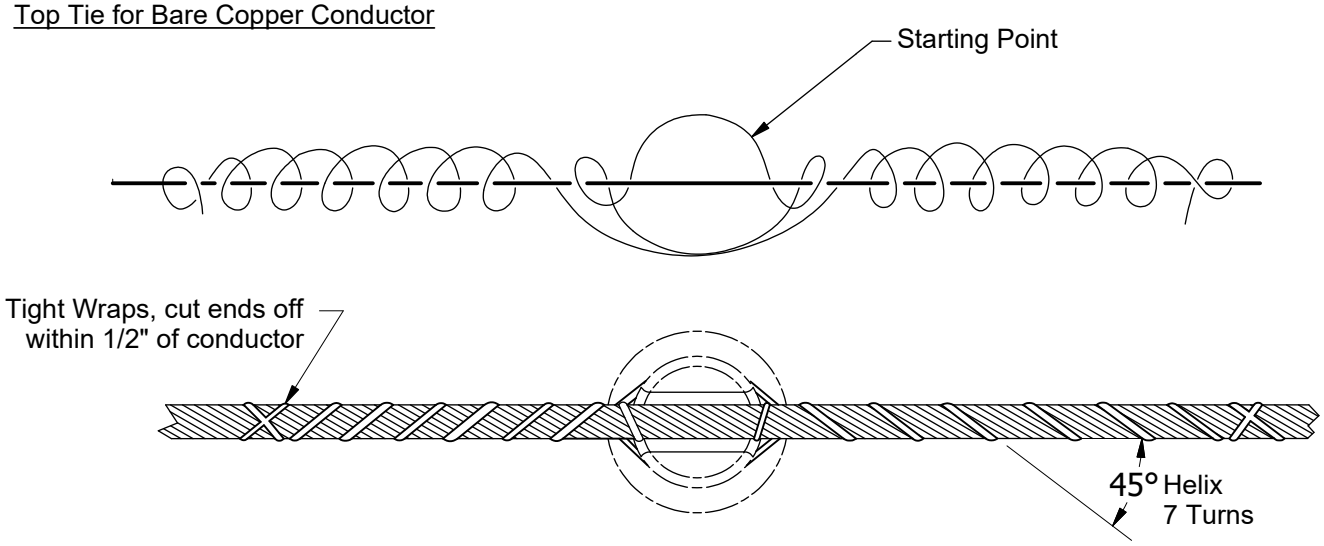
3. The cottonbraid or polyethylene covering on covered copper conductor used for primary voltages must be removed at all insulator ties to a point 6" beyond the ends of the tie wires. The conductor shall then be tied in as if a bare copper conductor.

Conventional Hand Top Ties

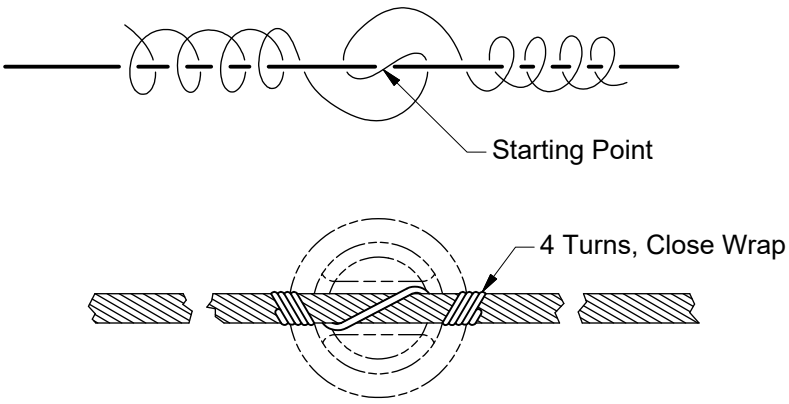
Top Tie for Aluminum Conductor - Bare or Covered



Top Tie for Bare Copper Conductor



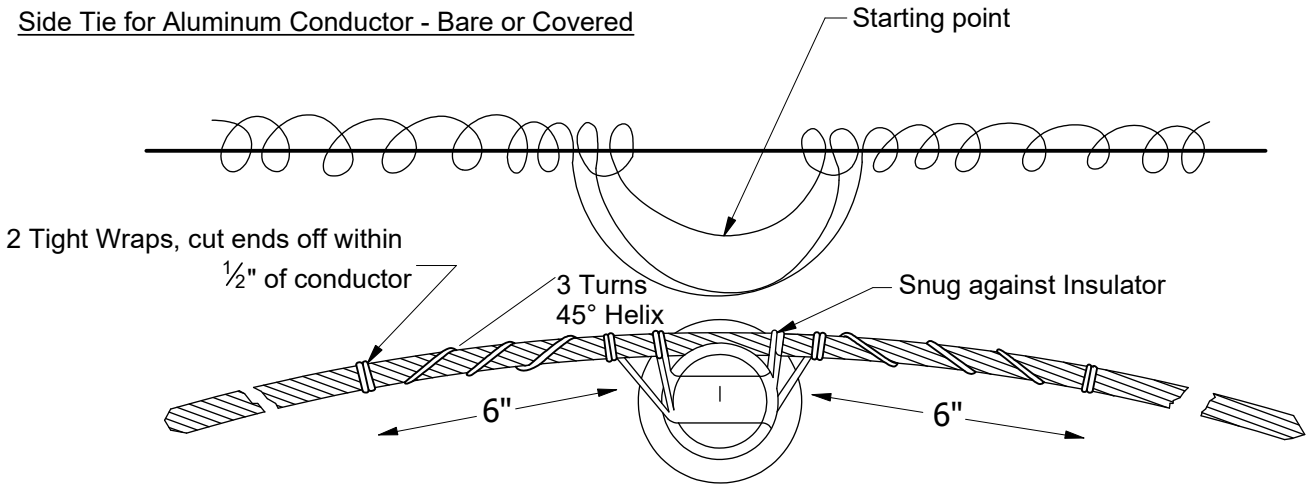
Top Tie for Covered Copper Conductor - 4kV



REV	DATE	ENG	DESCRIPTION
8	07/01/23	PER	Converted to new format
7	10/01/20	DCG	

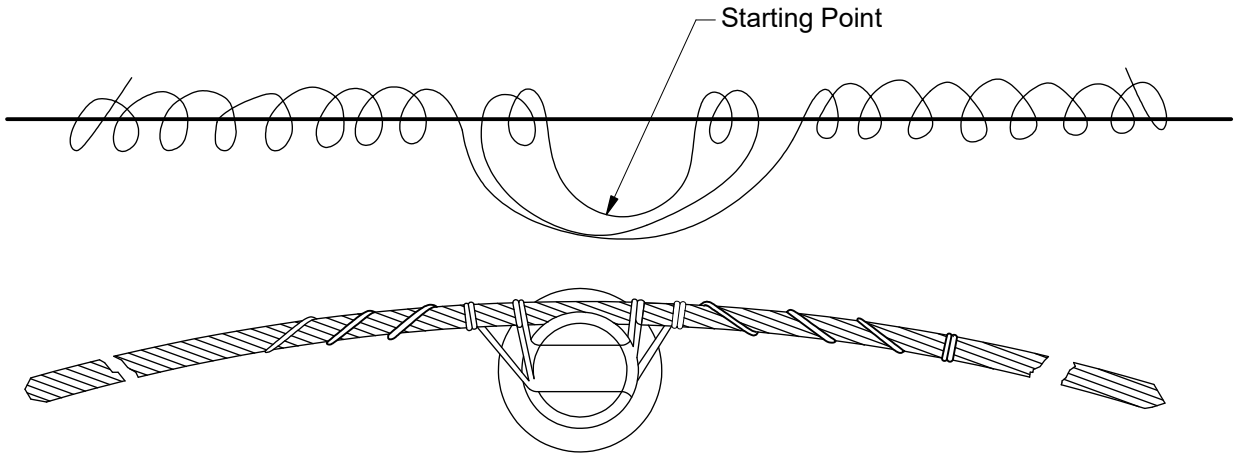
Conventional Hand Side Ties

Side Tie for Aluminum Conductor - Bare or Covered



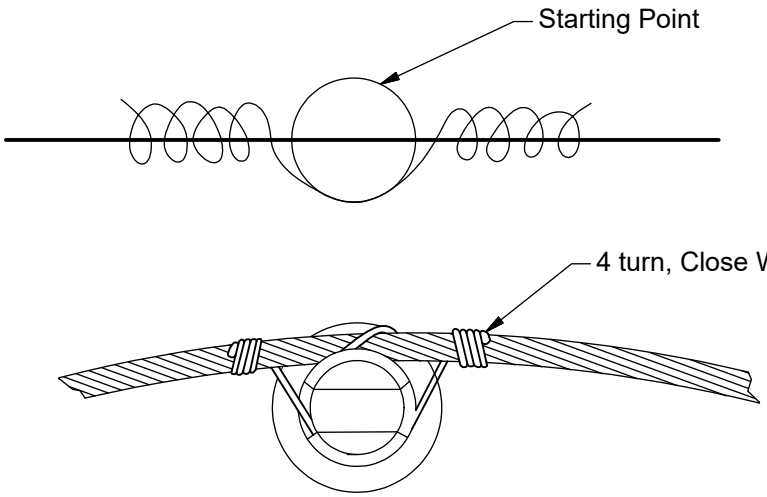
Double Ties: Make Two Single Ties - Reduce spiral length between insulators as necessary.

Side Tie for Bare Copper Conductor



Double Ties: Make Two Single Ties - Reduce spiral length between insulators as necessary.

Side Tie for Covered Copper Condcutor - 4kV



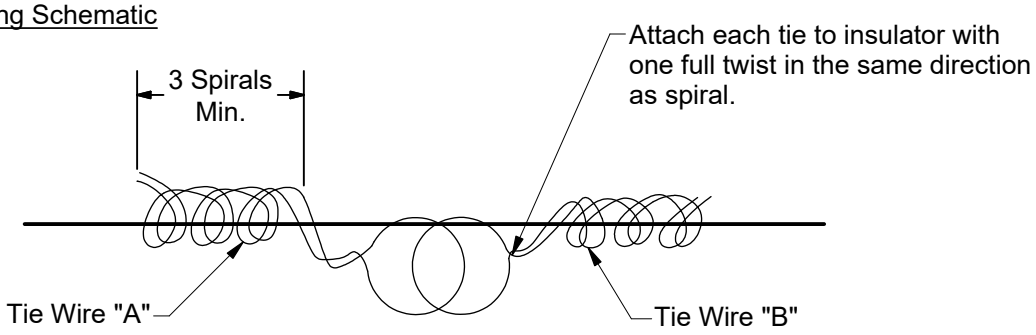
REV	DATE	ENG	DESCRIPTION
8	07/01/23	PER	Converted to new format
7	10/01/20	DCG	

Live Line Ties

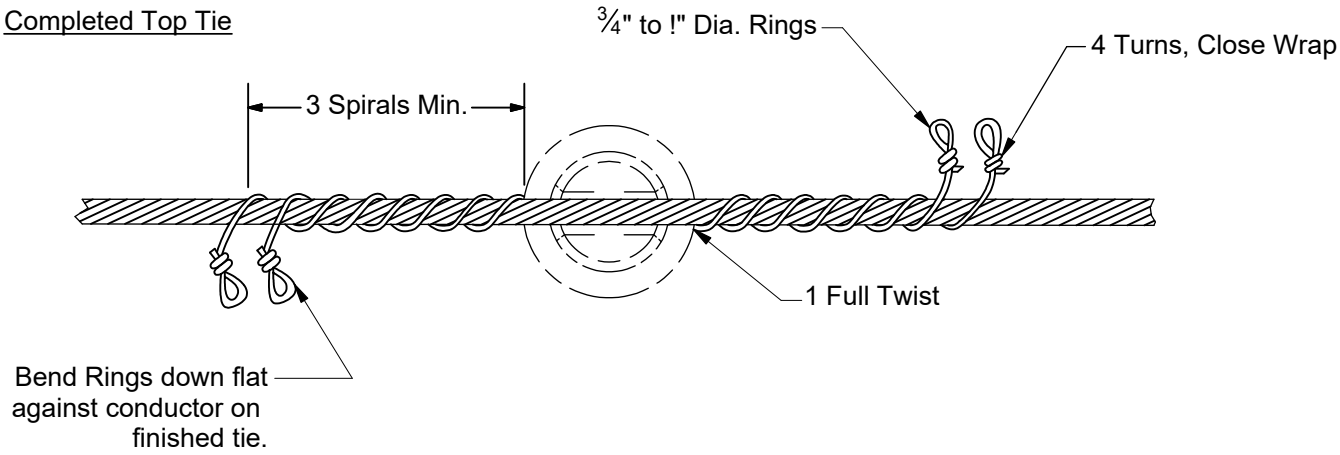
For Use on Bare Aluminum or Copper Conductors

This same tie may be used as either a Hot Tap Tie or Hot Side Tie as shown below.

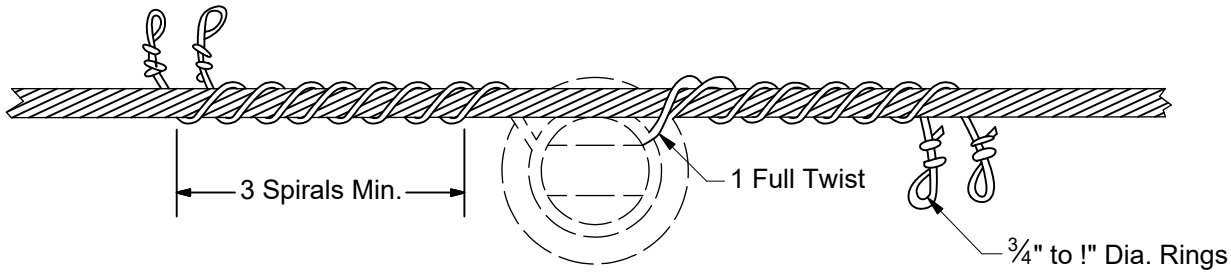
Live Line Tying Schematic



Completed Top Tie

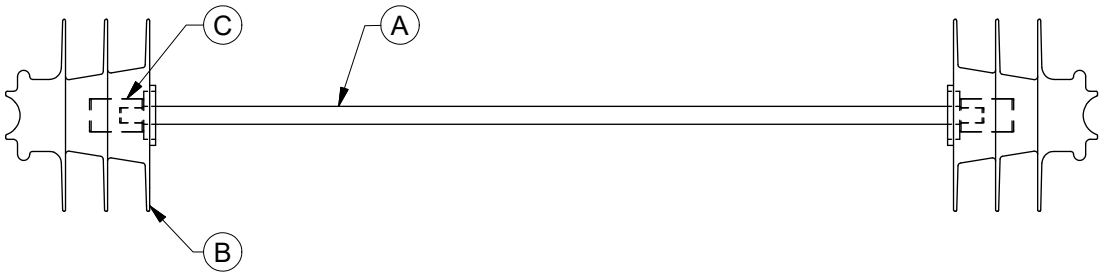


Completed Side Tie



Double Ties: Same as single tie except that only one tie is installed on each insulator.

REV	DATE	ENG	DESCRIPTION
8	07/01/23	PER	Converted to new format
7	10/01/20	DCG	



DCS#	DESCRIPTION
07 00 45 01	Spacer 36" 12kV
07 00 45 02	Spacer 48" 12kV
07 00 45 03	Spacer 36" 34kV
07 00 45 04	Spacer 48" 34kV

CONSTRUCTION NOTE(s):

1. Rod lengths are selected based on the normal separation between phases.

2. Conductors may be hand-tied to the insulators in either the top or the side groove, with the top groove position preferred.

ITEM	STK / DCS #	DESCRIPTION 07 00 45 **	01	02	03	04
A	23 17 290	Spacer Rod - 36"	1	-	1	-
A	23 17 278	Spacer Rod - 48"	-	1	-	1
B	25 05 069	Insulator, Pin Type, 12kV	2	2	-	-
B	25 05 080	Insulator, Pin Type, 34kV, F-Neck	-	-	2	2
C	23 62 125	Adapter - 1" to 1-3/8"	-	-	2	2
D	18 55 028	Wire - Tie, Al, #4 AWG	20	20	20	20

DESIGN NOTE(s):

3. Spacers are to be used at known problem locations to prevent phases from coming in contact with each other.

REV	DATE	ENG	DESCRIPTION
4	07/01/23	PER	Converted to new format
3	10/01/20	WYW	

Tap or Line Conductor	Lead - S.D. Bare Copper or AA		Lead - Poly Covered S.D. Cu or AA
	Size	STK #	STK # ◇3
4 ACSR Bare	4 Cu	18 52 020	18 51 025
1/0 AAAC, ACSR, Bare	1/0 Cu	18 52 026	18 51 024
336.4 ACSR Bare	350 Cu	18 52 023	18 51 052
477 ACSR Bare	350 Cu	18 52 023	18 51 052
556.5 AA Bare	350 Cu	18 52 023	18 51 052
795 AA Bare	795 Cu	18 05 032	◇2
954 AA, ACSR, Bare	954 Cu	18 05 043	◇2
4 ACSR Poly.	4 Cu	18 52 020	18 51 025
1/0 AAAC Poly.	1/0 Cu	18 52 026	18 51 024
336.4 AA Poly.	4/0 Cu	18 52 024	18 51 052
556.5 AA Poly.	350 Cu	18 52 023	18 51 052
#6 Cu. Bare	4 Cu	18 52 020	18 51 025
#4 Cu. Bare	4 Cu	18 52 020	18 51 025
#2 Cu. Bare	2 Cu	18 52 025	18 51 019
#1/0 Cu. Bare	1/0 Cu	18 52 026	18 51 024
#4/0 Cu. Bare	4/0 Cu	18 52 024	18 51 023
350 Cu. Bare	350 Cu	18 52 023	18 51 052
500 Cu. Bare	500 Cu	18 52 021	18 51 022
#6 Cu. Poly.	4 Cu	18 51 020	18 51 025
#4 Cu. Poly.	4 Cu	18 51 020	18 51 025
#2 Cu. Poly.	2 Cu	18 52 025	18 51 019
#1/0 Cu. Poly.	1/0 Cu	18 52 026	18 51 024
#4/0 Cu. Poly.	4/0 Cu	18 52 024	18 51 023
500 Cu. Poly.	500 Cu	18 51 021	18 51 022

DESIGN NOTE(s):

1. Lead size is based on current capacity of tap for tap standards and of line for line sectionalizing. Line conductor (of equal size) may be used.

◇2 Applicable to 34.5kV air break switches. Use Stock #23 17 425 conductor cover.

◇3 Poly covered leads are to be used for jumpers to prevent wildlife outages.

Tap or Line Conductor	Lead - 2400 V. Insulated Copper ◇3◇	
	Size	STK #
4 ACSR Bare	◇2◇	18 53 018
1/0 AAAC, ACSR Bare	4/0	18 53 028
336.4 ACSR Bare	350 ◇2◇	18 53 102
477 ACSR Bare	350 ◇2◇	18 53 102
556.5 AA Bare	350 ◇2◇	18 53 102
4 ACSR Poly.	◇2◇	18 53 018
1/0 AAAC Poly.	1/0	18 53 022
336.4 AA Poly.	350	18 53 102
556.5 AA Poly.	350 ◇2◇	18 53 102
#6 Cu. Bare	◇2◇	18 53 018
#4 Cu. Bare	◇2◇	18 53 018
#2 Cu. Bare	1/0	18 53 022
#1/0 Cu. Bare	4/0	18 53 028
#4/0 Cu. Bare	350	18 53 102
350 Cu. Bare	350 ◇2◇	18 53 102
500 Cu. Bare	350 ◇2◇	18 53 102
#6 Cu. Poly.	◇2◇	18 53 018
#4 Cu. Poly.	◇2◇	18 53 018
#2 Cu. Poly.	1/0	18 53 022
#1/0 Cu. Poly.	4/0	18 53 028
#4/0 Cu. Poly.	350	18 53 102
350 Cu. Poly.	350 ◇2◇	18 53 102
500 Cu. Poly.	350 ◇2◇	18 53 102

DESIGN NOTE(s):

1. Lead size is based on current capacity of tap for tap standards and of line for line sectionalizing.

◇2◇ The 350 kcmil maximum size of the 2400kV lead has the same emergency rating as the highest rated substation exit cable. A larger size is not needed.

◇3◇ The lead wires on this standard are for use on 2.4/4.16 kV installations. For higher voltage installations refer to DCS **07 00 80 00**.

REV	DATE	ENG	DESCRIPTION
6	07/01/23	DCG	Converted to new format
5	10/01/20	DCG	

NOTES