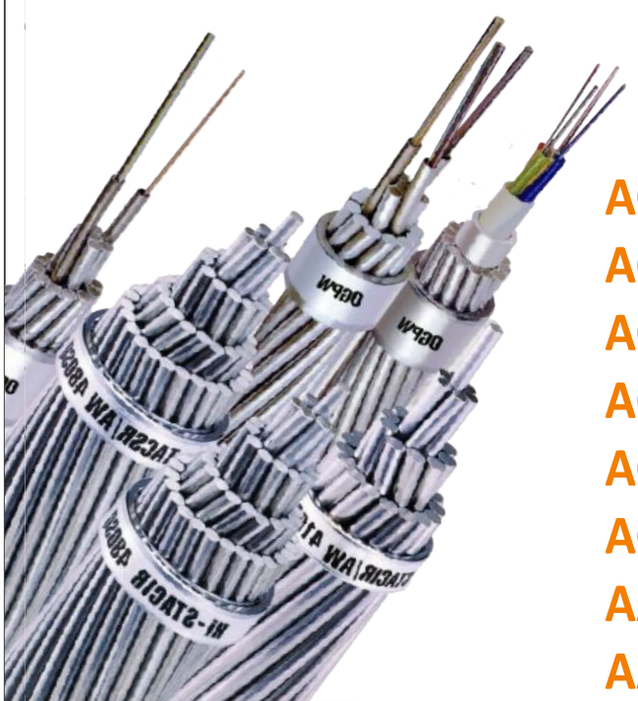
Simnoor Yazdan Co.

The Total Quality Management of
All Kind of Conductors



ACSR
ACSR/AW
ACSR/TW
ACSS
ACSS/AW
ACSS/TW
AAAC
AAC
OPGW
ADSS

Office: Unit 1, No.94, Eastern Ferdows Blvd.,Tehran,Iran **Tel:** (+9821) 33554049
Fax: (+9821) 33554069

Factory: No.112, Zone 3, Kheirabad Industrial Estate, Arak, Iran
Tel: (+9886) 33554049
Fax: (+9886) 33554069

www.simnoorco.com
info@simnoorco.com

An Introduction

Sim Noor Yazdan Co. was founded in 2008 in Iran and produces all different types of electric wire conductors. The company's focus is on research, development and innovation in electric industry and saving pure energy. The company chief goal is to reduce pure energy waste; as normally the waste is due to the mal transmission or the improper adopted saving methods. Hence, the top priority of the company is to develop new kinds of conductors with high quality in order to avoid the waste. This could be achieved by hiring high tech equipment and machines as well as observing the latest standards in the world which plays a key role in this mission.

Vision & Mission

At Simnoor Yazdan, our products deliver power, and so do our people. We will sustain our company in a fiercely competitive industry by believing in and supporting our employees, who in turn, will ensure our performance, exceeds that of our competitors by:

- **Growing Green:** The chief focus of the company is to help growing a greener world: we will reduce our environmental footprint, even as we grow. By so doing, we will not only sustain our business, but we also will help sustain the communities in which we work and the world in which we live.Using a safe, high-performance, and cost-optimized energy technological infrastructure is a significant competitive advantage. In order to utilize the much potential this area has to offer SNY which supports its customers in the construction and long-term economic operation of the appropriate facilities. This assistance is based on partnership, innovation, and it is service and safety-oriented.

- **Building Worth:** Our success depends on our customer's success. We will build worth for our shareholders, customers, and other stakeholders by achieving the lowest cost, highest quality, and best service in our industry. To do this, we must lead our core markets with superior products; grow steadily; spend wisely; keep debt low; and protect our investments.

- **Living Well:** We will preserve and enhance the lives of our employees by building a workplace that is satisfying, meaningful, and fun. In doing so, we will make certain that safety and health are always top priorities and will treat each other with dignity and respect.

- **Doing Right:** We will foster a culture guided by ethical values. We will not forget to live up to those values, even when it might be difficult. And when we make mistakes, we will be transparent and responsive to our critics.

Our Customers

Simnoor Yazdan has provided conductors for all over the country as well as Iran's neighbors. We have tried to build a solid and concrete connection with the customers, and they tuned it as to be permanent customers for the company. Regional Electricity of Fars, Sistan and Baluchestan, Bakhtar Distribution, Zanjan Distribution, Gilan State Electricity, Arak Electricity Distribution, SSco Company and many others are companies and organizations that Simoom provided conductors for them. The company also had exports to Afghanistan.

Our Products

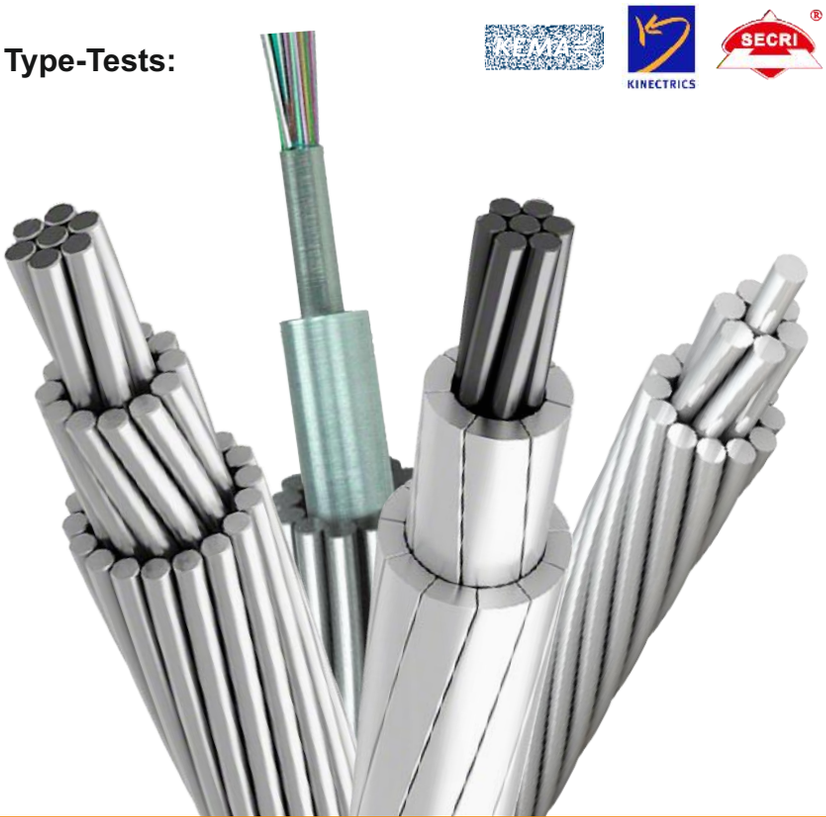
Our electrical products meet the international standards such as (ASTM, DIN, BS, NFC, IEC&GOST). Here is the list of products.

- **AAC (All Aluminum Conductor)**
- **AAAC (All Aluminum Alloy Conductor)**
- **ACSR (Aluminum Alloy Conductor Steel Reinforced)**
- **ACSR/AW**
- **ACSR/TW (Aluminum Alloy Conductor Steel Reinforced/Trapezoidal Shaped)**
- **ACSS (Aluminum Conductor Steel-Supported)**
- **ACSS/AW (Aluminum Conductor Steel-Supported/Aluminum Cladding Steel)**
- **ACSS/TW (Aluminum Conductor Steel-Supported/Trapezoidal Shaped)**
- **OPGW (Optical Ground Wire)**
- **ADSS (All Dielectric Self-Supporting Cable)**

Certificates

ISOs:

Type-Tests:



Contents

ACSR

Aluminum Conductor Steel Reinforced

Complete Conductor:

ACSR is a composite concentric-lay-stranded conductor. ACSR conductors are manufactured in accordance with the requirements of the latest applicable issues of ASTM specification B232. The steel strand or strands form the central core of the conductor, around which is stranded one or more layers of aluminum 1350-H19 wires. The steel core may consist of a single strand or a concentric-stranded cable of 7, 19, 37 or more wires. Numerous combinations of aluminum and steel strands and layers are possible. The sizes and standings listed on the following pages are those most frequently used for overhead lines.

Features and Benefits:

ACSR conductors are recognized for their record of economy, dependability and favorable strength/ weight ratio. ACSR conductors combine the light.

Features and Benefits (*cont'd*):

Weight and good conductivity of aluminum with the high tensile strength and ruggedness of steel. In line design, this can provide higher tensions, less sag and longer span lengths than obtainable with most other types of overhead conductors. The steel strands are added as mechanical reinforcement. The cross-sections above illustrate some common standings.

Applications:

Aluminum Conductors, Steel-Reinforced (ACSR) are extensively used for overhead distribution and transmission lines.

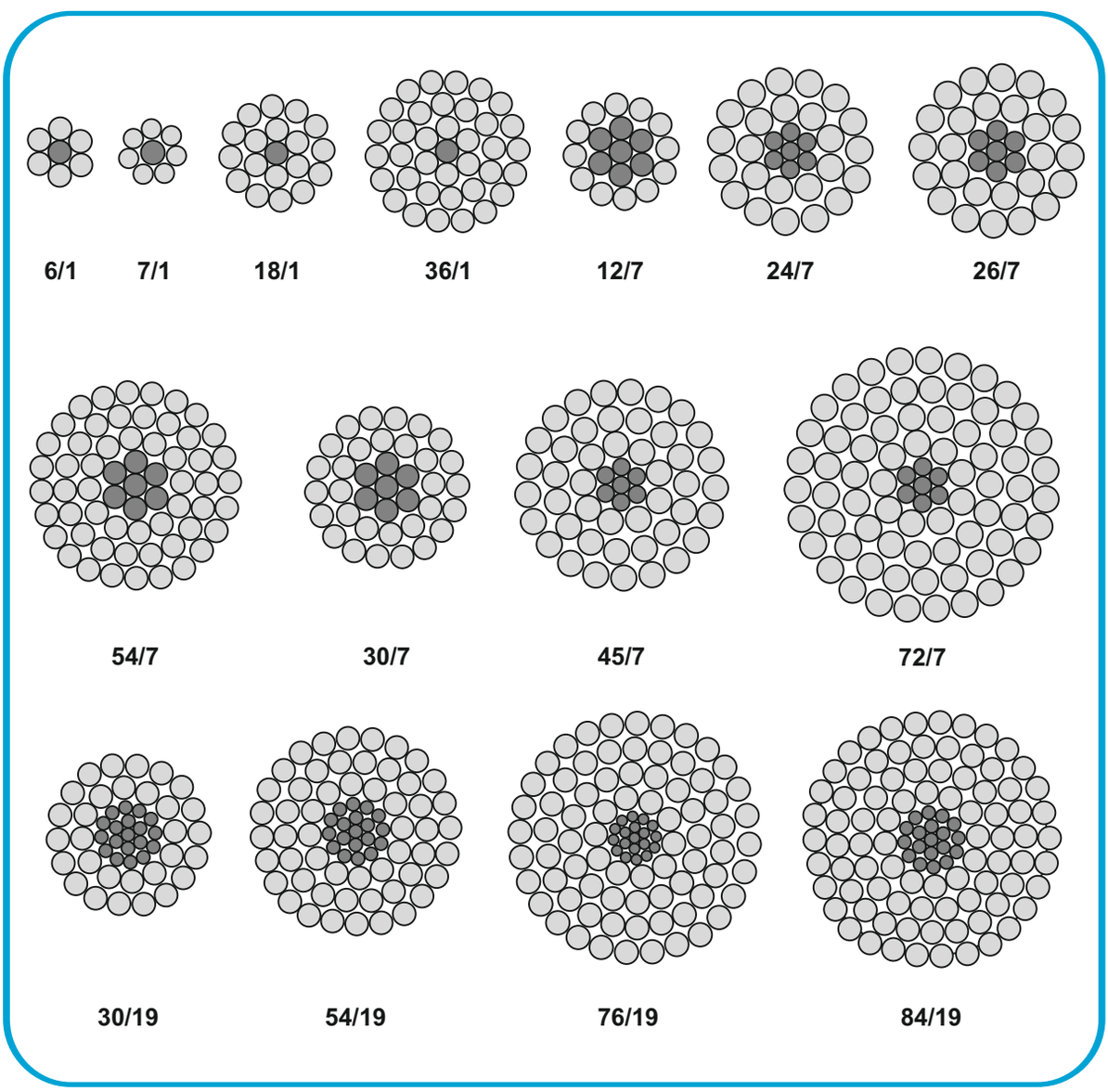
Options:

- High-conductivity aluminum (/HC) (62.0% IACS)
- Regular-strength class C galvanized steel core (/Gc2)
- High-strength class A galvanized steel core (/GA)
- Extra-high-strength class A galvanized steel core (/GA4)

Options (*cont'd*):

- Ultra-high-strength class A galvanized steel core (/GA5)
- Regular-strength class A zinc-5% aluminum mischmetal alloy - coated steel core (/MA2)
- High-strength class A zinc - 5% aluminum mischmetal alloy - coated steel core (/MA3)
- Extra-high-strength class A zinc - 5% aluminum mischmetal alloy - coated steel core (/MA4)
- Ultra-high-strength class A zinc - 5% aluminum mischmetal alloy - coated steel core (/MA5)
- Aluminum-clad steel core (/AW) (see ACSR/AW catalogue section)

ACSR cross section according to the number of layers:



- Non-specular surface finish (/NS)
- Compact ACSR (ASTM B401) designs are available

ASTM B232

- Based on:

- The conductor temp of 75˚c
- 0.6 m/s crosswind
- 0.5 coefficient of emisstivity
- Intensity of solar radiation 1033w/m2
- Height of sea level 1500m

Code Name	Area				Stranding and wire diameter	
	Aluminum		Steel	Total	Aluminum	Steel
	AWG or MCM*	mm^2	mm^2	mm^2	mm	mm
Turkey	6	13.3	2.22	15.52	6/1.68	1/1.68
Thrush	5	16.83	2.81	19.64	6/1.89	1/1.89
Swan	4	21.18	3.53	24.71	6/2.12	1/2.12
Swanate	4	21.12	5.35	26.47	7/1.96	1/2.61
Swallow	3	26.69	4.45	31.14	6/2.38	1/2.38
Sparrow	2	33.59	5.6	39.19	6/2.67	1/2.67
Sparate	2	33.54	8.55	42.09	7/2.47	1/3.30
Robin	1	42.41	7.07	49.48	6/3.00	1/3.00
Raven	1/0	53.52	8.92	62.44	6/3.37	1/3.37
Quail	210	67.33	11.22	78.55	6/3.78	1/3.78
Pigeon	310	85.12	14.19	99.3	6/4.25	1/4.25
Penguin	410	107.22	17.87	125.09	6/4.77	1/4.77
Waxwing	266.8	134.98	7.5	142.48	18/3.09	1/3.09
Partridge	266.8	134.87	21.99	156.86	26/2.57	7/2.0
Ostrich	300	152.19	24.71	176.89	26/2.73	7/2.12
Merlin	336.4	170.22	9.46	179.68	18/3.47	1/3.47
Linnet	336.4	170.55	27.83	198.38	26/2.89	7/2.25
Oriole	336.4	170.49	39.78	210.27	30/2.69	7/2.69
Chickadee	397.6	200.92	11.16	212.09	18/3.77	1/3.77
Brant	397.5	201.55	26.13	227.68	24/3.27	7/2.18
Ibis	397.5	201.33	32.73	234.06	26/3.14	7/2.44
Lark	397.5	200.89	46.87	247.77	30/2.92	7/2.92
Pelican	477	242.30	13.46	255.76	18/4.14	1/4.14
Flicker	477	241.58	31.4	272.98	24/3.58	7/2.39
Hawk	477	241.64	39.49	281.12	26/3.44	7/2.68
Hen	477	241.27	56.3	297.56	30/3.20	7/3.2
Osprey	556.5	282.46	15.69	298.16	18/4.47	1/4.47
Parakeet	556.5	282.3	36.59	318.89	24/3.87	7/2.58
Dove	556.5	282.58	45.92	328.49	26/3.72	7/2.89
Eagle	556.5	282.07	65.82	347.88	30/3.46	7/3.46
Peacock	605	306.12	39.78	345.91	24/4.03	7/2.69
Squab	605	305.82	49.81	355.62	26/3.87	7/3.01
Wood Duck	605	307.05	71.65	378.7	30/3.61	7/3.61
Teal	605	307.05	69.62	376.67	30/3.61	19/2.16
Kingbird	636	323	17.94	340.95	18/4.78	1/4.78

Approximate Overall Diameter	Weight			Content%		Nominal breaking load	Maximum de Resistance at 20°C	Maximum AC resistance		Current Rating Ambient Temp (1)	
mm	Aluminum	Steel	Total	Aluminum	Steel	kgf	ohm/km	25°c	75 °c	25°c	40°c
	kg/km							Ohm/km		A	
5.04	37	17	54	67.9	32.1	538	2.1046	2.1471	2.5711	95	80
5.67	46	22	68	67.6	32.4	681	1.6629	1.6964	2.0315	111	93
6.36	58	27	86	67.9	32.1	847	1.3216	1.3484	1.6148	129	108
6.53	58	42	100	58.13	41.87	1074	1.3088	1.3353	1.599	131	110
7.14	73	35	108	67.9	32.1	1041	1.0486	1.0699	1.2812	151	126
8.01	92	44	136	58.3	41.87	1294	0.8332	0.8503	1.0182	176	147
8.24	92	67	159	57.9	42.1	1646	0.8239	0.8408	1.0068	178	150
9	116	55	171	67.9	32.1	1613	0.66	0.6737	0.8068	205	172
10.11	147	69	216	67.9	32.1	1974	0.523	0.5339	0.6394	240	201
11.34	185	185	272	67.9	32.1	2373	0.4157	0.4246	0.5085	279	234
12.75	234	234	344	67.9	32.1	3000	0.3289	0.3362	0.4026	326	273
14.31	294	294	433	86.45	13.55	3779	0.2611	0.2672	0.32	380	319
15.45	372	372	431	68.5	31.5	3087	0.2118	0.2172	0.2601	432	362
16.28	374	374	546	68.5	31.5	5123	0.2097	0.2195	0.2629	442	371
17.28	422	422	615	68.5	31.5	5768	0.1858	0.1945	0.233	479	402
17.35	470	74	543	86.5	13.5	3893	0.168	0.1727	0.2068	504	423
18.31	473	217	690	68.5	31.5	6401	0.1658	0.174	0.2084	517	433
18.83	474	311	785	60	40	7897	0.1646	0.1742	0.2086	524	439
18.85	554	87	641	86.5	13.5	4423	0.1423	0.1467	0.1757	562	471
19.61	559	204	763	73	27	6601	0.141	0.1478	0.177	572	480
19.88	558	256	814	69	31	7349	0.1405	0.1479	0.1771	576	483
20.44	557	366	923	60	40	9209	0.1393	0.148	0.1772	584	490
20.7	669	105	773	86.5	13.5	5334	0.118	0.1222	0.1463	636	533
21.49	670	245	915	73	27	7717	0.1176	0.1238	0.1483	645	541
21.8	670	308	978	68.5	31.5	8845	0.117	0.1237	0.1481	650	545
22.4	671	440	1110	60	40	10725	0.1163	0.124	0.1485	658	552
22.35	779	122	901	86.5	13.5	6218	0.1012	0.1053	0.1261	703	589
23.22	783	286	1069	73	27	9004	0.1007	0.1065	0.1275	714	599
23.55	783	359	1142	68.5	31.5	10311	0.1001	0.1063	0.1273	719	603
24.21	784	514	1298	60	40	12539	0.0995	0.1072	0.1284	726	609
24.2	849	311	1160	73	27	9777	0.0928	0.0988	0.1183	751	630
24.51	848	389	1237	69	31	11029	0.9025	0.0988	0.1183	756	634
25.25	853	560	1413	60	40	13159	0.0914	0.0985	0.1179	769	645
25.24	853	545	1398	61	39	13602	0.0915	0.0988	0.1183	768	644
23.88	891	140	1031	86.5	13.5	7111	0.0885	0.0926	0.1109	766	642

ASTM B232

- Based on:

- The conductor temp of 75˚c
- 0.6 m/s crosswind
- 0.5 coefficient of emisstivity
- Intensity of solar radiation 1033w/m2
- Height of sea level 1500m

Code Name	Area				Stranding and wire diameter	
	Aluminum		Steel	Total	Aluminum	Steel
	AWG or MCM*	mm^2			mm	
Rook	636	323.06	41.88	364.94	24/4.14	7/2.76
Grosbeak	636	321.83	52.49	374.33	26/3.97	7/3.09
Seater	636	322.55	75.26	397.82	30/3.70	7/3.09
Egret	636	322.55	73.54	396.1	30/3.70	19/2.22
Flamingo	666.6	337.26	43.72	380.98	24/4.23	7/2.82
Gannet	666.6	338.25	54.9	393.15	26/4.07	7/3.16
Stilt	715.5	363.26	46.87	410.12	24/4.39	7/2.92
Starling	715.5	361.92	59.15	421.07	26/4.21	7/3.28
Red wing	715.5	362.05	82.41	444.46	30/3.92	19/2.35
Tern	795	403.76	27.83	431.59	45/3.38	7/2.25
Condor	795	402.32	52.15	454.47	54/3.08	7/3.08
Cuckoo	795	402.32	52.15	454.47	24/4.62	7/3.08
Drake	795	402.55	65.44	467.98	26/4.44	7/3.45
Mallard	795	403.83	91.78	495.61	30/4.14	19/2.48
Ruddy	900	455.49	31.67	487.16	45/3.59	7/2.4
Canary	900	456.27	59.15	515.41	54/3.28	7/3.28
Rail	954	483.83	33.54	517.37	45/3.7	7/2.47
Cardinal	945	484.51	62.81	547.32	54/3.38	7/3.38
Ortlan	1033.5	523.85	36.31	560.17	45/3.85	7/2.57
Curlew	1033.5	525.48	68.12	593.6	54/3.52	7/3.52
Blueiav	1113	565.47	38.9	604.37	45/4.0	7/2.66
Finch	1113	565.011	71.57	636.58	54/3.65	19/2.19
Bunting	1192.5	605.75	41.88	647.62	45/4.14	7/2.76
Grackie	1192.5	602.77	76.89	679.66	54/3.77	19/2.27
Bittern	1272	644.38	44.65	689.04	45/4.27	7/2.85
Pheasant	1272	645.06	81.71	726.77	54/3.90	19/2.34
Dipper	1351.5	684.22	46.87	731.09	4514.4	712.92
Martin	1351.5	685.37	86.67	772.04	54/4.02	19/2.41
Bobolink	1431	725.25	50.14	775.39	45/4.53	713.02
Plover	1431	726.89	91.78	818.67	54/4.14	19/2.48
Nuthatch	1510.5	764.18	52.83	817.01	45/4.65	7/3.10
Parrot	1510.5	766.04	97.03	863.07	54/4.25	19/2.55
Lap wing	1590	804.13	55.59	859.72	45/4.77	7/3.18
Falcon	1590	806.2	102.43	908.63	54/4.36	19/2.62
Ckukar	1780	1903.15	73.54	1976.69	84/3.70	19/2.22

Approximate Overall Diameter	Weight			Content%		Nominal breaking load	Maximum de Resistance at 20°C	Maximum AC resistance		Current Rating Ambient Temp (1)	
mm	Aluminum	Steel	Total	Aluminum	Steel	kgf	ohm/km	25°c	75 °c	25°c	40°c
	kg/km							Ohm/km		A	
24.84	896	327	1223	73	27	10305	0.088	0.0936	0.1121	779	653
25.15	892	410	1302	68.5	31.5	11410	0.0879	0.0939	0.1124	783	656
25.88	897	588	1484	60	40	13823	0.087	0.0938	0.1123	795	667
25.9	897	576	1472	61	39	14339	0.0871	0.0941	0.1126	794	666
25.4	935	341	1277	72	28	10758	0.0843	0.0896	0.1074	801	672
28.3	938	429	1367	68.5	31.5	11959	0.0836	0.0893	0.107	809	678
26.31	1007	366	1373	73	27	11560	0.0782	0.0838	0.1004	839	704
26.68	1003	462	1465	69	31	12845	0.0781	0.0841	0.1007	844	707
27.43	1006	645	1651	61	39	15672	0.0776	0.0844	0.1011	855	717
27.03	1119	217	1337	84	16	9940	0.071	0.0761	0.0912	885	742
27.72	1115	407	1523	73	27	12680	0.0706	0.0763	0.0914	895	750
27.74	1115	407	1523	73	27	12629	0.0706	0.0763	0.0914	895	750
28.11	1116	511	1627	69	31	14245	0.0703	0.0762	0.0913	902	756
28.96	1122	718	1841	61	31	17463	0.0695	0.0763	0.0914	916	768
28.73	1263	247	1510	84	16	11155	0.063	0.0681	0.0817	954	800
29.52	1265	462	1727	73	27	14380	0.0623	0.0679	0.0814	968	812
29.61	1341	262	1603	84	16	11838	0.0593	0.0641	0.0769	994	833
30.42	1343	491	1834	73	27	15270	0.0587	0.064	0.0767	1008	845
30.81	1452	284	1736	84	16	12573	0.0547	0.0599	0.0718	1042	873
31.68	1457	532	1989	73	27	16561	0.0541	0.0597	0.0715	1058	887
31.98	1568	304	1872	84	16	13535	0.0507	0.0562	0.0674	1089	913
32.85	1574	560	2134	73	27	17808	0.0506	0.0566	0.0678	1101	923
33.12	1680	327	2007	84	16	14525	0.0473	0.0532	0.0638	1133	950
33.97	1679	602	2281	74	26	18785	0.0474	0.0538	0.0644	1142	958
34.17	1787	349	2135	84	16	15465	0.0445	0.0509	0.0609	1171	982
35.1	1797	639	2437	74	26	19799	0.0443	0.0511	0.0612	1185	994
35.16	1897	366	2263	84	16	16353	0.0419	0.0479	0.0574	1218	1021
36.17	1910	678	2588	74	26	21018	0.0417	0.0436	0.0522	1296	1086
36.24	2011	392	2402	84	16	17391	0.0395	0.0460	0.0551	1256	1053
37.24	2025	718	2744	74	26	22275	0.0393	0.0461	0.0553	1272	1067
37.20	2119	413	2531	84	16	18117	0.0375	0.0436	0.0523	1301	1090
38.25	2134	759	2894	74	26	23512	0.0373	0.0437	0.0524	1318	1105
38.16	2230	434	2664	84	16	19064	0.0357	0.0415	0.0497	1346	1128
39.26	2246	802	3048	74	26	24783	0.0354	0.0424	10.0508	1351	1133
40.7	2516	576	3092	81	19	23232	0.0318	0.0386	10.0463	1428	1197

ASTM B232
(High strength stranding)

- Based on:

- The conductor temp of 75˚c
- 0.6 m/s crosswind
- 0.5 coefficient of emisstivity
- Intensity of solar radiation 1033w/m2
- Height of sea level 1500m

Code Name	Area				Stranding and wire diameter	
	Aluminum		Steel	Total	Aluminum	Steel
	AWG or MCM*	mm^2			mm	
Grouse	80	40.54	14.12	54.65	8/2.54	1/4.24
Petrel	101.8	51.6	30.1	81.71	12/2.34	712.34
Minorca	110.8	56.11	32.73	88.84	12/2.44	712.44
Leghorn	134.6	68.2	39.78	107.98	12/2.69	712.69
Guinea	159	80.36	46.87	127.23	12/2.92	712.92
Dotterel	176.9	89.4	52.15	141.56	12/3.08	7/3.08
Darking	190.8	96.51	56.3	152.8	12/3.20	713.2
Cochin	211.3	107.03	62.44	169.47	12/3.37	713.37
Brahma	203.2	102.78	91.78	194.56	16/2.86	19/2.48

German Sizes DIN 48204

Area					Stranding and wire diameter		Overall diameter
Nominal		Actual					
Aluminum	Steel	Aluminum	Steel	Total	Aluminum	Steel	
mm2					mm		
16	2.5	15.27	2.54	17.81	6/1.80	1/1.80	5.4
25	4	23.86	3.98	27.83	6/2.25	1/2.25	6.8
35	6	34.35	5.73	40.08	6/2.7	1/2.70	8.1
44	32	43.98	31.67	75.65	14/2.00	7/2.4	11.2
50	8	48.25	8.04	56.3	6/3.20	1/3.20	9.6
50	30	51.16	29.85	81.01	12/2.33	7/2.33	11.7
70	12	69.89	11.4	81.29	26/2.85	7/1.44	11.7
95	15	94.39	15.33	109.72	26/2.15	7/1.67	13.6
95	55	96.51	56.3	152.8	12/3.20	7/3.2	16
105	75	105.66	75.54	181.21	14/3.10	19/2.25	17.5
120	20	121.57	19.85	141.42	26/2.44	7/1.9	15.5
120	70	122.14	71.25	193.39	12/3.60	7/3.6	18
125	30	127.91	29.85	157.76	30/2.33	7/2.33	16.1
150	25	148.86	24.24	173.1	26/2.7	7/2.10	17.1
170	40	171.76	40.08	211.84	30/2.7	7/2.7	18.9
185	30	183.78	29.85	213.62	26/3	7/2.33	19
210	35	209.1	34.09	243.18	26/3.2	7/2.49	20.3
210	50	212.05	49.48	261.53	30/3.00	7/3.0	21
230	30	230.9	29.85	260.75	24/3.5	7/2.33	21
240	40	243.05	39.49	282.53	26/3.45	7/2.68	21.9
265	35	263.65	34.09	297.74	24/3.74	7/2.49	22.4
300	50	304.25	49.48	353.72	26/3.86	7/3.0	24.5
305	40	304.61	39.49	344.09	54/2.68	7/2.68	24.1
340	30	339.28	29.85	369.13	48/3.0	7/2.33	25
380	50	381.69	49.48	431.17	54/3.0	7/3.0	27
385	35	386.03	34.09	420.11	48/3.20	7/2.49	26.7
435	55	434.28	56.3	490.58	54/3.2	7/3.2	28.8
450	40	448.7	39.49	488.19	48/3.45	7/2.68	28.7
490	65	490.26	63.55	553.82	54/3.4	7/3.4	30.6
550	70	549.64	71.25	620.89	54/3.6	7/3.6	32.4
560	50	561.69	49.48	611.16	48/3.86	7/3.0	32.2
680	85	678.56	85.95	764.52	54/4	19/2.40	36

Approximate Overall Diameter	Weight			Content%		Nominal breaking load	Maximum de resistance at 20°C	Maximum AC resistance		Current Rating Ambient Temp (1)	
mm	Aluminum	Steel	Total	Aluminum	Steel	kgf	ohm/km	25°c	75 °c	25°c	40°c
	kg/km							Ohm/km		A	
9.32	112	110	222	50.5	49.5	2332	0.6758	0.6894	0.8256	205	172
11.71	143	236	379	38	62	4707	0.5544	0.5673	0.6794	244	205
12.22	156	256	412	38	62	5118	0.5099	0.5218	0.6248	258	216
13.46	189	312	501	38	62	6188	0.4195	0.4293	0.5141	294	246
14.63	223	367	590	38	62	7252	0.3561	0.3643	0.4363	328	275
15.42	248	408	656	38	62	7820	0.32	0.3275	0.3921	352	295
16.03	268	441	708	38	62	8441	0.2965	0.3034	0.3633	370	311
16.84	297	489	786	38	62	9362	0.2673	0.2738	0.3279	397	333
18.14	285	720	1005	28	72	12904	0.2799	0.2864	0.3429	398	334

Weight			Content%		Nominal breaking load	Maximum de resistance at 20°C	Maximum AC resistance		Current Rating Ambient Temp (1)	
aluminum	Steel	Total	Aluminum	Steel	kgf	Ohm/km	25·c	75 °c	25·c	40 °c
							Ohm/km		A	
42	20	62	67.7	32.3	569	1.8332	1.87	2.2397	104	87
65	31	96	67.7	32.3	873	1.1733	1.2	1.4335	140	117
94	45	139	67.6	32.4	1230	0.8148	0.83	0.9957	178	150
121	248	370	32.7	67	4405	0.5932	0.6608	0.7913	233	195
132	63	195	67.7	32.3	1664	0.5801	0.5921	0.7091	224	187
141	234	375	37.6	62.4	4310	0.519	0.569	0.6814	252	211
193	89	282	68.4	31.6	2576	0.4033	0.4205	0.5035	286	240
260	120	381	68.2	31.5	3408	0.2987	0.3117	0.3732	350	293
266	441	707	37.6	62.4	7771	0.2751	0.3021	0.3618	385	323
292	594	886	33	67	10367	0.2472	0.2785	0.3335	418	350
335	156	491	68.2	31.8	4354	0.2318	0.2423	0.2901	414	347
337	558	895	37.7	62.3	9535	0.2174	0.239	0.2862	450	377
353	234	587	60.1	39.9	5656	0.2183	0.2301	0.2755	434	364
411	190	601	68.4	31.6	5267	0.1893	0.1982	0.2373	473	397
474	314	788	60.2	39.8	7461	0.1625	0.1721	0.206	528	442
507	234	741	68.4	31.6	6422	0.1534	0.1609	0.1927	544	456
577	267	844	68.4	31.6	7260	0.1348	0.1419	0.1699	592	496
585	388	973	60.1	39.9	8938	0.1317	0.1398	0.1674	606	509
636	234	870	73.1	26.9	7081	0.1226	0.129	0.1545	627	526
670	309	980	68.4	31.5	8377	0.116	0.1225	0.1467	653	548
727	267	994	73.1	26.9	8036	0.1074	0.1135	0.1359	683	573
839	388	1227	68.4	31.6	10241	0.0926	0.099	0.1185	755	633
841	309	1151	73.1	26.8	9621	0.0931	0.099	0.1186	750	629
936	234	1170	80	20	8968	0.084	0.0889	0.1065	798	669
1054	388	1442	73.1	26.9	11715	0.0743	0.0796	0.0953	868	728
1065	267	1332	80	20	10106	0.0739	0.0787	0.0943	867	727
1199	441	1640	73.1	26.9	13203	0.0653	0.0706	0.0845	943	791
1238	309	1548	80	20	11645	0.0635	0.069	0.0826	950	797
1354	498	1852	73.1	26.9	14810	0.0578	0.0639	0.0765	1012	848
1518	558	2076	73.1	26.9	16328	0.0516	0.0577	0.0691	1085	910
1550	388	1938	80	20	14282	0.0508	0.0565	0.0676	1091	914
1874	676	2550	73.5	26.5	20347	0.0418	0.0483	0.0578	1230	1031

British Sizes BS 215

- Based on:

- The conductor temp of 75˚c
- 0.6 m/s crosswind
- 0.5 coefficient of emisstivity
- Intensity of solar radiation 1033w/m2
- Height of sea level 1500m

Code Name	Area			Stranding and wire diameter		Approximate overall diameter
	Aluminum	Steel	Total	Aluminum	Steel	
	mm ²			mm		
Mole	10.6	1.77	12.37	6/1.50	1/1.50	4.5
Squirrel	20.98	3.50	24.48	6/2.11	1/2.11	6.33
Gopher	26.25	4.37	30.62	6/2.36	1/2.36	7.08
Weasel	31.61	5.27	36.88	6/2.59	1/2.59	7.77
Fox	36.68	6.11	42.79	6/2.79	1/2.79	8.37
Ferret	42.41	7.07	49.48	6/3.00	1/3.00	9
Rabbit	52.88	8.81	61.7	6/3.35	1/3.35	10.05
Mink	63.12	10.52	73.64	6/3.66	1/3.66	10.98
Shank	63.22	36.88	100.1	12/2.59	7/2.59	12.95
Beaver	75.02	12.5	87.52	6/3.99	1/3.99	11.97
Horse	73.36	42.79	116.16	12/2.79	7/2.79	13.95
Raccoon	79.21	13.2	92.42	6/4.10	1/4.10	12.3
Otter	83.92	13.99	97.9	6/4.22	1/4.22	12.66
Cat	95.42	15.9	111.33	6/4.5	1/4.50	13.5
Hare	104.98	17.5	122.48	6/4.72	1/4.72	14.16
Dog	104.98	13.55	118.53	6/4.72	7/1.57	14.15
Hyena	105.95	20.48	126.43	7/4.39	7/1.93	14.57
Leopard	131.37	16.84	148.21	6/5.28	7/1.75	15.81
Coyote	132.1	20.09	152.2	26/2.54	7/1.91	15.89
Cougar	130.3	7.24	137.5	18/3.05	18/3.05	15.25
Tiger	131.23	30.62	161.85	30/2.36	7/2.36	16.52
Wolf	158.05	36.88	194.93	30/2.59	7/2.59	18.13
-	158.65	8.81	167.46	18/3.35	1/3.35	16.75
lynx	183.4	42.79	226.2	30/2.79	7/2.79	19.53
-	184.23	10.24	194.47	18/3.61	1/3.61	18.05
Panther	212.05	49.48	261.53	30/2.00	7/3.0	21
Lion	238.26	55.59	293.85	30/3.18	7/3.18	22.26
Bear	264.42	61.7	326.11	30/3.35	7/3.35	23.45
Goat	324.3	75.67	399.97	30/3.71	7/3.71	25.97
Sheep	375.1	87.52	462.62	30/3.99	7/3.99	27.93
Antelope	374.1	48.49	422.59	54/2.97	7/2.97	26.73
Bison	381.69	49.48	431.17	54/3.0	7/3.0	27
-	210.63	11.7	222.33	18/3.86	1/3.86	19.3
Deer	429.59	100.24	529.83	30/4.27	7/4.27	29.89
Zebra	428.87	55.59	484.46	54/3.18	7/3.18	28.62
Elk	477.12	111.33	588.44	30/4.50	7/4.5	31.5
Camel	475.95	61.7	537.65	54/3.35	7/3.35	30.15
Moose	528.47	68.51	596.98	54/3.53	7/3.53	I 31.77

Weight			Content%		Nominal breaking load	Maximum de resistance at 20°C	Maximum AC resistance		Current Rating Ambient Temp	
Aluminum	Steel	Total	Aluminum	Steel			35 °c	75 °c	25·c	40 °c
kg/km					kgf	Ohm/km	A			
29	14	43	67.4	32.6	421	2.6398	2.6931	3.2251	82	69
58	27	85	68.2	31.8	806	1.3341	1.3612	1.6300	129	108
72	34	106	62.9	32.1	980	1.0664	1.088	1.303	149	125
87	41	128	67.9	32.1	1157	0.8855	0.9036	1.082	169	141
101	48	148	68.2	31.1	1343	0.7631	0.7787	0.9325	186	156
116	55	171	67.8	32.2	1553	0.66	0.6735	0.8065	205	172
145	69	214	67.7	32.3	1873	0.5293	0.5403	0.647	238	199
173	82	255	67.8	32.2	2223	0.4434	0.4529	0.5423	267	224
175	288	463	37.8	62.2	5378	0.42	0.4608	0.5518	290	243
206	97	303	67.9	32.1	2627	0.3731	0.3811	0.4563	300	251
203	334	537	37.8	62.2	6240	0.362	0.3971	0.4755	321	269
217	103	320	67.8	32.2	2774	0.3533	0.3612	0.4326	311	261
230	109	339	67.8	32.2	2939	0.3335	0.341	0.4083	323	271
262	124	386	67.8	32.2	3341	0.2933	0.2999	0.3591	352	295
288	136	424	67.9	32.1	3665	0.2666	0.2729	0.3268	375	314
288	106	394	73	27	3333	0.2681	0.279	0.3341	374	313
291	160	451	64.5	35.5	4194	0.2632	0.276	0.3305	381	319 .
360	132	492	73.2	26.8	4157	0.2143	0.2234	0.2675	433	363
365.7	155.8	521.5	70.1	29.9	4684	0.2144	0.2242	0.2685	434	364
359	56.3	415.3	86.4	13.6	3116	0.2172	0.2227	0.2667	425	356
363	239	602	60.3	39.7	5916	0.2127	0.2247	0.269	441	370
437	288	725	60.3	39.7	7061	0.1766	0.187	0.2239	499	419
437	69	506	86.4	13.6	3460	0.18	0.185	0.2216	481	403
507	334	841	60.3	39.7	8137	0.1522	0.1611	0.193	551	462
508	80	588	86.4	13.6	3983	0.155	0.1593	0.1908	532	446
586	387	973	60.2	39.8	9408	0.1317	0.1398	0.1674	606	509
658	435	1093	60.2	39.8	10247	0.1172	0.1249	0.1496	654	549
731	482	1213	60.3	39.7	11345	0.1056	0.1131	0.1354	700	587
896	591	1488	60.2	39.8	13848	0.0861	0.0928	0.1111	799	671
1036	684	1721	60.2	39.8	15940	0.0744	0.0808	0.0968	878	736
1015	379	1394	72.8	27.2	12087	0.0745	0.0798	0.0955	865	725
1036	387	1423	72.8	27.2	12130	0.073	0.0782	0.0936	876	735
580	91	672	86.3	13.7	4513	0.1356	0.1429	0.1711	574	481
1187	783	1971	60.2	39.8	18212	0.065	0.0711	0.0852	957	803
1164	435	1599	72.8	27.2	13454	0.0649	0.0702	0.084	943	791
1318	870	2189	60.2	39.8	20227	0.0585	0.0647	0.0775	1022	857
1292	482	1774	72.8	27.2	14883	0.0585	0.0639	0.0765	1006	844
1434	535	1970	72.8	27.2	16417	0.0527	0.0582	0.0697	1073	900

ACSR/AW

Aluminum Conductor Steel Reinforced/Aluminum Clad Steel

Complete Conductor:

ACSR/AW is a composite concentric-lay-stranded conductor. ACSR/AW conductors are manufactured in accordance stranded conductor of 7,19,37 or more wires. Numerous combinations of aluminum and steel strands and layers are possible. The sizes and stranding listed on the following pages are those most frequently used for overhead lines with the requirements of the latest applicable ASTM specification B549issues. Aluminum-clad steel strands form the central core of the conductor, around which is stranded one or more layers of aluminum 1350-H19 wires. The aluminum- clad steel core may consist of a single strand or a concentric.

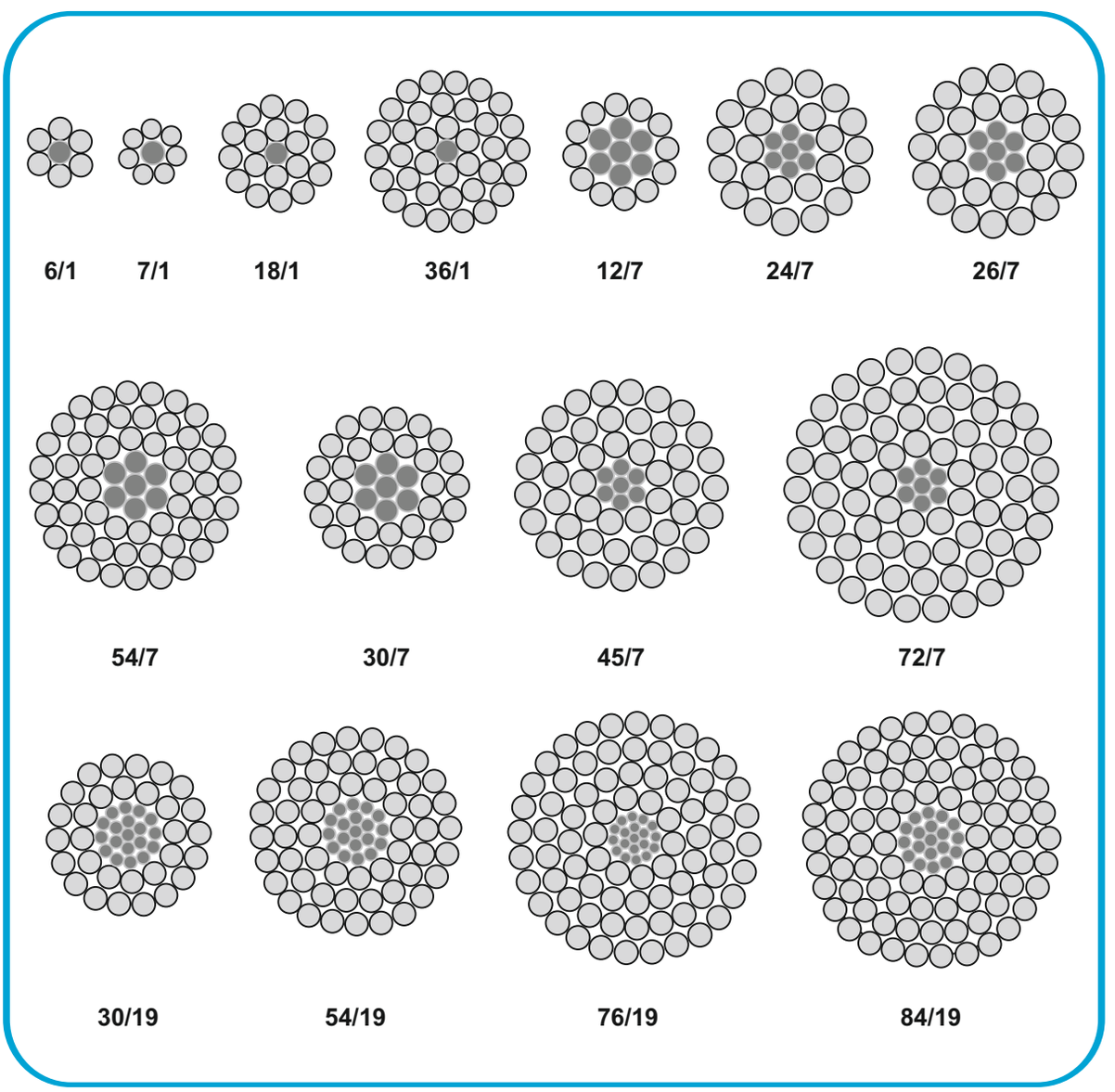
Features and Benefits:

The AW core, which consists of a thick layer of aluminum (approx. 10 percent of the nominal wire radius) over steel, gives ACSR/AW conductors the advantage of the light weight and good conductivity of aluminum with the high tensile strength and ruggedness of steel. The cross-sections above illustrate some common standings.

Applications:

Aluminum conductors reinforced with aluminum- clad steel wire (ACSR/AW) are used for overhead distribution and transmission lines where a high degree of corrosion resistance is needed. It should also be considered for use in locations where air pollution exists, such as along the coast or in highly industrialized areas.

ACSR cross section according to the number of layers:



USA Sizes ASTM B549

1- Due to rounding, the total values may not be exactly equal to the sum of the components values.

2- Based on a conductivity of 61.2% (minimum lot average) IACS at 20 c for the aluminum and 8% IACS at 20 c for the steel core.

AC resistance for single-layer and three-layer designs approximates the effects of core magnetization.

Code Name	Area				Stranding and wire diameter	
	AWG or	Aluminum	Steel	Total	Aluminum	Steel
		mm^2			mm	
Grouse	80000	40.54	14.13	54.67	8/2.54	1/4.24
Patrel	101800	51.56	30.08	81.64	12/2.34	7/2.34
Minorca	110800	56.16	32.76	88.91	12/2.44	7/2.44
Leghorn	134600	68.2	39.78	107.98	12/2.69	7/2.69
Guinea	159000	80.58	47	127.58	12/2.92	7/2.92
Dotterel	176900	89.64	52.29	141.93	12/3.08	7/3.08
Darking	190800	96.69	56.4	153.09	12/3.20	7/3.2
Brahma	203200	103	91.93	194.93	16/2.86	19/2.48
Cochin	211300	107.1	62.47	169.57	12/3.37	7/3.37
Turkey	6	13.28	2.21	15.5	6/1.68	1/1.68
Swan	4	21.14	3.52	24.66	6/2.12	1/2.12
Swanate	4	21.14	5.37	26.51	7/1.96	1/2.61
Sparrow	2	33.64	5.61	39.25	6/2.67	1/2.67
Sparate	2	33.65	8.55	42.2	7/2.47	1/3.30
Robin	1	42.41	7.07	49.48	6/3.00	1/3.00
Raven	1/0	53.55	8.92	62.47	6/3.37	1/3.37
Quail	210	67.4	11.23	78.64	6/3.78	1/3.78
Pigeon	310	84.99	14.17	99.16	6/4.25	1/4.25
Penguin	410	107.22	17.87	125.09	6/4.77	1/4.77
Waxing	266800	135.07	7.5	142.57	18/3.09	1/3.09
Artridge	266800	134.87	21.99	156.86	26.2.57	7/2.0
Ostrich	300000	151.96	24.73	176.7	26/2.73	7/2.12
Merlin	336400	170.42	9.47	179.88	18/3.47	1/3.47
Linne	336400	170.31	27.71	198.02	26/2.89	7/2.25
Oriole	336400	170.49	39.78	210.27	30/2.6 9	7/2.69
Hickadee	397500	201.35	11.19	212.54	18/3.77	1/3.77
Bran	397500	201.43	26.1	227.53	24/3.27	7/2.18
Ibis	397500	201.2	32.76	233.96	26/3.14	7/2.44
Lark	397500	201.44	47	248.45	30/2.92	7/2.92
Pelican	477000	241.71	13.43	255.14	18/4.14	1/4.14
Flicker	477000	241.71	31.35	273.06	24/3.58	7/2.39
Hawk	477000	241.5	39.34	280.84	26/3.44	7/2.68
Hen	477000	241.72	56.4	298.12	30/3.20	713.2
Osprey	556500	281.83	15.66	297.49	18/4.47	1/4.47
Parakee	556500	282.01	36.54	318.55	24/3.87	7/2.58
Dove	556500	282.58	45.92	328.49	26/3.72	7/2.89
Eagle	556500	281.9	65.78	347.68	30/3.46	7/3.46
Peacock	605000	306.12	39.78	345.91	24/4.03	7/2.69
Squab	605000	305.82	49.81	355.63	26/3.87	7/3.01
Egret	636000	322.55	73.54	396.1	30/3.70	19/2.22
Swift	636000	322.24	8.95	331.19	36/3.38	1/3.38
Flamingo	666600	337.26	43.72	380.98	24/4.23	7/2.82
Gannet	666600	338.25	54.9	393.15	26/4.07	7/3.16

Approximate overall diameter	Weight[1]			Nominal breaking load	Maximum DC[2] resistance at 20°c	Maximum AC resistance		Current rating ambient temp	
	Aluminum	Steel	Total			25°c	75°c	25°c	40°c
mm	kg/km			kgf	ohm/k	ohm/km		A	
9.32	112	93	205	2254	0.6359	0.6491	0.7773	212	177
11.69	143	199	342	4486	0.4688	0.5577	0.6679	266	223
12.21	156	217	372	4885	0.4305	0.5124	0.6136	281	236
13.45	189	263	452	5899	0.3545	0.4223	0.5057	320	268
14.62	223	311	534	6931	0.3	0.3574	0.428	357	300
15.42	249	346	594	7666	0.2697	0.3217	0.3852	384	322
16.01	268	373	641	8269	0.25	0.2982	0.3571	403	338
18.14	286	609	895	12280	0.2159	0.2839	0.34	452	380
16.86	297	413	710	8896	0.2257	0.2693	0.3224	432	362
5.04	36	15	51	526	2.0444	2.0857	2.4976	96	81
6.35	58	23	81	827	1.2847	1.3108	1.5697	131	110
6.54	58	35	93	1064	1.2497	1.275	1.5269	134	113
8.02	92	37	129	1283	0.8072	0.8238	0.9865	179	150
8.25	92	56	149	1631	0.7851	0.8012	0.9595	183	153
9	116	47	163	1596	0.6404	0.6537	0.7828	208	175
10.11	147	59	206	1930	0.5072	0.5177	0.62	243	204
11.35	185	74	259	2353	0.4029	0.4115	0.4928	283	238
12.74	233	93	327	2916	0.3195	0.3266	0.3912	331	277
14.31	294	118	412	3555	0.2533	0.2593	0.3105	386	323
15.46	373	49	422	3101	0.2095	0.2148	0.2573	435	364
16.28	372	145	519	4899	0.2035	0.2185	0.2617	449	376
17.28	421	164	585	5515	0.1806	0.1944	0.2328	485	407
17.36	470	62	533	3880	0.166	0.1707	0.2044	507	425
18.29	472	183	656	6099	0.1612	0.1735	0.2077	524	439
18.83	474	263	737	7608	0.1578	0.1731	0.2073	535	448
26.42	556	74	629	4410	0.1405	0.1449	0.1735	635	533
19.62	558	173	731	6330	0.1378	0.1474	0.1765	579	486
19.88	558	217	775	7112	0.1364	0.1473	0.1764	585	490
20.47	560	311	871	8894	0.1335	0.147	0.176	597	501
20.68	667	88	755	5246	0.1171	0.1212	0.1451	638	535
21.49	670	207	878	7600	0.1148	0.1233	0.1477	653	547
21.78	670	260	930	8143	0.1137	0.1232	0.1475	659	553
22.42	672	373	1045	10558	0.1113	0.123	0.1473	673	564
22.33	778	103	881	6204	0.1004	0.1044	0.1251	705	591
23.21	782	242	1024	8728	0.0984	0.1062	0.1272	722	605
23.55	783	304	1087	9880	0.0972	0.1058	0.1267	730	612
24.21	784	435	1219	12094	0.0954	0.1066	0.1277	742	622
24.19	849	263	1112	9489	0.0906	0.0984	0.1179	760	638
24.51	848	330	1177	10668	0.0898	0.0984	0.1178	768	644
25.9	897	488	1384	13614	0.0836	0.0939	0.1124	811	680
23.63	889	59	948	5196	0.0886	0.0928	0.1111	763	639
25.38	935	289	1224	10441	0.0823	0.09	0.1078	808	678
25.76	938	363	1301	11776	0.0812	0.0896	0.1073	818	686

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1- Due to rounding, the total values may not be exactly equal to the sum of the components values.

2- Based on a conductivity of 61.2% (minimum lot average) IACS at 20 c for the aluminum and 8% IACS at 20 c for the steel core.

AC resistance for single-layer and three-layer designs approximates the effects of core magnetization.

Code Name	Area				Stranding and wire diameter	
	AWG or	Aluminum	Steel	Total	Aluminum	Steel
		mm^2			mm	
Grouse	80000	40.54	14.13	54.67	8/2.54	1/4.24
Patrel	101800	51.56	30.08	81.64	12/2.34	7/2.34
Minorca	110800	56.16	32.76	88.91	12/2.44	7/2.44
Leghorn	134600	68.2	39.78	107.98	12/2.69	7/2.69
Guinea	159000	80.58	47	127.58	12/2.92	7/2.92
Dotterel	176900	89.64	52.29	141.93	12/3.08	7/3.08
Darking	190800	96.69	56.4	153.09	12/3.20	7/3.2
Brahma	203200	103	91.93	194.93	16/2.86	19/2.48
Cochin	211300	107.1	62.47	169.57	12/3.37	7/3.37
Turkey	6	13.28	2.21	15.5	6/1.68	1/1.68
Swan	4	21.14	3.52	24.66	6/2.12	1/2.12
Swanate	4	21.14	5.37	26.51	7/1.96	1/2.61
Sparrow	2	33.64	5.61	39.25	6/2.67	1/2.67
Sparate	2	33.65	8.55	42.2	7/2.47	1/3.30
Robin	1	42.41	7.07	49.48	6/3.00	1/3.00
Raven	1/0	53.55	8.92	62.47	6/3.37	1/3.37
Quail	210	67.4	11.23	78.64	6/3.78	1/3.78
Pigeon	310	84.99	14.17	99.16	6/4.25	1/4.25
Penguin	410	107.22	17.87	125.09	6/4.77	1/4.77
Waxing	266800	135.07	7.5	142.57	18/3.09	1/3.09
Artridge	266800	134.87	21.99	156.86	26.2.57	7/2.0
Ostrich	300000	151.96	24.73	176.7	26/2.73	7/2.12
Merlin	336400	170.42	9.47	179.88	18/3.47	1/3.47
Linne	336400	170.31	27.71	198.02	26/2.89	7/2.25
Oriole	336400	170.49	39.78	210.27	30/2.6 9	7/2.69
Hickadee	397500	201.35	11.19	212.54	18/3.77	1/3.77
Bran	397500	201.43	26.1	227.53	24/3.27	7/2.18
Ibis	397500	201.2	32.76	233.96	26/3.14	7/2.44
Lark	397500	201.44	47	248.45	30/2.92	7/2.92
Pelican	477000	241.71	13.43	255.14	18/4.14	1/4.14
Flicker	477000	241.71	31.35	273.06	24/3.58	7/2.39
Hawk	477000	241.5	39.34	280.84	26/3.44	7/2.68
Hen	477000	241.72	56.4	298.12	30/3.20	713.2
Osprey	556500	281.83	15.66	297.49	18/4.47	1/4.47
Parakee	556500	282.01	36.54	318.55	24/3.87	7/2.58
Dove	556500	282.58	45.92	328.49	26/3.72	7/2.89
Eagle	556500	281.9	65.78	347.68	30/3.46	7/3.46
Peacock	605000	306.12	39.78	345.91	24/4.03	7/2.69
Squab	605000	305.82	49.81	355.63	26/3.87	7/3.01
Egret	636000	322.55	73.54	396.1	30/3.70	19/2.22
Swift	636000	322.24	8.95	331.19	36/3.38	1/3.38
Flamingo	666600	337.26	43.72	380.98	24/4.23	7/2.82
Gannet	666600	338.25	54.9	393.15	26/4.07	7/3.16

Approximate overall diameter	Weight[1]			Nominal breaking load	Maximum DC[2] resistance at 20°c	Maximum AC resistance		Current rating ambient temp	
	Aluminum	Steel	Total			25°c	75°c	25°c	40°c
mm	kg/km			kgf	ohm/k	ohm/km		A	
9.32	112	93	205	2254	0.6359	0.6491	0.7773	212	177
11.69	143	199	342	4486	0.4688	0.5577	0.6679	266	223
12.21	156	217	372	4885	0.4305	0.5124	0.6136	281	236
13.45	189	263	452	5899	0.3545	0.4223	0.5057	320	268
14.62	223	311	534	6931	0.3	0.3574	0.428	357	300
15.42	249	346	594	7666	0.2697	0.3217	0.3852	384	322
16.01	268	373	641	8269	0.25	0.2982	0.3571	403	338
18.14	286	609	895	12280	0.2159	0.2839	0.34	452	380
16.86	297	413	710	8896	0.2257	0.2693	0.3224	432	362
5.04	36	15	51	526	2.0444	2.0857	2.4976	96	81
6.35	58	23	81	827	1.2847	1.3108	1.5697	131	110
6.54	58	35	93	1064	1.2497	1.275	1.5269	134	113
8.02	92	37	129	1283	0.8072	0.8238	0.9865	179	150
8.25	92	56	149	1631	0.7851	0.8012	0.9595	183	153
9	116	47	163	1596	0.6404	0.6537	0.7828	208	175
10.11	147	59	206	1930	0.5072	0.5177	0.62	243	204
11.35	185	74	259	2353	0.4029	0.4115	0.4928	283	238
12.74	233	93	327	2916	0.3195	0.3266	0.3912	331	277
14.31	294	118	412	3555	0.2533	0.2593	0.3105	386	323
15.46	373	49	422	3101	0.2095	0.2148	0.2573	435	364
16.28	372	145	519	4899	0.2035	0.2185	0.2617	449	376
17.28	421	164	585	5515	0.1806	0.1944	0.2328	485	407
17.36	470	62	533	3880	0.166	0.1707	0.2044	507	425
18.29	472	183	656	6099	0.1612	0.1735	0.2077	524	439
18.83	474	263	737	7608	0.1578	0.1731	0.2073	535	448
26.42	556	74	629	4410	0.1405	0.1449	0.1735	635	533
19.62	558	173	731	6330	0.1378	0.1474	0.1765	579	486
19.88	558	217	775	7112	0.1364	0.1473	0.1764	585	490
20.47	560	311	871	8894	0.1335	0.147	0.176	597	501
20.68	667	88	755	5246	0.1171	0.1212	0.1451	638	535
21.49	670	207	878	7600	0.1148	0.1233	0.1477	653	547
21.78	670	260	930	8143	0.1137	0.1232	0.1475	659	553
22.42	672	373	1045	10558	0.1113	0.123	0.1473	673	564
22.33	778	103	881	6204	0.1004	0.1044	0.1251	705	591
23.21	782	242	1024	8728	0.0984	0.1062	0.1272	722	605
23.55	783	304	1087	9880	0.0972	0.1058	0.1267	730	612
24.21	784	435	1219	12094	0.0954	0.1066	0.1277	742	622
24.19	849	263	1112	9489	0.0906	0.0984	0.1179	760	638
24.51	848	330	1177	10668	0.0898	0.0984	0.1178	768	644
25.9	897	488	1384	13614	0.0836	0.0939	0.1124	811	680
23.63	889	59	948	5196	0.0886	0.0928	0.1111	763	639
25.38	935	289	1224	10441	0.0823	0.09	0.1078	808	678
25.76	938	363	1301	11776	0.0812	0.0896	0.1073	818	686

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1- Due to rounding, the total values may not be exactly equal to the sum of the components values.

2- Based on a conductivity of 61.2% (minimum lot average) IACS at 20 c for the aluminum and 8% IACS at 20 c for the steel core.

AC resistance for single-layer and three-layer designs approximates the effects of core magnetization.

Code Name	Area				Stranding and wire diameter	
	AWG or	Aluminum	Steel	Total	Aluminum	Steel
		mm 2			mm	
Still	715500	362.76	47	409.77	24/4.39	7/2.92
Starling	715500	361.92	59.15	421.07	26/4.21	7/3.28
Redwing	715500	362.05	82.41	444.46	30/3.92	19/2.35
Cuckoo	795000	402.32	52.15	454.47	24/4.62	7/3.08
Drake	795000	402.55	65.44	467.98	26/4.44	7/3.45
Coot	795000	402.7	11.19	413.89	36/3.77	1/3.77
Tern	795000	403.76	27.83	431.59	45/3.38	7/2.25
Condor	795000	402.32	52.15	454.47	54/3.08	7/3.08
Mallard	795000	403.83	91.78	495.61	30/4.14	19/2.48
Ruddy	900000	455.49	31.67	487.16	45/3.59	7/2.4
Canary	900000	456.27	59.15	515.41	54/3.28	7/3.28
Catbird	954000	483.43	13.43	496.86	36/4.14	1/4.14
Rail	954000	483.83	33.54	517.37	45/3.7	7/2.47
Cardin	954000	484.51	62.81	547.32	54/3.38	7/3.38
Tenager	1033500	523.51	14.54	538.05	36/4.30	1/4.30
Ortlan	1033500	523.85	36.31	560.17	45/3.85	7/2.57
Curlew	1033500	525.48	68.12	593.6	54/3.52	7/3.52
Bluejay	1113000	565.47	38.9	604.37	45/4.0	7/2.66
Finch	1113000	545.01	71.57	636.58	54/3.65	19/2.19
Bunting	1192500	605.75	41.88	647.62	54/4.14	7/2.76
Crackle	1192500	602.77	76.89	679.66	54/3.77	19/2.27
Skylark	1272000	644.65	17.91	662.56	36/4.78	1/4.78
Bifern	1272000	644.38	44.65	689.04	45/4.27	7/2.85
Pheasant	1272000	645.06	81.71	726.77	54/3.9	19/2.34
Dipper	1351500	684.22	46.87	731.09	45/4.4	7/2.92
Martin	1351500	685.37	86.67	772.04	54/4.02	19/2.41
Bobolink	1431000	725.25	50.14	775.39	45/4.53	7/3.02
Plover	1431000	726.89	91.78	818.67	54/4.14	19/2.48
Nuthatch	1510500	764.18	52.83	817.01	54/4.65	7/3.10
Parrot	1510500	766.04	97.03	863.07	54/4.25	19/2.55
Lapwing	1590000	804.13	55.59	859.72	54/4.77	7/3.18
Falcon	1590000	806.2	102.43	908.63	54/4.36	19/2.62
Chukar	1780000	903.15	73.54	976.69	84/3.70	19/2.22
Bluebird	2156000	1092.27	88.91	1181.19	84/4.07	19/2.44
Kiwi	2167000	9098.24	47.49	1145.72	72/4.41	7/2.94
Thrasher	2312000	2171.38	63.82	1235.2	76/4.43	19/2.07
Wood Due	605000	306.54	71.53	378.07	30/3.61	7/3.61
Teal	605000	307.05	69.62	376.67	30/3.61	19/2.16
Kingbird	636000	323	17.94	340.95	18/4.78	1/4.78
Rook	636000	323.06	41.88	364.94	24/4.14	7/2.76
Grosbeak	636000	321.83	52.49	374.33	263.97	7/3.09
Scoter	636000	322.2	75.18	397.39	30/3.70	7/3.7

Approximate overall diameter	Weight[1]			Nominal breaking load	Maximum DC[2] resistance at 20°c	Maximum AC resistance		Current rating ambient temp	
	Aluminum	Steel	Total			25°c	75°c	25°c	40°c
mm	kg/km			kgf	ohm/k	ohm/km		A	
9.32	112	93	205	2254	0.6359	0.6491	0.7773	212	177
11.69	143	199	342	4486	0.4688	0.5577	0.6679	266	223
12.21	156	217	372	4885	0.4305	0.5124	0.6136	281	236
13.45	189	263	452	5899	0.3545	0.4223	0.5057	320	268
14.62	223	311	534	6931	0.3	0.3574	0.428	357	300
15.42	249	346	594	7666	0.2697	0.3217	0.3852	384	322
16.01	268	373	641	8269	0.25	0.2982	0.3571	403	338
18.14	286	609	895	12280	0.2159	0.2839	0.34	452	380
16.86	297	413	710	8896	0.2257	0.2693	0.3224	432	362
5.04	36	15	51	526	2.0444	2.0857	2.4976	96	81
6.35	58	23	81	827	1.2847	1.3108	1.5697	131	110
6.54	58	35	93	1064	1.2497	1.275	1.5269	134	113
8.02	92	37	129	1283	0.8072	0.8238	0.9865	179	150
8.25	92	56	149	1631	0.7851	0.8012	0.9595	183	153
9	116	47	163	1596	0.6404	0.6537	0.7828	208	175
10.11	147	59	206	1930	0.5072	0.5177	0.62	243	204
11.35	185	74	259	2353	0.4029	0.4115	0.4928	283	238
12.74	233	93	327	2916	0.3195	0.3266	0.3912	331	277
14.31	294	118	412	3555	0.2533	0.2593	0.3105	386	323
15.46	373	49	422	3101	0.2095	0.2148	0.2573	435	364
16.28	372	145	519	4899	0.2035	0.2185	0.2617	449	376
17.28	421	164	585	5515	0.1806	0.1944	0.2328	485	407
17.36	470	62	533	3880	0.166	0.1707	0.2044	507	425
18.29	472	183	656	6099	0.1612	0.1735	0.2077	524	439
18.83	474	263	737	7608	0.1578	0.1731	0.2073	535	448
26.42	556	74	629	4410	0.1405	0.1449	0.1735	635	533
19.62	558	173	731	6330	0.1378	0.1474	0.1765	579	486
19.88	558	217	775	7112	0.1364	0.1473	0.1764	585	490
20.47	560	311	871	8894	0.1335	0.147	0.176	597	501
20.68	667	88	755	5246	0.1171	0.1212	0.1451	638	535
21.49	670	207	878	7600	0.1148	0.1233	0.1477	653	547
21.78	670	260	930	8143	0.1137	0.1232	0.1475	659	553
22.42	672	373	1045	10558	0.1113	0.123	0.1473	673	564
22.33	778	103	881	6204	0.1004	0.1044	0.1251	705	591
23.21	782	242	1024	8728	0.0984	0.1062	0.1272	722	605
23.55	783	304	1087	9880	0.0972	0.1058	0.1267	730	612
24.21	784	435	1219	12094	0.0954	0.1066	0.1277	742	622
24.19	849	263	1112	9489	0.0906	0.0984	0.1179	760	638
24.51	848	330	1177	10668	0.0898	0.0984	0.1178	768	644
25.9	897	488	1384	13614	0.0836	0.0939	0.1124	811	680
23.63	889	59	948	5196	0.0886	0.0928	0.1111	763	639
25.38	935	289	1224	10441	0.0823	0.09	0.1078	808	678
25.76	938	363	1301	11776	0.0812	0.0896	0.1073	818	686

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Code Name	Conductor Size	Area			Stranding and wire diameter	
		Aluminum	Steel	Total	Aluminum	Steel
	mm	mm²			mm	
Gopher	25	26.25	4.37	30.62	6/2.36	1/2.36
Weasel	35	31.61	5.27	36.88	6/2.59	1/2.59
Ferrer	40	42.41	7.07	49.48	6/3.00	1/3.35
Rabbit	50	52.88	8.81	61.7	6/3.35	7/2.79
Horse	70	73.36	42.79	116.16	12/2.79	7/2.79
Dog	100	104.98	13.55	118.53	6/4.72	7/1.57
Wolf	150	158.05	36.88	194.93	30/2.59	7/2.59
Dingo	150	158.65	8.81	167.46	18/3.35	1/3.35
Lynx	175	183.4	42.79	226.2	30/2.79	7/2.79
Cardinal	175	184.23	10.24	194.47	18/3.61	1/3.61
Panther	200	212.05	49.48	261.53	30/3.00	7/3.00
jaguar	200	210.63	11.7	222.33	18/3.86	1/3.86
zebra	400	428.87	55.59	484.46	54/3.18	7/3.18

Semi-standard sizes

Code Name	Conductor Size	Area			Stranding and wire diameter	
		Aluminum	Steel	Total	Aluminum	Steel
	mm²				mm	
Fox	35	36.68	6.11	42.79	6/2.79	1/2.79
Mink	60	63.12	10.52	73.64	6/3.66	1/3.66
Shunk	60	63.22	36.88	100.1	12/2.59	7/2.59
Beaver	75	75.02	12.5	87.52	6/3.99	1/3.99
Raccoon	75	78.83	13.14	91.96	6/4.09	1/4.09
Otter	80	83.92	13.99	97.9	6/4.22	1/4.22
Cat	95	95.42	15.9	111.33	6/4.5	1/4.50
Hare	105	104.98	17.5	122.48	6/4.72	1/4.72
Hyena	105	105.97	20.48	126.43	7/4.39	7/1.93
Leopard	130	131.37	16.84	148.21	6/5.28	7/1.75
Tiger	130	131.23	30.62	161.85	30/2.36	7/2.36
Coyote	130	131.74	20.06	151.8	26/2.54	7/1.91
Lion	235	238.26	55.59	293.85	30/3.18	7/3.18
Bear	260	264.42	61.7	326.11	30/3.35	7/3.35
Batang	300	323	15.52	338.52	18/4.78	7/1.68
Goat	320	324.3	75.67	399.97	30/3.71	7/3.71
Antelope	370	374.1	48.49	422.59	54/2.97	7/2.97
Sheep	375	375.1	87.52	462.62	30/3.99	7/3.99
Bison	380	381.69	49.48	431.17	54/3.0	7/3.0
Deer	425	429.59	100.24	529.83	30/4.27	7/4.27
Camel	475	475.95	61.7	537.65	54/3.35	7/3.35
Elk	475	477.12	111.33	588.44	30/4.5	7/4.5
Moose	525	528.47	68.51	596.98	54/3.53	7/3.53

Approximate overall diameter	Weight			Nominal breaking load	Maximum de resistance at 20 °c	Maximum AC resistance	
	Aluminum	Steel	Total			25 °c	75 °c
mm	kg/km			kgf	ohm/kg		
7.08	72	29	101	452	1.0347	1.0557	1.2642
7.77	87	35	122	532	0.8591	0.8767	1.0499
9	116	47	163	685	0.6403	0.6537	0.7828
10.05	145	58	203	849	0.5135	0.5242	0.6278
13.95	203	283	487	6267	0.3295	0.3926	0.4701
14.15	288	90	378	3235	0.2619	0.278	0.329
18.13	439	244	683	6933	0.1702	0.1973	0.2362
16.75	419	58	477	2468	0.1784	0.188	0.2251
19.53	510	283	793	7993	0.1467	0.1614	0.1933
18.05	508	67	576	2831	0.1536	0.1607	0.1925
21	589	327	917	9191	0.1269	0.1402	0.1679
19.3	581	77	658	3197	0.1343	0.1385	0.1659
28.62	11.89	368	1557	13132	0.0647	0.0721	0.0863

Approximate overall diameter	Weight			Nominal breaking load	Maximum de resistance at 20 °c	Maximum AC resistance	
Aluminum	Aluminum	Steel	Total			25°c	50°c
mm	kg/km			kgf	ohm/km		
8.37	101	40	141	1359	0.7404	0.7555	0.9048
10.98	173	69	243	2221	0.4302	0.4394	0.5262
12.95	175	244	419	5419	0.3824	0.4551	0.545
11.97	206	82	288	2582	0.362	0.3697	0.4428
12.27	216	87	303	2713	0.3445	0.3522	0.4218
12.66	230	92	323	2838	0.3236	0.3308	0.3962
13.5	262	105	367	3163	0.2846	0.2909	0.3484
14.16	288	115	404	3419	0.2587	0.2648	0.3171
14.57	291	135	426	4068	0.2542	0.2746	0.3288
15.81	361	111	472	4033	0.2093	0.0006	0.2665
16.52	365	203	567	5806	0.205	0.2244	0.2687
15.89	365	133	498	4518	0.2091	0.2238	0.2681
22.26	662	368	1030	10294	0.1129	0.1248	0.1494
23.45	735	408	1143	11193	0.1017	0.113	0.1353
24.16	896	103	998	6704	0.0883	0.0936	0.1121
25.97	901	501	1402	13155	0.083	0.0933	0.1118
26.73	1037	321	1358	11594	0.0742	0.0818	0.098
27.93	1043	579	1622	15145	0.0717	0.0814	0.0975
27	1058	327	1386	11688	0.0727	0.0802	0.096
29.89	1194	663	1857	16361	0.0626	0.0718	0.0859
30.15	1320	408	1728	14325	0.0583	0.0657	0.0787
31.5	1326	737	2063	18467	0.0564	0.0654	0.0783
31.77	1465	453	1919	15572	0.0525	0.0599	0.0718

ACSR/TW

Aluminum Conductor Steel Reinforced/Trapezoidal Shaped

Complete Conductor:

ACSR/TW is a trapezoidal aluminum conductor steel-reinforced concentric-lay-stranded conductor. The aluminum strands are trapezoidal in shape. The wedge-shaped aluminum strands enable a more compact alignment of the aluminum wires. Conductor designs that maintain the same circular mil cross-sectional area of aluminum as a conventional round conductor result in a TW conductor that is 10 to 15 percent smaller in overall diameter. Conductor designs that maintain the same overall diameter as a conventional round conductor result in a TW conductor that has 20 to 25 percent more aluminum cross-sectional area packed in.

The ACSR/TW conductors are manufactured in accordance with the requirements of the latest issue of ASTM B779.

The steel strands form the central core of the conductor, around which is stranded two, three or four layers of aluminum 1350-H19 wires. The steel core may consist of a concentric stranded cable of 7,19 or more wires. Numerous combinations of aluminum and steel strands and layers are possible. The sizes and constructions listed on the following pages are common examples used in overhead lines.

For ACSR/TW conductors, the standard class A galvanized coating is usually adequate for ordinary environments.

Features and Benefits:

ACSR/TW has a continuous operating temperature rating of 75°C. ACSR and ACSR/TW conductors have an “industry-accepted” short- duration maximum operating temperature rating of 100°C. Operation of the conductor at elevated temperatures may increase the conductor sag properties and lower the rated tensile strength of the conductor.

ACSR/TW conductors are recognized for their record of economy, dependability and favorable strength-to-weight ratio. ACSR/TW conductors constructed of equivalent aluminum circular mil cross-sectional area provide a conductor that is smaller in overall diameter than the equivalent conventional round wire ACSR conductor. The reduced conductor diameter is advantageous in reducing the effects of ice and wind loading on the conductor. ACSR/TW conductors constructed to equivalent overall diameter enable a greater circular mil cross-sectional area of aluminum within the conductor, allowing a significant increase in conductor current-carrying capacity.

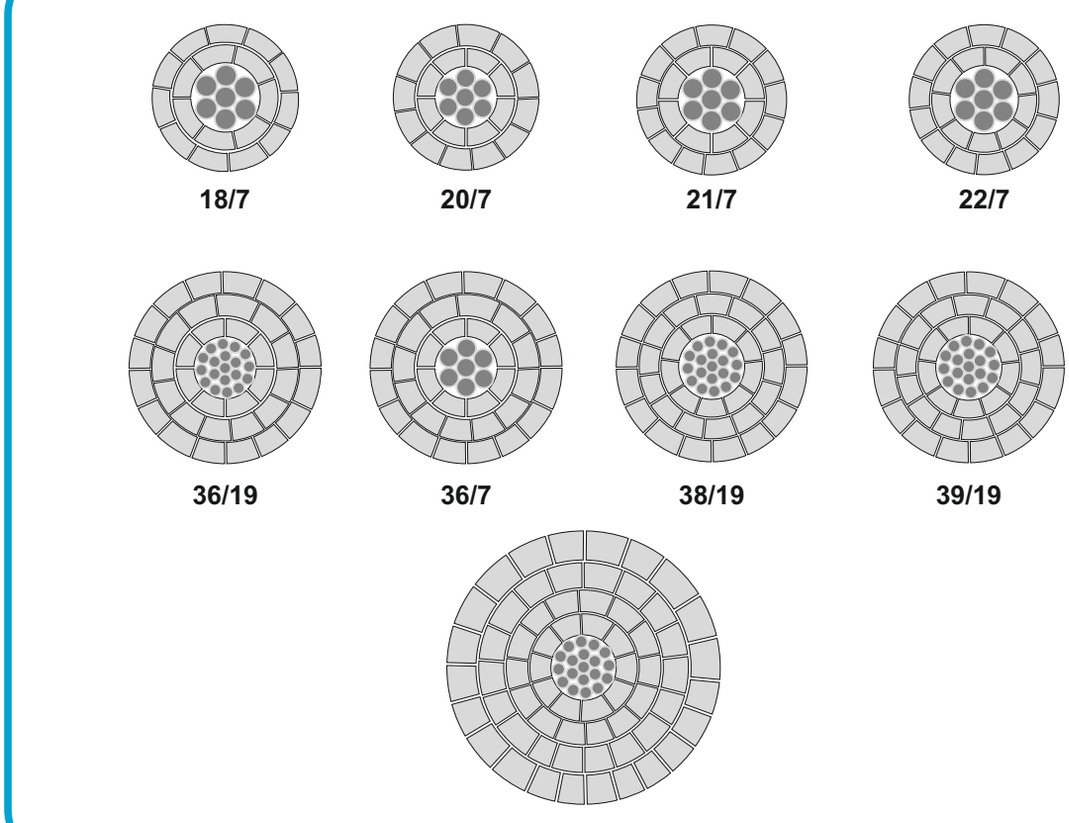
Applications:

Trapezoidal aluminum conductors steel-reinforced (ACSR/TW) are used for overhead transmission lines.

Electrical Parameters:

The electrical parameters for the trapezoidal ACSR equivalent circular mil area and equivalent overall diameter conductors may be found in the last table of this section.

ACSS/TW cross section according to the number of layers:



ASTM B779 with eual area

Code Word	Size AWG or kcmil	Type	No. Al. Wires	Fill Factor	Equivalent Aluminum Diameter	Steel Core No. x Dia.	Steel Core O.D.	Cross Section	
					mm			Total	Aluminum
								mm2	
Oriole	336.4	23	17	88.7	3.5738	7x2.6898	8.0696	210.19	170.45
Flicker	477	13	18	91.3	4.1351	7x2.3876	7.1628	273.16	241.81
Hawk	477	16	18	91.3	4.1351	7x2.6746	8.0239	280.97	241.61
Hen	477	23	16	88.7	4.3866	7x3.2029	9.6088	298.06	241.68
Parakeet	556.5	13	18	92	4.4653	7x2.5781	7.7343	318.58	282.06
Dove	556.5	16	20	91.8	4.2367	7x2.8905	8.6716	327.93	282
Rook	636	13	18	92.6	4.7752	7x2.7559	8.2677	363.93	322.19
Grosbeak	636	16	20	92	4.5288	7x3.0886	9.2659	374.77	322.32
Tern	795	7	17	93.5	5.494	7x2.2555	6.7666	430.97	403.03
Puffin	795	11	21	93.5	4.9403	7x2.8143	8.443	446.19	402.64
Condor	795	13	21	93	4.9403	7x3.0810	9.2431	454.9	402.71
Drake	795	16	20	93.1	5.0622	7x3.4544	10.3632	468.32	402.71
Mallard	795	23	22	93	4.8285	19x2.4815	12.4079	494.71	402.84
Phoenix	954	5	30	92.9	4.5314	7x2.1259	6.3779	508.52	483.68
Rail	954	7	33	92.2	4.318	7x2.4663	7.399	516.84	483.42
Cardinal	954	13	21	93.9	5.4127	7x3.3756	10.127	546	483.35
Snowbird	1033.5	5	30	92.5	4.7142	7x2.2123	6.637	550.45	523.55
Ortolan	1033.5	7	33	92.3	4.4933	7x2.5654	7.6962	559.55	523.35
Curlew	1033.5	13	21	93.7	5.6363	7x3.5128	10.5385	591.61	523.74
Avocet	1113	5	30	93	4.892	7x2.2961	6.8885	592.64	563.68
Bluejay	1113	7	33	92.7	4.666	7x2.6644	7.9934	603.29	564.26
Finch	1113	13	39	91.9	4.2901	19x2.1894	10.9474	635.16	563.68
Oxbird	1192.5	5	30	93.2	5.0622	7x2.3774	7.1323	635.03	603.93
Bunting	1192.5	7	33	93	4.8285	7x2.7584	8.2753	646.19	604.39

Code Word	Size AWG or kcmil	Type	No. Al. Wires	Fill Factor	Equivalent Aluminum Diameter	Steel Core No. x Dia.	Steel Core O.D.	Cross Section	
					mm			Total	Aluminum
								mm 2	
Grackle	1192.5	13	39	92.3	4.4425	19x2.2656	11.3284	681.0309	604.4504
Scissortail	1272	5	30	93.6	5.2299	7x2.4561	7.3685	677.9341	644.7729
Bittern	1272	7	33	93.3	4.9886	7x2.8473	8.542	689.3535	644.7729
Pheasant	1272	13	39	93	4.5872	19x2.3393	11.6967	725.934	644.3213
Dipper	1351.5	7	33	93.5	5.141	7x2.9337	8.8011	732.2566	684.9019
Martin	1351.5	13	39	93	4.7269	19x2.4104	12.0523	771.2243	684.5148
Bobolink	1431	7	33	93	5.2908	7x3.0200	9.0602	775.4823	725.3534
Plover	1431	13	39	93	4.8666	19x2.4815	12.4079	817.1597	725.2889
Lapwing	1590.0	7	36	93.0	5.3391	7x3.1826	9.5479	861.3531	805.6758
Falcon	1590.0	13	42	93.5	4.9428	19x2.6162	13.0810	907.4821	805.3532
Chukar	1780.0	8	38	93.5	5.4966	19x2.2199	11.0998	975.6110	902.0627
Bluebird	2156	8	64	91	4.6609	19x2.4409	12.2047	1181.417	1092.5139

Overal Diameter	Weight			Percent By Mass		Rated Strenght			Resistance		Ampacity 75
	Total	Aluminum	Steel			kg			ohm/km		
mm	kg/km			Aluminum	Steel	GA	HS	UHS	DC 20°c	DC 75°c	
17.526	782.77	473.24	311.03	60.34	39.66	7756.4	8300.7	8845.1	0.1647	0.2011	525
19.812	910.76	666.7	244.06	73.14	26.86	7801.8	8210	8618.3	0.1171	0.1434	640
20.066	974.75	666.7	306.56	68.47	31.53	8799.7	9298.6	9843	0.1168	0.1427	645
21.082	1110.17	669.67	440.5	60.34	39.66	10704.8	11475.9	12247	0.1161	0.1421	655
21.336	1062.55	776.82	285.73	73.15	26.85	9071.8	9570.8	10069.8	0.1004	0.123	705
21.59	1136.96	778.31	358.65	68.45	31.55	10251.2	10886.2	11475.9	0.1001	0.1227	710
22.606	1214.34	888.43	325.91	73.15	26.85	10387.3	10931.6	11521.2	0.0879	0.1079	765
23.114	1299.17	889.92	409.25	68.47	31.53	11521.2	12247	12972.7	0.0876	0.1073	770
24.384	1327.44	1108.68	218.76	83.54	16.46	9933.7	10296.5	10659.4	0.0705	0.0873	870
24.892	1449.47	1110.17	340.79	76.55	23.45	11884.1	12473.8	13063.5	0.0705	0.0866	875
25.146	1517.93	1110.17	407.76	73.15	26.85	12791.3	13517.1	14197.4	0.0702	0.0866	880
25.654	1623.59	1111.66	511.93	68.45	31.55	14424.2	15331.4	16193.2	0.0699	0.086	885
26.5684	1836.39	1117.61	718.78	60.84	39.16	17554	18778.7	19958.1	0.0699	0.0856	895
26.416	1529.83	1336.37	193.46	87.32	12.68	10795.5	11113	11430.5	0.0594	0.0764	950
26.924	1598.29	1337.86	260.43	83.66	16.34	11748	12201.6	12655.2	0.0591	0.0761	955
27.432	1821.51	1331.91	489.61	73.15	26.85	15195.3	16057.2	16873.6	0.0584	0.0725	985
27.686	1657.81	1446.5	209.83	87.32	12.68	11657.3	12020.2	12383.1	0.0548	0.0705	995
27.94	1730.73	1447.98	282.75	83.68	16.32	12745.9	13199.5	13698.5	0.0548	0.0705	1000
28.702	1973.31	1443.52	529.79	73.15	26.85	16465.4	17372.6	18279.8	0.0541	0.0669	1035
28.702	1784.31	1558.11	226.2	87.32	12.68	12473.8	12836.7	13244.9	0.0509	0.0656	1045
28.956	1864.67	1559.6	305.07	83.66	16.34	13743.8	14242.8	14787.1	0.0509	0.0656	1050
29.972	2123.61	1564.06	559.55	73.64	26.36	17735.5	18688	19595.2	0.0505	0.065	1065
29.718	1912.29	1669.72	242.57	87.31	12.69	13335.6	13789.2	14197.4	0.0476	0.0617	1090
29.97	1998.6	1671.21	327.4	83.65	16.35	14696.4	15286.1	15830.4	0.0472	0.0614	1095

ACSR/TW

Overall Diameter	Weight			Percent by Mass		Rated Strength			Resistance			Ampacity 75°
	Total	Aluminum	Steel			GA	HS	UHS	DC 20°c	AC 25°c	DC 75°c	
mm	kg/km			Aluminium	Steel	kg			ohm/km			
30.99	2275	1676	600	73.65	26.35	19005.5	20003.4	21001.3	0.0472	0.0495	0.0607	1110
30.48	2040	1781	259	87.3	12.7	14242.8	14696.4	15150	0.0443	0.0476	0.0577	1130
30.99	2131	1783	348	83.67	16.33	15694.3	16284	16873.6	0.0443	0.0472	0.0577	1135
32	2426	1787	638	73.66	26.34	20003.4	21046.7	22135.3	0.0443	0.0466	0.0571	1155
31.75	2263	1894	369	83.68	16.32	16646.8	17281.9	17916.9	0.0417	0.0446	0.0545	1180
33.02	2577	1899	679	73.68	26.32	21228.1	22362.1	23496.1	0.0417	0.0443	0.0538	1195
32.77	2397	2006	391	83.67	16.33	17644.7	18325.1	19005.5	0.0394	0.0423	0.0515	1220
33.78	2729	2011	719	73.66	26.34	22498.2	23677.5	24902.2	0.0394	0.042	0.0509	1240
34.54	2664	2229	435	83.67	16.33	19141.6	19912.7	20638.5	0.0354	0.0387	0.0466	1300
35.56	3033	2234	799	73.65	26.35	24992.9	26308.4	27669.1	0.0354	0.0381	0.0459	1320
36.83	3067	2491	576	81.24	18.76	22997.1	23949.7	24902.2	0.0316	0.0348	0.0417	1400
40.89	3738	3043	695	81.39	18.61	27714.5	28893.8	30027.8	0.0263	0.0295	0.0344	1585

ASTM B779 equivalent area to ACSR with equal diameter

Code Word	Size AWG or kcmil	Type	No. Al. Wires	Fill Factor	Equivalent Aluminum Diameter	Steel Core No. x Dia.	Steel Core O.D.	Cross Section	
					mm			Total	Aluminum
								mm2	
Cheyenne	1168.1	5	30	92.9	5.0114	7x2.3520	7.0561	622.06	591.61
Genesee	1158	7	33	92.5	4.7574	7x2.7381	8.2144	627.87	586.71
Hudson	1158.4	13	26	93.7	5.3619	7x3.7261	11.1785	663.16	586.84
Catawba	1272	5	30	93.3	5.2299	7x2.4561	7.3685	677.87	644.71
Nelson	1257.1	7	35	92.4	4.8133	7x2.8321	8.4963	681.16	637.1
Yukon	1233.6	13	39	91	4.5161	*	11.557	704.71	625.03
Truckee	1372.5	5	30	93.6	5.4331	7x2.5501	7.6505	731.42	695.68
Mackenzie	1359.7	7	36	92.9	4.9352	7x2.9438	8.8316	736.32	688.64
Thames	1334.6	13	39	92.6	4.699	*	11.9888	761.8	676.06
St. Croix	1467.8	5	30	93.4	5.6185	7x2.6441	7.9324	782.39	744
Miramichi	1455.3	7	36	93.4	5.1054	7x3.048	9.144	788.32	737.22
Merrimack	1433.6	13	39	92.1	4.8692	*	12.4206	818.19	726.13
Platte	1569	5	33	93.7	5.5397	7x2.7279	8.1839	836.26	795.35
Potomac	1557.4	7	36	93.2	5.2832	7x3.1521	9.4564	844.13	789.48
Rio Grande	1533.3	13	39	93.2	5.0368	*	12.8524	875.74	777.16
Schuylkill	1657.4	7	36	93.5	5.4483	7x3.2512	9.7536	897.55	839.48
Pecos	1622.0	13	39	93.1	5.1791	*	13.5128	930.64	821.68
Pee Dee	1758.6	7	37	93	5.5372	7x3.3502	10.0508	952.51	890.77
James	1730.6	13	39	92.5	5.3518	*	13.6525	988.51	877.29
Athabaska	1949.6	7	42	93.4	5.4737	7x3.5356	10.607	1057.03	988.26
Cumberland	1926.9	13	42	93.3	5.4407	*	14.3891	1099.61	976.06
Powder	2153.8	8	64	92.2	4.6584	*	12.2047	1180.19	1091.29
Santee	2627.3	8	64	93.1	5.1486	*	13.4874	1440.51	1331.93

ASTM B779 with eual diameter

Code Word	Size AWG or kcmil	Type	No. Al. Wires	Fill Factor	Equivalent Aluminum Diameter	Steel Core No. x Dia.	Steel Core O.D.	Cross Section	
					mm			Total	Aluminum
								mm2	
Mohawk	571.7	13	18	92.2	4.5263	7x2.6162	7.8486	327.23	289.6123
Calument	565.3	16	20	91.5	4.2697	7x2.9108	8.7325	332.97	286.322
Mystic	666.6	13	20	92.3	4.638	7x2.8219	8.4658	381.61	337.8058
Oswego	664.8	16	20	92.3	4.6304	7x3.1597	9.4793	391.81	336.9026
Maumee	768.2	13	20	93	4 .9784	7x3.0353	9.1059	439.81	389.1605
Wabash	762.8	16	20	92.9	4.9606	7x3.3807	10.1422	449.22	386.3863
Kettle	957.2	7	33	92.2	4.3256	7x2.4714	7.4143	518.58	485.0313
Suwanee	959.6	16	22	93.4	5.3061	7x3.7922	11.3767	565.42	486.3861
Columbia	966.2	13	21	93.6	5.4483	7x3.3985	10.1956	553.29	489.741

Overall Diameter	Weight			Percent by Mass		Rated Strength			Resistance			Ampacity 75°
	Total	Aluminum	Steel			GA	HS	UHS	DC 20°c	AC 25°c	DC 75°c	
mm	kg/km			Aluminium	Steel	kg			ohm/km			
29.46	1873.6	1635.5	238.1	87.32	12.68	13063	13472	13925	0.0486	0.0515	0.0627	1075
29.46	1945	1623.6	321.4	83.45	16.55	14334	14923	15467	0.0489	0.0515	0.063	1075
30.48	2214.4	1617.6	596.8	73.08	26.92	17962	19278	20276	0.0482	0.0505	0.06	1110
30.48	2040.3	1781.3	258.9	87.3	12.7	14243	14696	15150	0.0443	0.0476	0.0577	1130
30.73	2105.8	1762	343.8	83.65	16.35	15513	16103	16692	0.0449	0.0479	0.0584	1130
31.75	2357.3	1733.7	623.5	73.53	26.47	19459	20502	21546	0.0456	0.0482	0.0587	1135
31.75	2201	1921.2	279.8	87.32	12.68	15150	15649	16103	0.0413	0.0443	0.0538	1185
32	2278.4	1906.3	372	83.67	16.33	16738	17418	18053	0.0417	0.0446	0.0541	1185
32.77	2546.2	1875.1	671.2	73.64	26.36	21001	22090	23224	0.042	0.0446	0.0545	1190
32.77	2355.8	2055.2	300.6	87.26	12.74	16239	16738	17282	0.0384	0.0417	0.0505	1235
33.02	2439.1	2040.3	398.8	83.64	16.36	17781	18461	19142	0.0387	0.0417	0.0509	1235
34.04	2735.2	2015	720.3	73.65	26.35	22544	23723	24948	0.039	0.0417	0.0509	1240
33.78	2516.5	2196.5	320	87.3	12.7	17327	17872	18416	0.0361	0.0394	0.0476	1285
34.29	2610.2	2183.1	427.1	83.65	16.35	19006	19777	20502	0.0364	0.0394	0.0476	1285
35.05	2925.7	2154.9	770.9	73.63	26.37	24131	25401	26717	0.0367	0.0394	0.0476	1295
35.31	2776.9	2323	453.9	83.66	16.34	19958	20729	21546	0.0341	0.0371	0.0449	1335
36.07	3132.6	2278.4	852.7	72.77	27.23	26082	27488	28939	0.0344	0.0371	0.0453	1340
36.32	2946.6	2464.4	482.2	83.65	16.35	21183	21999	22861	0.0321	0.0354	0.0427	1380
37.34	3302.2	2431.7	870.6	73.64	26.36	26943	28395	29846	0.0324	0.0351	0.0427	1390
38.1	3269.5	2732.3	537.2	83.58	16.42	23541	24449	25401	0.029	0.0323	0.0387	1470
39.12	3674.3	2707	967.3	73.68	26.32	29937	31570	33158	0.0292	0.032	0.0384	1485
40.64	3735.3	3038.8	695	81.37	18.63	27714	28848	30028	0.0263	0.0295	0.0344	1580
44.7	4556.8	3708.5	849.7	81.36	18.64	33793	35244	36650	0.0216	0.0252	0.0291	1765

ACSR/TW

Overall Diameter	Weight			Percent by Mass		Rated Strength			Resistance			Ampacity 75°
	Total	Aluminum	Steel			GA	HS	UHS	DC 20°c	AC 25°c	DC 75°c	
mm	kg/km			Aluminium	Steel	kg			ohm/km			
21.59	1092	799	293	73.1	26.9	9344	9843	10342	0.0978	0.1004	0.1198	715
21.844	1155	790	363	68.48	31.52	10387	11022	11657	0.0984	0.101	0.1207	715
23.114	1272	932	342	73.14	26.86	10886	11476	12066	0.0837	0.0863	0.103	790
23.622	1359	930	429	68.44	31.56	12066	12791	13562	0.0837	0.086	0.1027	795
24.892	1469	1073	396	73.07	26.93	12565	13245	13925	0.0728	0.0751	0.0896	860
25.146	1557	1067	491	68.49	31.51	13835	14696	15513	0.0728	0.0751	0.0896	865
26.924	1604	1342	262	83.65	16.35	11793	12247	12701	0.0591	0.062	0.0761	955
28.194	1960	1342	618	68.49	31.51	16874	18189	19278	0.0581	0.06	0.0715	995
27.686	1845	1350	496	73.13	26.87	15422	16239	17100	0.0577	0.06	0.0715	995

ACSS

Aluminum Conductor Steel Supported

Complete Conductor

ACSS is a composite concentric-lay-stranded cable. The steel strands form the central core of the cable, around which is stranded one or more layers of aluminum 1350-O wires. ACSS Conductors are manufactured in accordance with the requirements of the latest applicable issue of ASTM specification B856. The “O” temper of the aluminum, a fully annealed or soft temper, causes most or all of the mechanical load on ACSS to be carried by the steel. The steel core may consist Of 7, 19, 37 or more wires.Class A zinc coating is usually adequate for ordinary environment.

Features and Benefits

ACSS conductors are similar to conventional ACSR with some very important additional advantages. ACSS can operate continuously at high temperatures (200°C) without damage. For conductor applications to 250°C, zinc-5% aluminum mischmetal alloy-coated steel or aluminum-clad steel should be considered. ACSS sags less under emergency electrical.

Loadings than ACSR, it is self-damping if prestretched during installation, and its final sags are not affected by long-time creep of the aluminum.

Applications

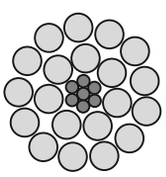
Aluminum conductor steel-supported (ACSS) is used for overhead transmission lines. It is especially useful in reconductoring applications requiring increased current with existing tensions and clearances; new line applications where structures can be economized due to reduced sag; new line applications requiring high emergency loadings; and lines where aeolian vibration is a problem.

Options:

1. High-strength class A galvanized steel core (/HS)
2. Extra-high-strength class A galvanized steel core (/EHS)
3. Ultra-high-strength class A galvanized steel core (/UHS)

4. Regular-strength class A zinc-5% aluminum misch-metal alloy-coated steel core (/MA)
5. High-strength class A zinc-5% aluminum misch-metal alloy-coated steel core (/MA)
6. Extra-high-strength class A zinc-5% aluminum misch-metal alloy-coated steel core (/EM)
7. Ultra-high-strength class A zinc-5% aluminum misch-metal alloy-coated steel core (/UM)
8. Aluminum-clad steel core (/AW).
9. 250°C operating temperature rating utilizing either the zinc-5% aluminum misch-metal alloy-coated steel core wires or the aluminum-clad steel core wires
10. Trapezoidal-shaped aluminum strands (/TW)

ACSS cross section according to the number of layers:



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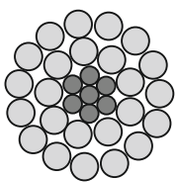

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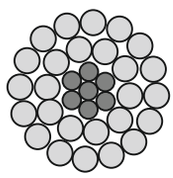

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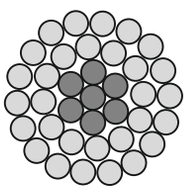

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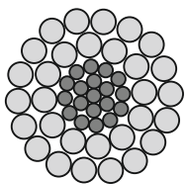

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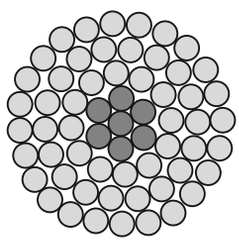

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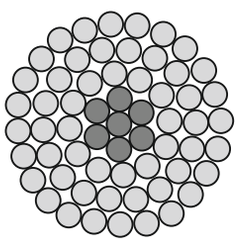
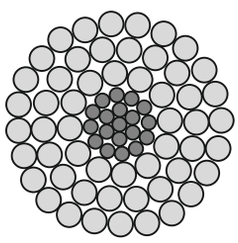


54/7



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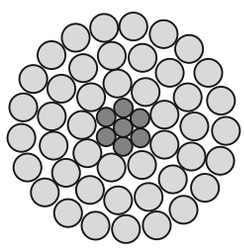

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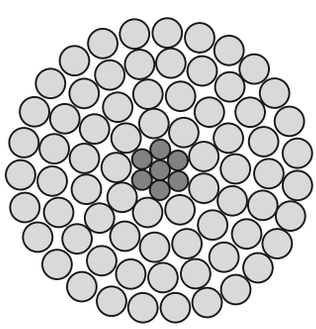

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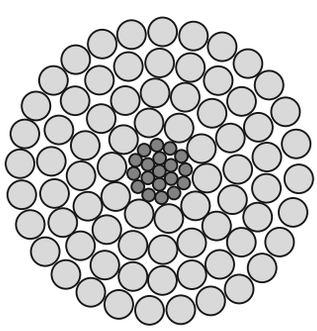

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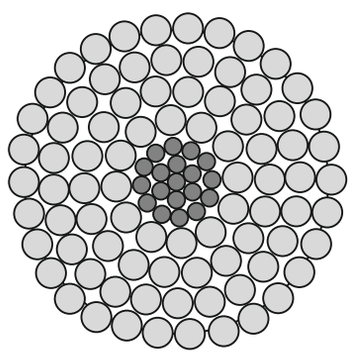

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ACSS

ASTM B856

Code Word	Size (kcmil)	Stranding (Al/St)	Diameter			
			Individual Wires		Steel Core	Complete
			Aluminum	Steel		
			mm			
Partridge	266.8	26/7	2.573	2.0015	6.002	16.3068
Junco	266.8	30/7	2.3952	2.3952	7.1857	16.764
Ostrich	300.0	26/7	2.728	2.1209	6.3652	17.272
Linnet	336.4	26/7	2.888	2.2479	6.7412	18.288
Oriole	336.4	30/7	2.6899	2.6899	8.0696	18.8214
Brant	397.5	24/7	3.269	2.1793	6.538	19.6088
Ibis	397.5	26/7	3.1394	2.4435	7.3279	19.8882
Lark	397.5	30/7	2.9235	2.9235	8.7706	20.4724
Flicker	477.0	24/7	3.5814	2.3876	7.1603	21.4884
Hawk	477.0	26/7	3.4392	2.6746	8.0264	21.7932
Hen	477.0	30/7	3.2029	3.2029	9.6088	22.4282
Parakeet	556.5	24/7	3.8684	2.5781	7.7343	23.2156
Dove	556.5	26/7	3.716	2.8905	8.669	23.5458
Eagle	556.5	30/7	3.4595	3.4595	10.3784	24.2062
Peacock	605	24/7	4.0335	2.6873	8.0645	24.2062
Squab	605	26/7	3.8735	3.0124	9.0399	24.5364
Wood Duck	605	30/7	3.6068	3.6068	10.8204	25.2476
Teal	605	30/19	3.6068	2.1641	10.8204	25.2476
Rook	636	24/7	4.1351	2.7559	8.2702	24.8158
Grosbeak	636	26/7	3.9726	3.0886	9.2685	25.1714
Seater	636	30/7	3.6982	3.6982	11.0947	25.8826
Egret	636	30/19	3.6982	2.22	11.0947	25.8826
Flamingo	666.6	24/7	4.2342	2.8219	8.4658	25.4
Gannet	666.6	26/7	4.0665	3.1623	9.4894	25.7556
Stilt	715.5	24/7	4.3866	2.9235	8.7706	26.3144
Starling	715.5	26/7	4.2139	3.2766	9.8323	26.6954
Redwin	715.5	30/19	3.9218	2.3546	11.7678	27.4574
Cuckoo	795	24/7	4.6228	3.081	9.2456	27.7368
Drake	795	26/7	4.4425	3.4544	10.3632	28.1178
Macaw	795	42/7	3.495	1.9406	5.8242	26.797
Tern	795	45/7	3.3757	2.2504	6.7513	27.0002
Condor	795	54/7	3.081	3.081	9.2456	27.7368
Mallard	795	30/19	4.1351	2.4816	12.4054	28.9306
Ruddy	900	45/7	3.5916	2.3952	7.1831	28.7274
Canary	900	54/7	3.2791	3.2791	9.8374	29.5148
Redbird	954	24/7	5.0648	3.3757	10.127	30.3784
Rail	954	45/7	3.6982	2.4663	7.3965	29.591
Towhee	954	48/7	3.5814	2.7864	8.3566	29.845
Cardinal	954	54/7	3.3757	3.3757	10.127	30.3784
Canvasback	954	30/19	4.5288	2.7178	13.589	31.6992

(1) Resistance and ampacity based on an aluminum conductivity of 63 %,IACS at 20°c and a steel conductivity of 8% IACS at 20 °c.

(2) Ampacity based on a 200°c conductor temperature 25°c. Ambient temperature 2 ft/sec. wind in sun.Emissivity of 0.5. coefficient of solar absorption of 0.5 at sea level.

(3) Rated strength for standard strength core based on class A Galfan coated steel core wire in accordance with ASTM B 802.

Rated strength for high strength core based on class A Galfan coated high strength steel core wire in accordance with B803.

Weight			Rated Strength [3]			Resistance [1]		Ampacity [2] at 200°c AMPS
Aluminum	Steel	Total	Standard Strength	High Strength	HS285 Strength	DC at 20°c	AC at 75°c	
kg/km			kg			ohm/km		
373.98	171.88	545.86	4027.9	4413.5	5171	0.2031	0.2497	812
374.87	246.29	621.16	5307	5896.7	6894.6	0.2018	0.248	822
420.56	193.31	613.72	4535.9	4944.2	5806	0.1808	0.2221	877
471.45	216.83	688.28	5080.2	5579.2	6531.7	0.1611	0.1982	945
472.64	310.58	783.22	6713.2	7393.6	8663.6	0.1601	0.1969	957
557.17	203.88	761.05	4989.5	5488.5	6395.7	0.1368	0.1686	1047
557.17	256.11	813.28	5896.7	6441	7484.3	0.1365	0.168	1054
558.51	366.83	925.49	7937.9	8754.3	10251.2	0.1355	0.1667	1068
668.63	244.65	913.14	5896.7	6441	7438.9	0.1142	0.1407	1180
668.63	307.31	975.94	7076	7756.4	8981.1	0.1135	0.1401	1188
670.27	440.35	1110.62	9525.4	10296.5	12110.9	0.1129	0.1391	1204
779.95	285.43	1065.38	6894.6	7529.6	8709	0.0978	0.1207	1306
780.1	358.5	1138.59	8255.4	9026.5	10523.3	0.0974	0.1201	1315
781.88	513.71	1295.6	11113	12020.2	14106.7	0.0968	0.1191	1331
847.96	310.28	1158.24	7484.3	8210	9434.7	0.0899	0.1112	1379
847.96	389.75	1237.85	8935.8	9661.5	11430.5	0.0896	0.1106	1389
850.04	558.51	1408.55	11793.4	12836.7	15104.6	0.0889	0.1096	1407
850.04	546.75	1396.79	12065.6	13290.3	15785	0.0892	0.1099	1406
891.41	326.21	1217.62	7847.1	8618.3	9933.7	0.0856	0.1056	1425
891.41	409.84	1301.25	9389.4	10160.5	11793.4	0.0853	0.1053	1435
893.64	587.08	1480.72	12428.4	13471.7	15875.7	0.0846	0.1043	1454
893.64	574.88	1468.52	12700.6	14016	16601.5	0.0846	0.1047	1453
934.42	341.83	1276.25	8255.4	9026.5	10387.3	0.0817	0.101	1470
934.27	429.48	1363.75	9843	10614.1	12383.1	0.0814	0.1004	1480
1002.87	366.83	1369.85	8845.1	9661.5	11158.4	0.0761	0.0942	1540
1002.87	461.03	1463.91	10568.7	11430.5	13517.1	0.0758	0.0938	1550
1005.4	646.76	1652.01	13970.6	15422.1	18053	0.0755	0.0932	1570
1114.34	407.76	1521.95	9843	10568.7	12201.6	0.0686	0.085	1650
1114.34	512.23	1626.56	11748	12700.6	14787.1	0.0686	0.0843	1662
1114.34	161.76	1276.1	5352.4	5715.3	6486.4	0.0692	0.086	1621
1114.34	217.42	1331.76	6441	6894.6	7892.5	0.0689	0.0863	1618
1114.34	407.76	1521.95	9843	10568.7	12201.6	0.0686	0.0873	1618
1117.02	718.49	1835.5	15558.2	17191.2	20094.1	0.0679	0.0837	1683
1261.52	246.14	1507.66	7166.8	7711.1	8709	0.061	0.0764	1755
1261.52	461.48	1723	11158.4	11974.8	13834.6	0.0604	0.0774	1756
1337.12	489.16	1826.42	11793.4	12700.6	14651	0.0571	0.0712	1859
1337.12	260.88	1598.14	7575	8164.7	9253.3	0.0574	0.0722	1824
1337.12	332.9	1670.17	8935.8	9661.5	11022.3	0.0574	0.0715	1842
1337.26	489.16	1826.42	11793.4	12700.6	14651	0.0571	0.0732	1825
1340.39	862.24	2202.63	18642.6	20593.1	24085.8	0.0564	0.0702	1897

ASTM B856

Code Word	Size (kcmil)	Stranding (Al/St)	Diameter			
			Individual Wires		Steel Core	Complete
			Aluminum	Steel		
			mm			
Snowbird	1033.5	42/7	3.9853	2.2123	6.6396	30.5562
Ortolan	1033.5	45/7	3.8481	2.5654	7.6987	30.7848
Curlew	1033.5	54/7	3.5128	3.5128	10.541	31.623
Bluejay	1113	45/7	3.9954	2.6619	7.9883	31.9532
Finch	1113	54/19	3.6474	2.1869	10.9398	32.8168
Buntin	1192.5	45/7	4.1351	2.7559	8.2702	33.0708
Bittern	1272	45/7	4.2697	2.8473	8.5395	34.163
Pheasant	1272	54/19	3.8989	2.3393	11.6942	35.0774
Dipper	1351	45/7	4.4018	2.9337	8.8011	35.2044
Martin	1351	54/19	4.0183	2.4105	12.0523	36.1696
Bobolink	1431	45/7	4.5288	3.0201	9.0576	36.2458
Plover	1431	54/19	4.1351	2.4816	12.4054	37.211
Nuthatch	1510	45/7	4.6533	3.1013	9.3066	37.211
Parrot	1510	54/19	4.2469	2.5476	12.7432	38.227
Ratite	1590	42/7	4.9428	2.7457	8.2372	37.8968
Lapwing	1590	45/7	4.7752	3.1826	9.5479	38.2016
Falcon	1590	54/19	4.3586	2.6162	13.0759	39.2176
Chukar	1780	84/19	3.6982	2.2174	11.0922	40.6654
Mockingbird	2034.5	72/7	4.2697	2.8473	8.5395	42.6974
Roadrunner	2057	76/19	4.1783	1.9507	9.7511	43.18
Bluebird	2156	84/19	4.0691	2.4409	12.2072	44.7548
Kiwi	2167	72/7	4.4069	2.9388	8.8138	44.069
Thrasher	2312	76/19	4.4298	2.0676	10.3378	45.7708
Joree	2515	76/19	4.6203	2.1565	10.7823	47.752

(1) Resistance and ampacity based on an aluminum conductivity of 63 %,IACS at 20°c and a steel conductivity of 8% IACS at 20 °c.

(2) Ampacity based on a 200°c conductor temperature 25°c. Ambient temperature 2 ft/sec. wind in sun.Emissivity of 0.5. coefficient of solar absorption of 0.5 at sea level.

(3) Rated strength for standard strength core based on class A Galfan coated steel core wire in accordance with ASTM B 802.

Rated strength for high strength core based on class A Galfan coated high strength steel core wire in accordance with B803.

Weight			Rated Strength [3]			Resistance [1]		Ampacity [2] at 200°c AMPS(2)
Aluminum	Steel	Total	Standard Strength	High Strength	HS285 Strength	DC at 20°c	AC at 75°c	
kg/km			kg			ohm/km		
1448.58	210.28	1658.86	6985.3	7484.3	8391.5	0.0531	0.0669	1924
1448.58	282.75	1731.33	8210	8845.1	9979	0.0531	0.0669	1921
1448.58	530.08	1978.66	12791.3	13743.8	15875.7	0.0528	0.0676	1924
1560.04	304.33	1864.37	8845.1	9570.8	10795.5	0.0492	0.0623	2017
1567.63	558.81	2126.44	13789.2	15059.3	17554	0.0492	0.0633	2015
1671.51	326.21	1997.71	9706.9	10659.4	11521.2	0.0459	0.0584	2110
1782.97	347.93	2130.9	10115.1	10886.2	12337.7	0.043	0.0548	2200
1791.6	638.72	2430.17	15467.5	16919	19504.5	0.043	0.0554	2200
1893.69	369.51	2263.2	10750.1	11566.6	13063.5	0.0407	0.0518	2289
1902.92	678.31	2581.22	16420	17962.3	20683.8	0.0404	0.0525	2288
2005.75	391.39	2397.13	11385.2	12247	13834.6	0.0384	0.0492	2375
2015.57	718.49	2734.05	17417.9	19005.5	21908.5	0.0384	0.0495	2375
2116.47	412.97	2529.58	12020.2	12745.9	14424.2	0.0364	0.0469	2459
2126.88	758.22	2884.95	18325.1	20048.8	23133.2	0.0361	0.0472	2460
2228.67	323.53	2552.2	10614.1	11339.8	12655.2	0.0344	0.0446	2543
2228.67	434.84	2663.52	12655.2	13426.3	15195.3	0.0344	0.0446	2543
2239.54	798.4	3037.94	19323	21137.4	24357.9	0.0344	0.0449	2545
2507.11	574.58	3081.69	16057.2	17327.2	19912.7	0.0308	0.04	2751
2865.61	347.78	3213.39	12337.7	13108.8	14515	0.0272	0.0361	2960
2897.31	443.92	3341.23	14378.9	15376.8	17372.6	0.0269	0.0354	2992
3036.75	695.87	3732.61	19096.2	20638.5	23450.7	0.0256	0.0338	3106
3052.22	370.4	3422.63	13154.2	13970.6	15467.5	0.0256	0.0341	3080
3256.4	498.98	3755.38	16147.9	17281.9	19504.5	0.024	0.0322	3218
3542.43	542.73	4085.16	17554	18778.7	21228.1	0.022	0.0302	3390

ACSS/AW

Aluminum Conductor Steel Supported / Aluminum Cad Steel Support

Complete Conductor:

ACSS/AW is a composite concentric-lay-stranded cable. Aluminum-clad steel strands for the central core of the cable, around which is stranded one or more layers of aluminum 1350-O wires.

ACSS/AW conductors are manufactured in accordance with the latest applicable issue of ASTM B856. The “O” temper of the aluminum, a fully annealed or soft temper, causes most or all of the mechanical load of ACSS/AW to be carried by the steel. The aluminum-clad steel core may consist of 7,19,37 or more wires. Numerous combinations of aluminum and steel strand and layers are possible. The sizes and standings listed on the following pages are those most frequently used for overhead lines.

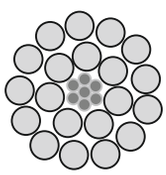
Features and Benefits:

The AW core, which consists of a thick layer of aluminum (approx. 10% of the nominal wire\ radius) over steel, gives ACSS/AW conductors the advantages of standard ACSS along with the light weight and good conductivity of aluminum and the high tensile strength and ruggedness of steel. ACSS/AW can operate continuously at high temperatures (250°C) without damage. The cross- sections illustrate some common stranding. Aluminum conductor steel-supported with aluminum-clad steel wire (ACSS/AW) are used for overhead distribution and transmission lines where a high degree of corrosion resistance is required.

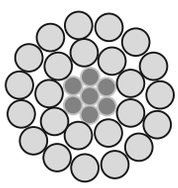
Options:

1. High-strength aluminum-clad steel core (/HSAW)
2. Extra-High-strength aluminum-clad steel core (/EHSAW)
3. Ultra-High-strength aluminum-clad steel core (/UHSAW)
4. Trapezoidal-shaped aluminum strands (/TW)

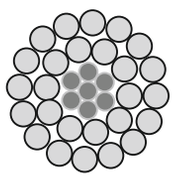
ACSS/AW cross section according to the number of layers:



20/7



24/7



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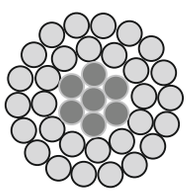

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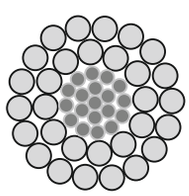

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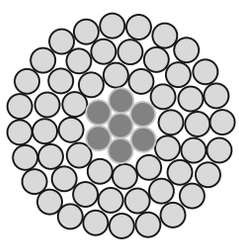

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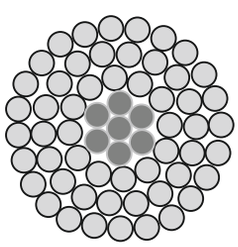

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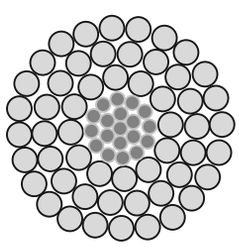

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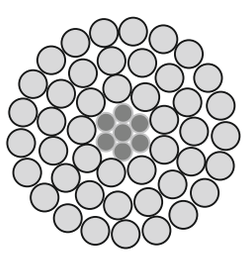

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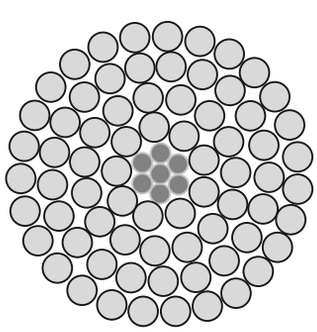

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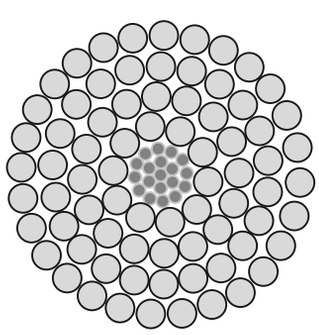

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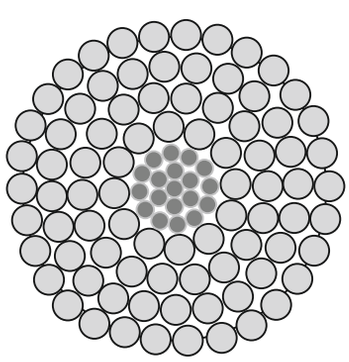

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Code Word	Size AWG or kcmil	Stranding No.		Cross Section		Overall Diameter
		Aluminum	Steel	Total	Aluminum	
		mm		mm 2		mm
Spoonbill	266.8	22x2.7965	7x1 5544	148.39	135.16	15.85
Scaup	266.8	24x2.6771	7x17856	152.64	135.16	16.08
Partridge	266.8	26x2.5730	7x2.0015	157.23	135.23	16.31
Junco	266.8	30x2.3952	7x2.3952	166.71	135.16	16.76
Ostrich	300	26x2.7279	7x2.1209	176.71	151.94	17.27
Trogon	336.4	20x3.2943	7x1.4630	182.26	170.45	17.58
Woodcock	336.4	22x3.1 41 9	7x1.7449	187.29	170.58	17.81
Widgeon	336.4	24x3.0073	7x2.0040	192.58	170.45	18.03
Linnet	336.4	26x2.8879	7x2.2453	198.06	170.32	18.29
Oriole	336.4	30x2.6898	7x2.6898	210.26	170.45	18.82
Ptarmigan	397.5	20x3.581 4	7x1.5925	215.42	201.48	19.1
Stork	397.5	22x3.41 37	7x1.8973	221.16	201.35	19.35
Brant	397.5	24x3.2689	7x2.1793	227.55	201.42	19.61
Ibis	397.5	26x3.1394	7x2.4409	234	201.29	19.89
Lark	397.5	30x2.9235	7x2.9235	248.39	201.35	20.47
Tailorbird	477	20x3.921 7	7x1.7424	258.26	241.68	20.93
Toucan	477	22x3.7388	7x2.0777	265.29	241.55	21.18
Flicker	477	24x3.5814	7x2.3876	273.1	241.74	21.49
Hawk	477	26x3.4391	7x2.6746	280.84	241.55	21.79
Hen	477	30x3.2029	7x3.2029	298.13	241.74	22.43
Heron	500	30x3.2791	7x3.2791	312.45	253.35	22.96
Tody	556.5	20x4.2367	7x1.8821	301.42	281.93	22.61
Sapsucker	556.5	22x4.0386	7x2.2428	309.48	281.81	22.89
Parakeet	556.5	24x3.8684	7x2.5781	318.64	282.06	23.22
Dove	556.5	26x3.71 60	7x2.8905	327.93	282	23.55
Eagle	556.5	30x3.4594	7x3.4594	347.81	282	24.21
Peacock	605	24x4.0335	7x2.6898	346.45	306.64	24.21
Squab	605	26x3.8735	7x3.01 24	356.26	306.39	24.54
Wood Duck	605	30x3.6068	7x3.6068	378.06	306.52	25.25
Teal	605	30x3.6068	19x2.1640	376.39	306.52	25.25
Turacos	636	20x4.5288	7x2.0 l 1 6	344.45	322.19	24.1 6
Goldfinch	636	22x4.318	7x2.3977	353.74	322.19	24.46
Rook	636	24x4.1351	7x2.7559	364.06	322.32	24.82
Grosbeak	636	26x3.97256	7x3.0886	374.71	322.26	25.146
Seater	636	30x3.69824	7x3.6982	397.42	322.26	25.8826
Egret	636	30x3.69824	19x2.2199	395.81	322.26	25.8826
Flamingo	666.6	24x4.23418	7x2.8219	381.74	337.93	25.4
Gannet	666.6	26x4.06654	7x3.1623	392.64	337.68	25.7556
Stilt	715.5	24x4.38658	7x2.9235	409.68	362.71	26.3144
Starling	715.5	26x4.21386	7x3.2766	421.61	362.58	26.6954
Redwing	715.5	30x3.92176	19x2.3520	444.97	362.39	27.4574
Macaw	795	42x3.49504	7x1.9405	423.68	402.97	26.797
Turbit	795	20x5.06476	7x2.2504	430.77	402.97	27.0002
Tern	795	45x3.37566	7x2.2504	430.58	402.71	27.0002
Puffin	795	22x4.82854	7x2.6822	442.39	402.84	27.3558
Cuckoo	795	24x4.6228	7x3.0810	455.03	402.84	27.7368
Condor	795	54x3.08102	7x3.08102	454.77	402.58	27.7368
Drake	795	26x4.44246	7x3.4544	468.58	402.97	28.1178

1- Due to rounding,total values may be slightly greater or less than the sum of the component values.

2- Based on the conductivity of %61.2 (minimum lot average.)

IACS for aluminum and %8 IACS at 20°c for the steel core.

AC resistance for single-layer and three-layers designs approximates the effects of core magnetization.

Weight [1]			Percent by Mass		Rated Strength	Resistance [2]				Ampacity	
Total	Aluminum	Steel	Aluminum	Steel		DC at 20°c	AC at 25°c	AC at 75°c	AC at 200°c	75°c	200°c
kg/km			%		kg	ohm/km				A	
461.33	373.53	87.8	80.97	19.03	2595	0.2011	0.2054	0.247	0.351	460	810
489.61	373.53	116.08	76.33	23.67	3180	0.1991	0.2034	0.2444	0.3474	465	815
519.37	373.53	145.84	71.96	28.04	3797	0.1969	0.201 4	0.2418	0.3435	470	825
583.36	375.02	208.34	64.24	35.76	5080	0.1932	0.1975	0.2372	0.3363	480	840
584.85	421.15	163.7	71.99	28.01	4264	0.1752	0.1791	0.2152	0.3054	505	890
549.13	471.75	77.38	85.83	14.17	2590	0.1608	0.1647	0.1982	0.2812	530	935
581.87	471.75	110.12	80.98	19.02	3275	0.1594	0.1 631	0.1962	0.2785	535	940
617.59	471.75	145.84	76.34	23.66	4005	0.1578	0.1614	0.1942	0.2756	540	950
654.79	471.75	183.04	72	28	4763	0.1562	0.1 598	0.1919	0.2726	545	960
735.15	473.24	263.41	64.23	35.77	6441	0.1532	0.1565	0.188	0.2671	555	980
648.84	556.57	92.27	85.79	14.21	3084	0.1362	0.1398	0.1677	0.2382	590	1040
687.53	556.57	130.96	80.97	19.03	3869	0.1348	0.1381	0.1660	0.2359	595	1050
730.69	556.57	172.63	76.33	23.67	4717	0.1335	0.1368	0.1644	0.2333	600	1060
773.85	556.57	217.27	71.99	28.01	5625	0.1322	0.1355	0.1627	0.2306	605	1070
869.09	558.06	311.03	64.24	35.76	7575	0.1296	0.1325	0.1594	0.226	615	1095
778.31	668.19	110.12	85.82	14.18	3674	0.1135	0.1165	0.1401	0.1985	660	1175
825.93	668.19	157.75	80.98	19.02	4627	0.1125	0.1155	0.1385	0.1965	665	1185
876.53	668.19	206.85	76.33	23.67	5670	0.1112	0.1142	0.1371	0.1946	670	1195
928.61	668.19	260.43	71.98	28.02	6759	0.1102	0.1129	0.1355	0.1923	675	1210
1043.2	669.67	373.53	64.23	35.77	9117	0.1079	0.1106	0.1329	0.1883	690	1230
1093.8	702.41	391.39	64.23	35.77	9344	0.1030	0.1056	0.127	0.1798	710	1270
909.27	779.8	129.47	85.82	14.18	4286	0.0971	0.1001	0.1201	0.1703	725	1300
962.84	779.8	183.04	81	19	5398	0.0965	0.0991	0.1191	0.1686	730	1310
1022.37	779.8	241.08	76.34	23.66	6622	0.0955	0.0981	0.1178	0.1670	740	1325
1083.38	779.8	303.59	71.96	28.04	7938	0.0945	0.0971	0.1165	0.1650	745	1335
1217.32	781.29	436.03	64.23	35.77	10387	0.0925	0.0951	0.1142	0.1614	760	1365
1111.66	848.25	263.41	76.31	23.69	7212	0.0876	0.0902	0.1083	0.1535	780	1395
1178.63	848.25	330.37	71.98	28.02	8618	0.0869	0.0892	0.1073	0.1519	785	1410
1322.98	849.74	473.24	64.24	35.76	11068	0.0853	0.0876	0.105	0.1486	800	1440
1314.05	849.74	462.82	64.72	35.28	11340	0.0853	0.0876	0.105	0.149	800	1440
1038.74	891.41	147.33	85.83	14.17	4899	0.085	0.0879	0.1053	0.1493	790	1415
1101.24	891.41	209.83	81	19	6169	0.0843	0.0869	0.1043	0.1476	795	1430
1168.21	891.41	276.8	76.34	23.66	7575	0.0833	0.086	0.103	0.146	800	1445
1238.15	891.41	346.74	71.98	28.02	9026	0.0827	0.085	0.102	0.1444	810	1460
1391.43	894.39	497.05	64.24	35.76	11385	0.081	0.0833	0.0997	0.1414	825	1490
1381.02	894.39	488.12	64.7	35.3	11929	0.081	0.0833	0.1001	0.1417	825	1485
1224.76	934.57	290.19	76.33	23.67	7938	0.0797	0.082	0.0984	0.1394	825	1490
1297.68	934.57	363.11	71.98	28.02	9480	0.0787	0.0814	0.0974	0.1378	835	1505
1314.05	1003.02	311.03	76.33	23.67	8528	0.0741	0.0768	0.0919	0.1299	865	1560
1392.92	1003.02	389.9	71.97	28.03	9979	0.0735	0.0758	0.0909	0.1286	870	1575
1552.15	1006	547.64	64.75	35.25	13381	0.0722	0.0745	0.0892	0.126	885	1605
1251.55	1114.63	136.91	89.05	10.95	5171	0.0686	0.0715	0.0889	0.1286	885	1575
1299.17	1114.63	184.53	85.81	14.19	6123	0.0682	0.0709	0.0846	0.1198	905	1640
1299.17	1114.63	184.53	85.81	14.19	6123	0.0682	0.0712	0.0883	0.128	885	1585
1376.55	1114.63	261.92	80.98	19.02	7756	0.0676	0.0699	0.0837	0.1184	915	1655
1459.89	1114.63	345.25	76.34	23.66	9480	0.0669	0.0692	0.0827	0.1171	920	1670
1459.89	1114.63	345.25	76.34	23.66	9480	0.0669	0.0696	0.0863	0.1253	905	1615
1549.18	1114.63	434.54	71.97	28.03	11068	0.0659	0.0682	0.082	0.1158	930	1690

ACSS/AW

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1- Due to rounding,total values may be slightly greater or less than the sum of the component values.

2- Based on the conductivity of %61.2 (minimum lot average.)

IACS for aluminum and %8 IACS at 20°c for the steel core.

AC resistance for single-layer and three-layers designs approximates the effects of core magnetization.

Code Word	Size AWG or kcmil	Stranding No.		Cross Section		Overall Diameter
		Aluminum	Steel	Total	Aluminum	
		mm	mm	mm2	mm2	mm
Canary	900	54x3.27914	7x3.2791	515.16	456.06	29.5148
Phoenix	954	42x3.82778	7x2.1259	508.19	483.29	29.337
Corncrake	954	20x5.5473	7x2.46634	516.84	483.35	29.59
Rail	954	45x3.6982	7x2.46634	516.84	483.35	29.59
Towhee	954	48x3.5814	7x2.78638	526.26	483.55	29.85
Redbird	954	24x5.0647	7x3.37566	546.19	483.55	30.38
Cardinal	954	54x3.3756	7x3.37566	545.93	483.29	30.38
Canvasback	954	30x4.5288	19x2.7178	593.61	483.42	31.7
Snowbird	1033.5	42x3.9852	7x2.21488	550.9	523.93	30.56
Ortolan	1033.5	45x3.8481	7x2.21488	560.06	523.93	30.78
Whooper	1033.5	48x3.7261	7x2.89814	569.61	523.42	31.06
Curlew	1033.5	54x3.5128	7x3.51282	591.22	523.35	31.62
Avocet	1113	42x4.1351	7x2.29616	593.03	564.06	31.7
Bh1ejay	1113	45x3.9954	7x2.66446	603.22	564.19	31.98
Bullfinch	1113	48x3.8684	7x3.00736	613.93	564.13	32.23
Finch	1113	54x3.6474	19x2.18694	635.74	564.26	32.84
Oxbird	1192.5	42x4.2799	7x2.37744	635.29	604.19	32.82
Bunting	1192.5	45x4.1351	7x2.7559	646.06	604.32	33.07
Cormorant	1192.5	48x4.0030	7x3.11404	657.42	604.13	33.35
Grackle	1192.5	54x3.7744	19x2.26568	680.84	604.19	33.99
Scissortail	1272	42x4.4196	7x2.45618	677.48	644.32	33.88
Bittern	1272	45x4.2697	7x2.84734	688.9	644.32	34.16
Diver	1272	48x4.1351	7x3.2156	701.48	644.64	34.4678
Pheasant	1272	54x3.8989	19x2.3393	726.39	644.71	35.0774
Ringdove	1351.5	42x4.5567	7x2.5323	720.19	684.97	34.9504
Dipper	1351.5	45x4.5567	7x2.9337	732.13	684.77	35.2044
-none-	1351.5	48x4.2621	7x3.3147	745.22	684.77	35.5092
Martin	1351.5	54x4.0182	19x2.41 04	771.48	684.77	36.1696
Popinjay	1431	42x4.6888	7x2.6060	762.58	725.22	35.941
Bobolink	1431	45x4.5288	7x3.0200	775.03	724.9	36.2204
Wagtail	1431	48x4.3865	7x3.4112	789.35	725.42	36.5506
Plover	1431	54x4.1351	19x2.4815	817.1	725.22	37.211
Nuthatch	1510.5	45x4.6532	7x3.1013	818.19	765.29	37.2364
Parrot	1510.5	54x4.2468	19x2.5476	861.8	764.9	38.227
Ratite	1590	42x4.9428	7x2.7457	847.35	805.93	37.8968
Lapwing	1590	45x4.7752	7x3.1826	861.61	805.93	38.2016
Hornbill	1590	48x4.6228	7x3.5966	876.77	805.61	38.5318
Falcon	1590	54x4.3586	19x2.6162	907.87	805.74	39.243
Chukar	1780	84x3.6982	19x2.2199	975.87	902.32	40.6908
Sea hawk	1869	68x4.2113	7x2.3393	977.29	947.16	40.7162
Mockingbird	2034.5	72x4.2697	7x2.8473	1075.48	1030.9	42.6974
Roadrunner	2057.5	76x4.1783	19x1.9507	1098.9	1042.06	43.18
Bluebird	2156	84x4.0690	19x2.4409	1181.29	1092.32	44.7548
Kiwi	2167	72x4.4069	7x2.9387	1145.68	1098.19	44.069
Thrasher	2312	76x4.4297	19x2.0675	1235.09	1171.29	45.7708
joree	2515	76x4.6202	19x2.1564	1343.61	1274.19	47.752

ACSS/AW

Weight [1]			Percent by Mass		Rated Strength	Resistance [2]				Ampacity	
Total	Aluminum	Steel	Aluminum	Steel		DC at 20°c	AC at 25°c	AC at 75°c	AC at 200°c	75°c	200°c
kg/km			%		kg	ohm/km				A	
1653.35	1261.96	391.39	76.33	23.67	10523	0.0591	0.0617	0.0764	0.1106	975	1755
1501.56	1337.86	163.7	89.05	10.95	6169	0.0571	0.06	0.0741	0.1073	990	1780
1558.11	1337.86	221.74	85.8	14.2	7348	0.0568	0.0594	0.0709	0.1001	1015	1845
1558.11	1337.86	221.74	85.8	14.2	7348	0.0568	0.0597	0.0738	0.1066	995	1790
1619.12	1337.86	282.75	82.56	17.44	8618	0.0564	0.0594	0.0732	0.106	1000	1800
1751.57	1337.86	415.2	76.34	23.66	11158	0.0558	0.0581	0.0692	0.0978	1030	1885
1751.57	1337.86	415.2	76.34	23.66	11158	0.0558	0.0584	0.0722	0.1043	1010	1825
2071.52	1340.84	730.69	64.72	35.28	17872	0.0541	0.0561	0.0673	0.0948	1060	1940
1626.56	1447.98	178.58	89.03	10.97	6713	0.0528	0.0558	0.0686	0.0991	1040	1875
1687.58	1447.98	239.59	85.82	14.18	7983	0.0525	0.0554	0.0682	0.0984	1045	1885
1754.55	1447.98	305.07	82.58	17.42	9344	0.0522	0.0551	0.0676	0.0978	1050	1900
1897.41	1447.98	449.43	76.34	23.66	11839	0.0515	0.0541	0.0666	0.0965	1065	1925
1751.57	1559.6	191.97	89.05	10.95	7212	0.0489	0.0522	0.064	0.0919	1085	1970
1818.54	1559.6	258.94	85.8	14.2	8573	0.0486	0.0515	0.0633	0.0912	1095	1980
1889.97	1559.6	328.88	82.56	17.44	10070	0.0482	0.0512	0.063	0.0909	1100	1995
2041.76	1567.04	474.72	76.77	23.23	13063	0.0479	0.0505	0.0623	0.0899	1110	2015
1876.57	1671.21	205.37	89.05	10.95	7711	0.0456	0.0489	0.0597	0.086	1135	2060
1948.01	1671.21	276.8	85.82	14.18	9208	0.0453	0.0486	0.0594	0.0853	1140	2075
2023 .90	1671.21	352.69	82.57	17.43	10795	0.0453	0.0479	0.0591	0.0846	1150	2085
2187.6	1680.14	507.46	76.78	23.22	13971	0.0446	0.0476	0.0584	0.084	1160	2110
2003.07	1782.82	218.76	89.04	10.96	8255	0.0427	0.0459	0.0561	0.0807	1180	2150
2077.48	1782.82	294.66	85.81	14.19	9798	0.0427	0.0456	0.0558	0.0801	1185	2165
2159.33	1782.82	376.51	82.58	17.42	11476	0.0423	0.0453	0.0554	0.0794	1195	2175
2333.44	1791.75	541.69	76.79	23.21	14878	0.042	0.0446	0.0548	0.0787	1205	2200
2128.07	1894.43	233.64	89.04	10.96	8754	0.0404	0.0436	0.0531	0.0787	1225	2235
2206.95	1894.43	312.51	85.82	14.18	10433	0.04	0.0433	0.0528	0.0787	1230	2250
2294.75	1894.43	400.32	82.58	17.42	12020	0.0397	0.043	0.0522	0.0787	1240	2265
2477.79	1903.36	574.43	76.81	23.19	15830	0.0394	0.0423	0.0518	0.0787	1250	2290
2253.08	2006.04	247.04	89.03	10.97	9299	0.0381	0.0413	0.0502	0.0787	1265	2325
2337.91	2006.04	331.86	85.81	14.19	11022	0.0377	0.041	0.0499	0.0787	1275	2335
2428.68	2006.04	422.64	82.57	17.43	12701	0.0377	0.0407	0.0495	0.0787	1285	2350
2625.12	2014.97	608.66	76.79	23.21	16738	0.0374	0.04	0.0489	0.0787	1295	2375
2467.38	2117.66	349.72	85.82	14.18	11657	0.0358	0.039	0.0476	0.0787	1315	2420
2769.47	2128.07	642.89	76.82	23.18	17690	0.0354	0.0381	0.0466	0.0787	1340	2465
2503.09	2229.27	273.82	89.04	10.96	10297	0.0341	0.0377	0.0456	0.0787	1350	2485
2596.85	2229.27	369.06	85.81	14.19	12247	0.0341	0.0374	0.0453	0.0787	1355	2505
2699.53	2229.27	470.26	82.57	17.43	13880	0.0338	0.0371	0.0449	0.0787	1365	2520
2916.8	2239.69	677.11	76.78	23.22	18643	0.0335	0.0364	0.0443	0.0787	1380	2550
2994.19	2507.56	488.12	83.72	16.28	15241	0.0305	0.0335	0.0394	0.0787	1480	2770
2818.58	2619.17	199.41	92.94	7.06	9571	0.0292	0.0331	0.0387	0.0787	1495	2810
3160.86	2866.2	294.66	90.67	9.33	12020	0.0269	O.Q308	0.0358	0.0787	1570	2975
3273.96	2897.46	376.51	88.5	11.5	13744	0.0266	0.0302	0.0351	0.0787	1590	3010
3626.66	3037.34	589.31	83.74	16.26	18461	0.0253	0.0285	0.0335	0.0787	1650	3130
3366.23	3052.22	314	90.67	9.33	12791	0.0253	0.0292	0.0341	0.0787	1630	3095
3678.74	3256.1	422.64	88.51	11.49	15467	0.0236	0.0276	0.0318	0.0787	1695	3235
4003.16	3541.83	459.84	88.5	11.5	16828	0.0217	0.0259	0.0299	0.0787	1775	3410

ACSS/TW

Aluminum Conductor Steel Supported / Trapezoidal Shaped

Complete Conductor:

ACSS/TW is a trapezoidal aluminum conductor steel-supported concentric-lay-stranded conductor. The aluminum strands are trapezoidal in shape.

The wedge-shaped aluminum strands enable a more compact alignment of the aluminum wires. Conductor designs that maintain the same circular mil cross-sectional area of aluminum as a conventional round conductor result in a TW conductor that is 10 to 15 percent smaller in overall diameter. Conductor designs that maintain the same overall diameter as a conventional round conductor result in a TW conductor that has 20% to 25% more aluminum cross-sectional area packed in.

The ACSS/TW conductors are manufactured in accordance with the requirements of the latest issue of ASTM B857.

The steel strands form the central core of the conductor, around which is stranded two, three or four layers of aluminum 1350-O temper annealed wires. The steel core may consist of a concentric stranded cable of 7, 19 or more wires. Numerous combinations of aluminum and steel strands and layers are possible. The sizes and constructions listed on the following pages are common examples used in overhead lines.

For ACSS/TW conductors, the standard class A galvanized coating is usually adequate for ordinary environments.

Features and Benefits:

ACSS/TW conductors are similar to conventional ACSR/TW conductors but have very important additional significant advantages. ACSS/TW conductors can operate continuously at high temperatures (200°c) without any damages. It sags less than ACSR/TW under emergency electrical loadings, it has self damping properties and its final sags are not affected by long-term creep of aluminum. ACSS/TW conductors produced with equivalent aluminum circular mil cross-sectional area provide a conductor that is smaller in overall diameter than the equivalent conventional round wire ACSS conductor.

The reduced conductor diameter helps to reduce ice and wind loading effect on the conductor. ACSS/TW conductors produced with equivalent overall diameter enhances greater circular mil cross-sectional area of aluminum within the conductor, allowing a significant increase in conductor current-carrying capacity.

Applications:

Trapezoidal aluminum conductors steel-supported (ACSS/TW) are used for overhead transmission lines. They are specifically useful in re-conductoring operations requiring increased current with existing tensions; new line products are applicable where structures need to be economized to reduce sags, high emergency loadings or lines where aeolian vibration is a problem.

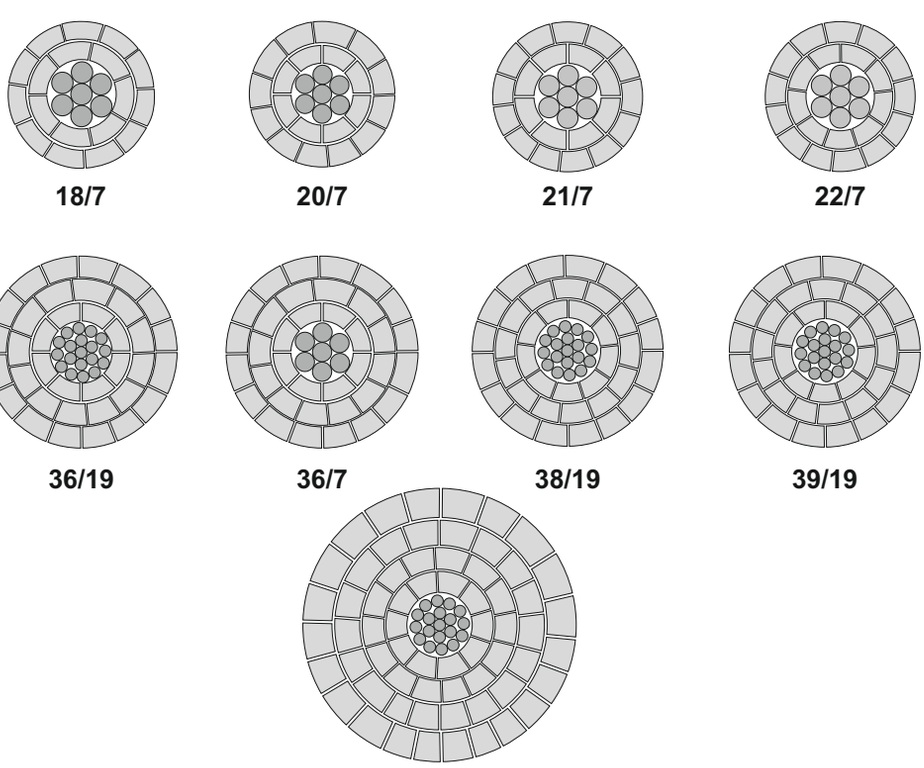
Electrical Parameters:

The electrical parameters for the trapezoidal ACSS equivalent circular mil area and equivalent overall diameter conductors may be found in the last table of this section.

Options:

- High-strength class A galvanized steel core (/HS)
- Extra-high-strength class A galvanized steel core (/EHS)
- Ultra-high-strength class A galvanized steel core (/UHS)
- Regular-strength class A zinc-5% aluminum misch-metal alloy-coated steel core (/MA)
- High-strength class A zinc-5% aluminum misch-metal alloy-coated steel core (/MS)
- Extra-high-strength class A zinc-5% aluminum misch-metal alloy-coated steel core (/EMS)
- Ultra-high-strength class A zinc-5% aluminum misch-metal alloy-coated steel core (/UMS)
- Aluminum-clad steel core (/AW)
- High-strength Aluminum-clad steel core (/HSAW)

ACSS/TW cross section according to the number of layers:



ASTM B857

Area Equal to standart ASCR size

Code Word	Size (kcmil)	Type No.	Cross Sectional Area		Stranding			Diameter	
			Aluminum	Total	No. of Layers of Aluminum	No. of Aluminum Wires	No. & Diameter Individual Steel Wire	Steel Core	Complete Cable
			mm^2		No.		No. x Di.	mm	
Linnet	336.4	16	170.39	198.06	2	18	7 x 2.2453	6.7361	16.7386
Oriole	336.4	23	170.45	210.19	2	16	7 x 2.6898	8.0696	17.6022
Flicker	477	13	241.74	273.1	2	18	7 x 2.3876	7.1628	19.7104
Hawk	477	16	241.68	281.03	2	18	7 x 2.6746	8.0239	20.0406
Hen	477	23	241.74	298.13	2	16	7 x 3.2029	9.6088	20.955
Parakeet	556.5	13	282	318.52	2	18	7 x 2.5781	7.7343	21.209
Dove	556.5	16	282	327.93	2	20	7 x 2.8905	8.6716	21.6408
Rook	636	13	322.26	364.06	2	18	7 x 2.7559	8.2677	22.606
Grosbeak	636	16	322.26	374.71	2	20	7 x 3.0886	9.2659	23.0632
Seater	636	23	322.26	397.42	2	18	7 x 3.6982	11.0947	24.2062
Tern	795	7	402.84	430.64	2	17	7 x 2.2504	6.7513	24.384
Puffin	795	11	402.84	446.39	2	18	7 x 2.6822	8.0467	24.892
Condor	795	13	402.84	455.03	2	20	7 x 3.0810	9.2431	25.2222
Drake	795	16	402.84	468.45	2	20	7 x 3.4544	10.3632	25.654
Canary	900	13	456.06	515.03	2	20	7 x 3.2791	9.8374	26.797
Phoenix	954	5	483.42	508.13	3	30	7 x 2.1259	6.3779	26.5176
Rail	954	7	483.42	516.84	3	32	7 x 2.4663	7.399	26.9494
Cardinal	954	13	483.42	546.06	2	20	7 x 3.3756	10.127	27.5336
Snowbird	1033.5	5	523.68	550.58	3	30	7 x 2.2123	6.637	27.6606
Ortolan	1033.5	7	523.68	559.87	3	32	7 x 2.5654	7.6962	27.9908
Curlew	1033.5	13	523.68	591.55	2	20	7 x 3.5128	10.5385	28.6766
Avocet	1113	5	564	592.97	3	30	7 x 2.2961	6.8885	28.6766
Bluejay	1113	7	564	603.03	3	33	7 x 2.6644	7.99	29.03
Finch	1113	13	564.06	635.61	3	38	19 x 2.1894	10.95	30.1
Oxbird	1192.5	5	604.26	635.35	3	30	7 x 2.3774	7.13	29.64
Bunting	1192.5	7	604.26	646	3	33	7 x 2.7559	8.27	30
Grackle	1192.5	13	604.26	680.9	3	38	19 x 2.2656	11.33	31.12
Scissortail	1272	5	644.58	677.74	3	30	7 x 2.4561	7.37	30.56
Bittern	1272	7	644.51	689.1	3	35	7 x 2.8473	8.54	30.99
Pheasant	1272	13	644.51	726.19	3	39	19 x 2.3393	11.7	32.11
Dipper	1351.5	7	684.84	732.13	3	35	7 x 2.9337	8.8	31.9
Martin	1351.5	13	684.84	771.55	3	39	19 x 2.4104	12.05	33.02
Bobolink	1431	7	724.9	775.29	3	36	7 x 3.0200	9.06	32.79
Plover	1431	13	725.1	817.03	3	39	19 x 2.4815	12.41	33.96
Lapwing	1590	7	805.68	861.35	3	36	7 x 3.1826	9.55	34.49
Falcon	1590	13	805.68	907.8	3	42	19 x 2.6162	13.08	35.76
Chukar	1780	8	902.32	975.87	3	37	19 x 2.2199	11.1	36.7
Bluebird	2156	8	1092.45	1181.22	4	64	19 x 2.4409	12.2	40.84

ACSS/TW

Weight			Rated Breaking Strength			Resistance		Ampacity (amps)				
Aluminum	Steel	Total	Standard Strength	High Strength	HS-285	DC at 20°c	AC at 75°c	75°c	100°c	150°c	200°c	250°c
kg/km			kg			ohms/km		A				
470.11	216.53	686.64	5080	5579	6532	0.1608	0.1977	523	638	801	921	1021
470.41	310.58	780.99	6713	7394	8664	0.1594	0.1958	533	650	816	940	1043
666.4	244.8	911.2	5897	6441	7439	0.1138	0.1401	648	793	998	1151	1279
666.85	307.16	974	7076	7756	8981	0.1134	0.1396	652	799	1005	1159	1289
667.14	440.5	1107.64	9525	10297	12111	0.1124	0.1383	663	813	1024	1181	1315
777.42	285.43	1062.85	6895	7530	8664	0.0975	0.1202	713	874	1102	1271	1415
778.16	358.65	1136.81	8255	9026	10478	0.0972	0.1198	719	881	1111	1282	1427
888.43	326.06	1214.49	7847	8618	9934	0.0853	0.1054	775	951	1200	1386	1544
889.33	409.54	1298.87	9389	10160	11793	0.0851	0.1049	781	958	1210	1398	1557
889.33	587.23	1476.56	12428	13472	15876	0.0843	0.1039	795	976	1234	1427	1591
1108.98	217.42	1326.4	6441	6895	7893	0.0687	0.0853	878	1080	1366	1580	1762
1110.02	340.05	1450.07	8029	8709	9979	0.0684	0.0848	886	1090	1378	1595	1778
1110.62	407.61	1517.93	9843	10569	12202	0.0682	0.0846	890	1095	1386	1604	1789
1111.66	512.37	1623.59	11748	12701	14787	0.068	0.0842	896	1103	1396	1616	1803
1257.35	461.63	1718.83	11158	11975	13835	0.0603	0.0749	962	1185	1501	1739	1942
1335.92	194.06	1529.83	6441	6895	7756	0.0576	0.0738	967	1189	1503	1740	1940
1337.26	261.17	1598.29	7575	8165	9253	0.0575	0.0735	972	1196	1512	1750	1953
1332.65	489.16	1821.51	11793	12701	14651	0.0569	0.0707	997	1229	1558	1806	2016
1447.24	210.13	1657.81	6985	7439	8391	0.0532	0.0682	1016	1251	1584	1834	2048
1447.24	282.6	1729.25	8210	8845	9979	0.0531	0.068	1021	1257	1592	1843	2058
1443.67	529.79	1973.31	12791	13744	15876	0.0525	0.0654	1048	1293	1641	1903	2126
1558.11	226.35	1784.31	7394	7938	8845	0.0493	0.0635	1063	1310	1661	1925	2150
1559.6	304.78	1864.67	8845	9525	10795	0.0493	0.0633	1068	1317	1669	1935	2161
1564.06	559.7	2123.61	13789	15059	17554	0.049	0.0628	1084	1336	1695	1965	2196
1669.72	242.72	1912.29	7938	8482	9480	0.046	0.0595	1108	1367	1735	2013	2249
1671.21	326.06	1997.12	9480	10206	11521	0.046	0.0593	1114	1374	1744	2023	2261
1675.67	599.43	2275.4	14787	16103	18824	0.0458	0.0587	1130	1395	1771	2055	2298
1781.33	258.94	2040.27	8482	9072	10115	0.0432	0.0559	1152	1423	1807	2098	2346
1782.82	348.08	2131.05	10115	10886	12292	0.0431	0.0557	1159	1431	1817	2110	2360
1787.28	639.02	2425.71	15467	16919	19504	0.0429	0.0551	1176	1452	1846	2143	2398
1894.43	369.51	2263.5	10750	11567	13063	0.0406	0.0526	1202	1485	1888	2194	2455
1898.9	678.45	2577.5	16420	17962	20684	0.0404	0.052	1220	1508	1918	2228	2494
2004.56	391.54	2397.43	11385	12247	13835	0.0383	0.0498	1243	1538	1958	2276	2549
2010.51	719.08	2729.29	17418	19006	21909	0.0382	0.0493	1263	1562	1989	2313	2590
2229.27	434.84	2663.81	12655	13426	15195	0.0345	0.0452	1324	1640	2092	2435	2730
2233.73	799.14	3032.88	19323	21137	24358	0.0344	0.0446	1346	1668	2127	2477	2777
2492.67	575.47	3068.59	16012	17327	19913	0.0308	0.0405	1421	1764	2255	2630	2952
3043.3	695.72	3738.27	19096	20638	23451	0.0256	0.0337	1601	1999	2573	3014	3396

ASTM B857

Diameter Equal to standart ASCR size

Code Word	Size (kcmil)	Type No.	Cross Sectional Area		Stranding		Diameter		
			Aluminum	Total	No. of Layers of Aluminum	No. of Aluminum Wires	No. & Diameter Individual Steel Wire	Steel Core	Complete Cable
			mm^2		No.		No. x Di.	mm	
Mohawk	571.7	13	289.68	327.35	2	18	7 x 2.6162	7.8486	21.4884
Calumet	565.3	16	286.39	333.03	2	20	7 x 2.9108	8.7401	21.7932
Mystic	666.6	13	337.81	381.55	2	20	7 x 2.8219	8.4658	23.1902
Oswego	664.8	16	336.84	391.74	2	20	7 x 3.1597	9.4793	23.5458
Maumee	768.2	13	389.29	439.93	2	20	7 x 3.0353	9.1059	24.8158
Wabash	762.8	16	386.58	449.42	2	20	7 x 3.3807	10.1422	25.146
Kettle	957.2	7	485.03	518.58	3	32	7 x 2.4714	7.4143	26.924
Fraser	946.7	10	479.74	526.97	3	35	7 x 2.9311	8.7935	27.3558
Columbia	966.2	13	489.61	553.1	2	21	7 x 3.3985	10.1956	27.7368
Suwannee	959.6	16	486.26	565.29	2	22	7 x 3.7922	11.3767	28.1432
Cheyenne	1168.1	5	591.93	622.32	3	30	7 x 2.3520	7.0561	29.337
Genesee	1158	7	586.77	627.93	3	33	7 x 2.7381	8.2144	29.591
Hudson	1158.4	13	586.97	663.29	2	25	7 x 3.7261	11.1785	30.3784
Catawba	1272	5	644.58	677.74	3	30	7 x 2.4561	7.3685	30.5562
Nelson	1257.1	7	637.03	681.1	3	35	7 x 2.8321	8.4963	30.8102
Yukon	1233.6	13	625.1	704.84	3	38	19 x 2.3114	11.557	31.623
Truckee	1372.5	5	695.48	731.22	3	30	7 x 2.5501	7.6505	31.6992
Mackenzie	1359.7	7	688.97	736.64	3	36	7 x 2.9438	8.8316	31.9786
Thames	1334.6	13	676.13	761.87	3	39	19 x 2.3977	11.9888	32.766
St. Croix	1467.8	5	743.8	782.19	3	33	7 x 2.6441	7.9324	32.8168
Miramichi	1455.3	7	737.42	788.51	3	36	7 x 3.048	9.144	33.0708
Merrimack	1433.6	13	725.81	817.87	3	39	19 x 2.4841	12.42	34.04
Platte	1569	5	795.03	835.93	3	33	7 x 2.7279	8.18	33.88
Potomac	1557.4	7	789.16	843.8	3	36	7 x 3.1521	9.46	34.16
Rio Grande	1533.3	13	776.97	875.55	3	39	19 x 2.5704	12.85	35.1
Schuylkill	1657.4	7	840	898.06	3	36	7 x 3.2512	9.75	35.2
Pecos	1622	13	821.87	930.9	3	39	19 x 2.7025	13.51	36.17
Pee Dee	1758.6	7	890.97	952.9	3	37	7 x 3.3502	10.05	36.25
James	1730.6	13	876.77	988	3	34	19 x 2.7305	13.65	37.34
Athabaska	1949.6	7	987.87	1056.58	3	42	7 x 3.5356	10.61	38.2
Cumberland	1926.9	13	976.39	1099.93	3	42	19 x 2.8778	14.39	39.24
Powder	2153.8	8	1091.09	1180	4	64	19 x 2.4409	12.2	40.69
Santee	2627.3	8	1330.97	1436.64	4	64	19 x 2.6974	13.49	44.75

Weight			Rated Breaking Strength			Resistance		Ampacity (amps)				
Aluminum	Steel	Total	Standard Strength	High Strength	HS-285	DC at 20°c	AC at 75°c	75°c	100°c	150°c	200°c	250°c
kg/km			kg			ohms/km		A				
798.5	293.9	1092.5	7076	7756	8936	0.0949	0.1171	725	889	1121	1294	1441
790.5	363.7	1154.2	8346	9163	10659	0.0957	0.1179	725	890	1122	1295	1442
931.1	341.8	1273	8255	9026	10387	0.0814	0.1006	798	980	1238	1431	1595
929.5	428.6	1358.1	9843	10614	12338	0.0813	0.1004	802	985	1244	1439	1604
1073.1	395.6	1468.7	9525	10433	12020	0.0706	0.0874	872	1072	1356	1569	1750
1066.6	490.6	1556.6	11294	12156	14152	0.0709	0.0877	873	1074	1359	1573	1755
1341.7	262.2	1604.2	7620	8210	9253	0.0573	0.0733	973	1197	1514	1753	1955
1328.3	368.9	1698	9571	10387	11884	0.0578	0.0738	974	1199	1517	1756	1959
1349.6	495.9	1845.3	11975	12837	14878	0.0562	0.0698	1005	1239	1571	1822	2035
1341.7	617.4	1959.9	13925	15014	17509	0.0564	0.07	1008	1243	1576	1828	2042
1635.5	237.5	1873.6	7802	8301	9299	0.047	0.0608	1095	1350	1712	1986	2219
1623.6	321.9	1945	9299	10024	11340	0.0473	0.061	1094	1350	1712	1985	2218
1617.6	596.2	2214.4	9299	15195	17599	0.0469	0.0586	1124	1389	1766	2051	2295
1781.3	258.9	2040.3	9299	9072	10115	0.0432	0.0559	1152	1423	1807	2098	2346
1762	344.4	2105.8	9299	10795	12202	0.0436	0.0564	1150	1420	1804	2094	2342
1733.7	623.8	2357.3	9299	16465	19006	0.0442	0.0568	1154	1425	1810	2101	2350
1922.7	279.2	2201	9299	9752	10886	0.04	0.0521	1206	1491	1896	2203	2466
1906.3	372	2278.4	9299	11657	13154	0.0403	0.0523	1206	1490	1895	2202	2465
1875.1	671.3	2546.2	9299	17735	20457	0.0409	0.0526	1210	1495	1902	2209	2472
2055.2	300.2	2355.8	9299	10478	11703	0.0374	0.0489	1256	1554	1979	2302	2578
2041.8	398.8	2440.6	9299	12292	13925	0.0377	0.0491	1269	1573	2007	2338	2577
2018	646	2738	17418	19051	21954	0.0381	0.0492	1277	1584	2021	2354	2595
2200	320	2519	10478	11158	12474	0.035	0.046	1319	1637	2092	2439	2692
2185	427	2612	12383	13154	14878	0.0352	0.046	1321	1639	2094	2441	2694
2156	772	2929	18688	20412	23541	0.0356	0.0461	1329	1650	2108	2456	2710
2326	454	2780	13200	14016	15830	0.0331	0.0435	1370	1702	2177	2539	2805
2281	854	3136	20412	22362	25809	0.0336	0.0437	1377	1710	2187	2551	2816
2467	482	2950	14016	14878	16828	0.0312	0.0412	1418	1763	2259	2637	2916
2435	871	3305	21047	23042	26535	0.0316	0.0412	1430	1778	2277	2657	2937
2732	537	3269	15558	16556	18733	0.0281	0.037	1505	1873	2403	2808	3157
2707	967	3674	23405	25583	29484	0.0283	0.0373	1508	1875	2400	2802	3148
3040	696	3735	19096	20638	23451	0.0256	0.0337	1599	1996	2569	3009	3391
3709	850	4557	23269	25220	28622	0.021	0.0285	1784	2237	2894	3403	3846

AAC

All Aluminum Conductor

All aluminum 1350 conductor concentric lay -stranded

Complete Conductor:

Bare all-aluminum 1350 conductors (AAC) are concentric-lay-stranded, consisting of one or more layers of wire wrapped helically around a straight round central wire. Each successive layer has six wires more than the layer immediately beneath. Greater flexibility is provided by increasing the number of strands for a specific cross-sectional area. AAC conductors are manufactured in accordance with the requirements of the latest applicable issues of ASTM (specifications B230 and B231 & DIN). The more commonly used standings are 7, 19, 37, 61 and 91 standings are also available

Complete Conductor (cont'd):

Class AA standings are used for bare overhead lines. The direction of lay for the outer layer is right-hand and is normally reversed in successive layers. The temper is full hard drawn (H19).

Features and Benefits:

Optimum economy is provided since the lighter weight means lower unit length costs, easier handling in installation and less-complex fittings. All-aluminum conductors have an inherent high corrosion resistance due to their homogeneous construction.

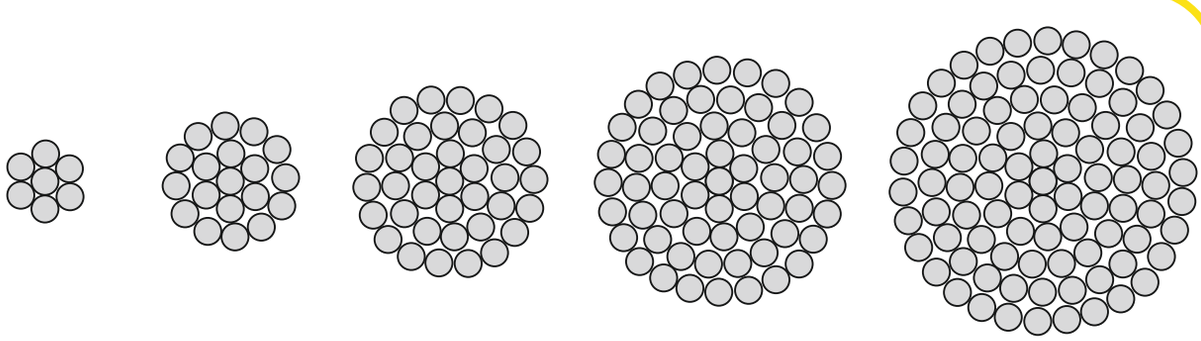
Applications:

Stranded bare all-aluminum 1350 conductors (AAC) are used in overhead line installations where design parameters do not require the higher strength or temperature ratings provided by ACSR, ACSS or other type conductors.

Options:

- Trapezoidal-shaped aluminum strands (/TW)
- High-conductivity aluminum (/HC) (61.8% IACS)

AAC cross section according to the number of layers:



ASTM B 231

Code Name	Total Area		Stranding and wire diameter	Approximate overall diameter	Weight	Nominal breaking load	Maximum resistance at 20° c	Maximum AC Resistance		Current Rating Ambient Temp	
	AWG or MCM	mm^2	mm		kg/km	kgf	Ohm/km	25°c	75°c	25°c	40°c
								Ohm/km		A	
Peachbell	6	13.21	7/1.55	4.7	36	252	2.1828	2.2269	2.667	91	76
Rose	4	21.12	7/1.96	5.9	58	403	1.3651	1.3928	1.668	124	104
Iris	2	33.54	7/2.47	7.4	92	608	0.8596	0.8772	1.05	169	141
Pansy	1	42.49	7/2.78	8.3	117	728	0.6786	0.6925	0.829	197	165
Poppy	1/0	53.52	7/3.12	9.4	148	891	0.5387	0.55	0.659	230	193
Aster	210	67.35	7/3.5	10.5	186	1121	0.4281	0.4373	0.524	268	225
Phlox	310	84.91	7/3.93	11.8	234	1372	0.3395	0.3471	0.416	312	262
Oxl ip	410	107.40	7/4.42	13.3	296	1735	0.2684	0.2748	3290	365	306
Valerian	250	126.36	19/2.91	14.6	348	2098	0.2282	0.2336	2797	409	343
Sneezewort	250	126.67	7/4.80	14.4	349	2046	0.2276	0.2330	2790	408	342
Laurel	266.8	135.20	19/3.01	15.1	373	2180	0.2133	0.2187	2619	427	358
Daisy	266.8	135.25	7/4.96	14.9	373	2185	0.2132	0.2186	2618	425	357
Peony	300	151.85	19/3.19	16.0	419	2449	0.1899	0.1947	2332	461	387
Tulip	336.4	170.48	19/3.38	16.9	470	2749	0.1691	0.1738	2082	498	417
Daffodil	350	177.61	19/3.45	17.2	490	2864	0.1623	0.1669	1998	512	429
Canna	397.5	200.98	19/3.67	18.4	554	3171	0.1435	0.1479	1771	555	465
Goldentuft	450	228.13	19/3.91	19.6	629	3455	0.1264	0.1308	1567	602	505
Syringa	477	241.03	37/2.88	20.2	665	3915	0.1196	0.1238	1483	626	525
Cosmos	477	241.15	19/4.02	20.1	665	3774	0.1196	0.1238	1482	625	524
Hyacinth	500	252.88	37/2.95	20.7	697	4107	0.1140	0.1180	1413	646	542
Zinnia	500	253.29	19/4.12	20.6	698	3964	0.1138	0.1178	1411	646	542
Dahlia	556.5	282.36	19/4.35	21.7	778	4419	0.1021	0.1062	1272	693	581
Mistletoe	556.5	281.06	37/3.11	21.8	775	4435	0.1026	0.1067	1278	692	580
Meado wsweet	600	303.17	37/3.23	22.6	836	4783	0.0951	0.0995	1192	725	608
Orchid	636	322.23	37/3.33	23.3	888	5084	0.0895	0.0936	1121	755	633
Heuchera	650	330.02	37/3.37	23.6	910	5207	0.0874	0.0914	1095	768	644
Flag	700	354.44	61/2.72	24.5	977	5856	0.0813	0.0857	1027	802	673
Verbena	700	353.94	37/3.49	24.5	976	5585	0.0815	0.0859	1028	801	672
Nasturtium	715.5	362.30	61/2.75	24.8	999	5986	0.0796	0.0839	1004	814	683
Violet	715.5	362.10	37/3.53	24.7	998	5713	0.0796	0.0839	1005	814	682
Cattail	750	380.98	61/2.82	25.3	1050	6120	0.0757	0.0798	0.096	842	706
Petunia	750	380.8	37/3.62	25.3	1050	6008	0.0757	0.0798	0.096	841	705
Lilac	795	402.91	61/2.90	26.1	1111	6472	0.0716	0.0761	0.091	870	730
Arbutus	795	402.13	37/3.72	26.1	1109	6345	0.0717	0.0762	0.091	869	729
Snapdragon	900	457.43	61/3.09	27.8	1261	7138	0.063	0.0677	0.081	934	790
Cockscomb.	900	455.69	37/3.96	27.7	1256	6978	0.0633	0.0679	0.081	940	788
Goldenrod	954	484.46	61/3.18	28.6	1336	7560	0.0595	0.0639	0.077	980	821
Magnolia	954	484.46	37/4.08	28.6	1336	7560	0.0595	0.0639	0.077	980	821
Camellia	1000	506.03	61/3.25	29.3	1395	7896	0.057	0.0619	0.074	1003	841
Hawkweed	1000	507.73	37/4.18	29.2	1400	7775	0.0568	0.0617	0.074	1005	842

ASTM B 231

Code Name	Total Area	Nominal Aluminum Area	Stranding and wire diameter	Approximate overall diameter	Weight	Rated Strength	Nominal de resistance at 20°c	Maximum AC resistance		Current Rating Ambient Temp	
								25°c	75°c	25°c	40°c
	mm²		mm		kg/km	kgf	Ohm/km			A	
Midge	23.33	22	7/2.06	6.2	64	433	1.2273	1.2521	1.4995	133	111
Aphis	26.44		3/3.35	7.2	72	445	1.0829	1.1048	1.323	166	139
Gnat	26.85		7/2.21	6.6	74	449	1.0663	1.8794	1.3028	146	122
Weevil	31.56		3/3.66	7.9	86	522	0.9072	0.9257	1.1086	187	157
Mosquito	36.88		7/2.59	7.8	101	649	0.7764	0.7923	0.9488	180	151
Ladybird	42.79		7/2.79	8.4	117	748	0.6691	0.6828	0.8176	199	161
Ant	52.83	50	7/3.10	9.3	145	889	0.5419	0.5532	0.6625	229	192
Fly	63.55	60	7/3.4	10.2	174	1075	0.4505	0.4602	0.551	259	217
Bluebottle	73.64		713.66	11	202	1220	0.3888	0.3971	0.4755	285	239
Earwig	78.55		7/3.78	11.4	215	1297	0.3645	0.3723	0.4458	298	250
Grasshopper	84.05		7/3.91	11.7	230	1361	0.3407	0.3483	0.417	311	261
Clegg	95.6		7/4.17	12.5	262	1551	0.2995	0.3062	0.3667	339	284
Wasp	105.95	100	7/4.39	13.2	290	1719	0.2702	0.2766	0.3313	363	304
Beetle	106.38		19/2.67	13.4	293	1810	0.2705	0.2769	0.3316	365	306
Bee	132		7/4.9	14.7	361	2136	0.2169	0.2224	0.2664	420	352
Cricket	159.72		7/5.36	16.1	437	2504	0.1793	0.1843	0.2207	476	399
Hornet	157.61	150	19/3.25	16.3	434	2576	0.1826	0.1876	0.2247	473	396
Caterpillar	185.94		19/3.53	17.7	512	3039	0.1548	0.1591	0.1905	528	443
Chafer	213.21	200	19/3.78	18.9	587	3416	0.1349	0.1391	0.1666	578	484
Spider	237.56		19/3.99	20	654	3719	0.1211	0.1417	0.1697	583	489
Cockroach	265.74	250	19/4.22	21.1	731	4168	0.1083	0.1126	0.1349	666	558
Butterfly	322.65	300	19/4.65	23.3	888	5080	0.0892	0.0933	0.0112	756	634
Moth	373.05		19/5.00	25	1027	5851	0.0771	0.0813	0.0974	830	696
Drone	372.43		37/3.58	25.1	1027	5851	0.0774	0.0816	0.0977	829	760
Locust	428.71		19/5.36	26.8	1180	6577	0.0671	0.0714	0.0854	907	744
Centipede	415.2	400	37/3.78	26.5	1145	6486	0.0694	0.0738	0.0884	888	823
Maybug	486.1		37/4.09	28.6	1340	7484	0.0591	0.0637	0.0763	982	867
Scorpion	529.83		37/4.27	29.9	1461	8819	0.0544	0.0591	0.0708	1034	958
Cicada	628.33		37/5.65	32.6	1732	9661	0.0459	0.0512	0.0613	1143	862
Tarantula	794.84		37/5.23	36.6	2191	12202	0.0363	0.0426	0.0511	1303	858
Larkspur	1033.5	524.88	61/3.31	29.8	1447	8191	0.0549	0.06	0.07	1028	862
Bluebell	1033.5	524.41	37/4.24	29.7	1440	8000	0.0552	0.06	0.72	1024	858
Marigold	1113	563.63	61/3.43	30.9	1554	8795	0.0512	0.056	0.07	1071	898
Hawthorn	1192.5	603.76	61/3.55	32	1665	9422	0.0478	0.053	0.06	1113	933
Narcissus	1272	645.27	61/3.67	33	1779	10069	0.0447	10.05	10.1	1164	976
Columbine	1351.5	684.53	61/3.78	34	1887	10368	0.04	0.048	0.06	1201	1007
Carnation	1431	724.95	61/3.89	35	1999	10980	0.0398	0.045	0.05	1248	1046
Gladiolus	1510.5	766.53	61/4.00	36	2113	11610	0.0376	0.043	0.05	1284	1076
Coreopsis	1590	805.33	61/4.10	37	2220	12197	0.0358	0.042	0.05	1315	1102
Jessamine	1750	885.82	61/4.30	38	2442	13416	0.0326	0.039	0.05	1388	1163
Cowslip	2000	1010.4	91/3.76	41.4	2786	15133	0.0285	0.036	0.04	1483	1242
Sagebrush	2250	1137.8	91/3.99	43.9	3137	17041	0.0253	0.033	0.04	1587	1329
Lupine	2500	1266.73	91/4.21	46.3	3492	18972	0.0228	0.031	0.04	1664	1394
Bitterroot	2750	1389.94	91/4.41	48.6	3832	20818	0.0207	0.029	0.03	1749	1464
Trillium	3000	1517.09	127/3.90	50.7	4183	23411	0.019	0.028	0.03	1809	1514
Bluebonnet	3500	1776.26 I	127/4.22	54.8	4897	26604	0.02	0.025	0.03	1961	1640

Germany Sizes (DIN 48201)

No	Area		Stranding and wire diameter	Overall Diameter	Weight	Nominal Breaking load	Maximum de resistance at 20°c	Maximum AC resistance		Current Rating Ambient Temp
	Nominal	Actual	mm		kg/km	kgf	Ohm/km	25°c	75°c	25°c A
1	16	15.89	7/1.7	5.1	43	289	1.8021	1.84	2.2	103
2	25	24.25	7/2.1	6.3	66	432	1.1809	1.2	1.44	137
3	35	34.36	7/2.5	7.5	94	589	0.8333	0.85	1.02	172
4	50	49.48	7/3.0	9	135	810	0.5787	0.59	0.71	219
5	50	48.36	19/1.8	9	133	881	0.5951	0.61	0.73	216
6	70	65.82	19/2.10	10.5	181	1173	0.4372	0.45	0.53	265
7	95	93.27	19/2.50	12.5	256	1599	0.3085	0.32	0.38	334
8	120	117	19/2.80	14	322	1961	0.2459	0.25	0.3	388
9	150	147.1	37/2.25	15.7	405	2580	0.196	0.2	0.24	452
10	185	181.6	37/2.5	17.5	500	3115	0.1587	0.16	0.19	520
11	240	242.53	61/2.25	20.2	670	4030	0.1192	0.12	0.15	628
12	300	299.42	61/2.50	22.5	827	4865	0.0966	0.1	0.12	721
13	400	400.13	61/2.89	26	1105	6207	0.0723	0.08	0.09	865
14	500	499.82	61/3.23	29.1	1381	7616	0.0579	0.06	0.08	993
15	625	626.28	91/2.96	32.6	1733	9714	0.0463	0.05	0.06	1138
16	800	802.06	91/3.35	36.8	2226	12222	0.0362	0.04	0.05	1307

British Sizes

Code Name	Nominal Aluminum Area	Stranding & wire Dia	Overal Diameter	Total Area	Weight	Rated Strenght	Maximum AC Resistance
	mm2	mm		mm2	kg/km	kN	ohm/km
Midge	22	7/2.06	6.2	23.3	64	3.99	1.227
Aphis	25	3.3.35	7.2	26.4	73	4.12	1.081
Gnat	25	7/2.21	6.6	26.8	73	4.59	1.0662
Weevil	30	3/3.66	7.9	31.6	86	4.86	0.9082
Mosquito	35	7/2.59	7.8	36.9	101	6.03	0.7763
Ladybird	40	7/2.79	8.4	42.8	117	6.99	0.6687
Ant	50	7/3.10	9.3	52.8	145	8.28	0.5419
Fly	60	7/3.40	10.2	63.6	174	9.90	0.4505
Bluebottle	70	7/3.66	11.0	73.7	202	11.33	0.3887
Earwig	75	7/3.78	11.4	78.5	215	11.94	0.3645
Grasshopper	80	7/3.91	11.7	84.1	230	12.78	0.3405
Clegg	90	7/4.17	12.5	95.6	262	14.53	0.2994
Wasp	100	7/4.39	13.2	106	290	16.00	0.2700
Beetle	100	19/2.67	13.4	106.4	293	17.38	0.2703
Bee	125	7/4.90	14.7	132.0	361	19.94	0.2167
Cricket	150	7/5.36	16.1	157.9	432	23.8	0.1812
Hornet	150	19/3.25	16.3	157.6	434	25.7	0.1825
Caterpillar	175	19/3.53	17.7	186.0	512	28.62	0.1547
Chafer	200	19/378	18.9	213.0	587	32.4	0.1349
Spider	225	19/399	20.0	237.0	652	36.11	0.1211
Cockroach	250	19/4.22	21.1	265.7	731	40.4	0.10830
Butterfly	300	19/4.65	23.3	322.7	888	48.75	0.08912
Moth	350	19/5.00	25.0	373.2	1027	56.35	0.77090
Drone	350	19/3.58	25.1	372.5	1029	57.32	0.07738
Locust	400	19/5.36	26.8	428.5	1179	64.76	0.06710
Centipede	400	37/3.78	26.5	415.2	1145	63.1	0.06944
Maybug	450	37/4.09	28.6	486	1340	73.89	0.05929
Scorpion	500	37/4.27	29.9	530	1460	80.03	0.05442
Cicada	600	37/4.65	32.6	628.6	1733	94.91	0.04587
Tarantula	750	37/5.23	36.6	794.8	2191	120.07	0.03628

AAAC

All Aluminum Alloy Conductor

Complete Conductor:

AAAC is a high-strength aluminum alloy, concentric- lay-stranded conductor. It is similar in construction and appearance to the AAC (all-aluminum conductor).

The AAAC conductor is manufactured in accordance with the requirements of the latest issue of ASTM B399. The AAAC conductor is manufactured from a heat-treated, magnesium-silicide high-strength 6201 T81 aluminum alloy.

The aluminum strands consist of a concentric- stranded cable of 7,19,37 or more wires. The sizes and standings listed are common examples used in overhead lines. Metric (mm) sizes are also available.

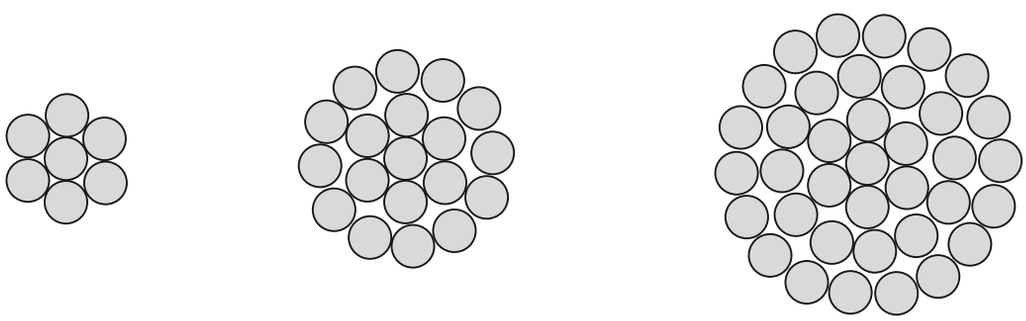
Features and Benefits:

- Aluminum alloy conductors have a number of advantages over the use of the ACSR or all- aluminum conductors.
- Lower power losses than for equivalent single- aluminum-layer ACSR conductors. (The inductive effect of the steel core in the ACSR is eliminated).
- Simpler fittings than those required for ACSR.
- Excellent corrosion resistance in environments conducive to galvanic corrosion in ACSR.
- Strength and sag approximately the same as for equivalent 6/1 and 26/7 ACSR conductors.
- Outside diameters are the same as for standard ACSR conductors, permitting interchangeability of fittings.
- Greater resistance to abrasion than that for 1350 wires in all-aluminum or ACSR conductors.

Applications:

AAAC aluminum alloy conductors are extensively used for overhead distribution and transmission lines adjacent to ocean coastlines where there can be a problem of corrosion in the steel of an ACSR construction.

AAAC cross section according to the number of layers:



ASTM B399

Total Area		Stranding & Wire Diameter	Overall diameter	Weight	Nominal Breaking Load	Maximum AC Resistance			Current Rating Ambient Temp	
						resistance at 20°c	25°c	75°c	25°c	40°c
AWG or MCM	mm^2	No./mm		kg/km	kgf	Ohm/km			A	
6	13.3	7/1.55	4.65	36	427	2.5361	2.59	3.098	84	71
4	21.1	7/1.96	5.88	58	682	1.5861	1.618	9379	115	96
2	33.5	7/2.47	7.41	92	1084	0.9987	1.019	2204	157	131
0	53.2	7/3.1 2	9.33	146	1718	0.6300	0.643	7701	213	178
2/0	67.4	7/3.50	10.5	185	2077	0.4974	0.507	6080	249	208
3/0	84.9	7/3.93	11,79	233	2619	0.3945	0.402	4825	290	243
4/0	107	7/4.42	13.23	293	3298	0.3133	0.320	3836	338	283
250	126	19/2.91	14.55	347	3955	0.2651	0.271	3249	379	318
300	152	19/3.19	15.95	417	4753	0.2206	0.226	2709	428	359
350	177	19/3.45	17.2	485	5276	0.1897	0.194	2329	473	397
400	202	19/3.69	18.4	554	6038	0.1658	0.170	2040	517	434
450	227	19/3.91	19.5	623	6781	0.1476	0.152	1822	558	468
500	253	19/4.1 2	20.6	695	7568	0.1322	0.136	1633	601	503
550	277	37/3.10	21.63	761	8498	0.1207	0.125	1497	638	535
600	303	3713.23	22.61	832	9286	0.1105	0.114	1376	675	566
650	328	3713.36	23.52	900	9591	0.1021	0.106	1272	711	596
700	354	37/3.49	24.43	971	10348	0.0946	0.099	1186	746	626
750	379	37/3.61	25.27	1039	11072	0.0885	0.092	1109	781	654
800	404	37/3.73	26.11	1109	11820	0.0829	0.087	1046	813	681
900	456	37/3.96	27.72	1250	13323	0.0735	0.078	936	876	735
1000	505	37/4.17	29.19	1386	14773	0.07	10.1	10.08	939	787

1) Based on conductor temp.75°c ,0.6 m/s crosswind ,0.5 coefficient of emissivity , intensity of solar radiation 1033 w/m^2 ,height of sea level 1500 m.

German Sizes (DIN 4821)

Area Stranding & wire			Overall diameter	Weight	Nominal Breaking Load	Maximum Resistance at 20°c	Maximum AC Resistance		Current Rating Ambient Temp.	
Nominal	Actual						25°c	75°c	25°c	40°c
mm²		mm		kg/km	kgf	Ohm/km			A	
16	15.89	7/1.7	5.1	43	453	2 .09127	2.1335	2.555	96	80
25	24.24	7/2.1	6.3	66	691	1.3705	1.3983	1.675	127	106
35	34.36	7/2.5	7.5	94	979	0.967	0.9872	1.182	160	134
50	49.48	7/3.0	9	135	1409	0.6715	0.6855	0.821	203	170
50	48.35	19/1.8	133	1377	0.6906	0.7050	0.7050	0.844	201	168
70	65.81	19/2.1	181	1875	0.5074	0.5180	0.5180	0.620	246	206
95	93.26	19/2.5	256	2657	0.3580	0.3660	0.3660	0.438	310	260
120	116.99	19/2.8	322	3333	0.3580	0.2918	0.2918	0.349	361	303
150	147.11	37/2.25	406	4191	0.2274	0.2328	0.2328	0.278	420	352
185	181.62	37/2.5	501	5174	0.1842	0.1889	0.1889	0.226	483	405
240	242.53	61/2.25	670	6909	0.1384	0.14	0.140	0.170	584	489
300	299.42	61/2.50	827	8530	0.1121	0.1160	0.1160	0.139	671	562
400	400.13	61/2.89	1105	11398	0.0839	0.0884	0.0884	0.105	807	676
500	499.82	61/3.23	1381	14238	0.0671	0.0714	0.0714	0.085	932	781
625	626.28	91/2.96	1733	17838	0.0537	0.0583	0.0583	0.069	1071	898
800	802.06	91/3.35	2220	22848	0.0419	0.0475	0.0475	0.56	1237	1036
1000	999.68	91/3.74	2767	28477	0.0337	0.0404	0.0404	0.48	1393	1166

French Sizes (NF C34-125)

DESIGNATION	Area	Stranding and wire diameter		Overall diameter	Nominal breaking load	Maximum de resistance at 20°c	Standard weight
	mm²	No.	mm	mm	daN	Ohm/km	kg/km
ASTER 22	21.99	7	2 .00	6	710	1.5	60.2
ASTER 34-4	34.36	7	2 .50	7.5	1105	0.958	94
ASTER 54-6	54.55	7	3.15	9.45	1755	0.603	149
ASTER 75-5	75.54	19	2.25	11.25	2430	0.438	208
ASTER 93-3	93.27	19	2.50	12.50	3000	0.354	257
ASTER 117	116.98	19	2.80	14	3765	0.283	322
ASTER 148	148.01	19	3.15	15.75	4765	0.224	407
ASTER 181-6	181.62	37	2.50	17.5	5845	0.183	500
ASTER 228	227.83	37	2.80	19.6	7340	0.146	627
ASTER 288	288.34	37	3.15	22.05	9280	0.115	794
ASTER 366	366.22	37	3.55	24.85	11785	0.0905	1009
ASTER 570	570.22	61	3.45	31.05	18360	0 .0583	1574
ASTER 851	850.69	91	3.45	37.95	27390	0.0391	2354
ASTER 1144	1143.54	91	4.0	44	36260	0.0292	3164
ASTER 1600	1595.93	127	4.0	52	50640	0.0209	4425

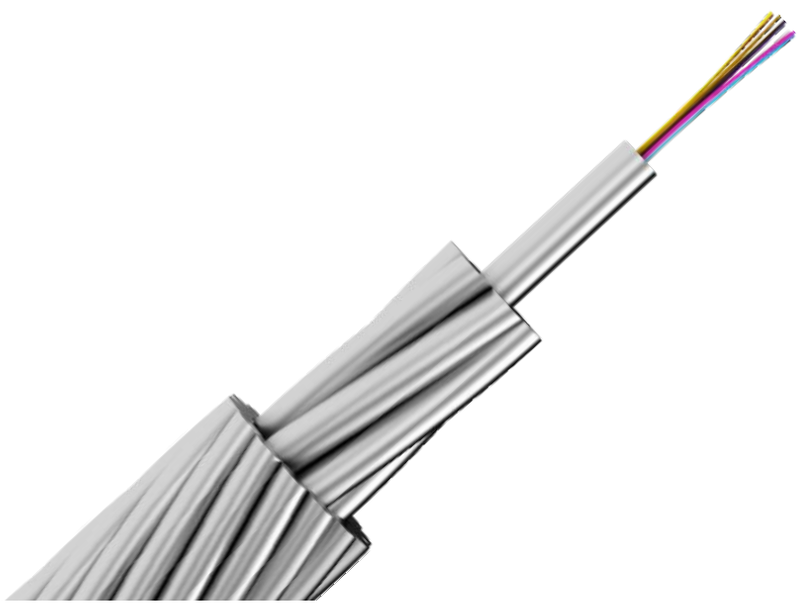
British Sizes BS3242

Code Name	Nominal Aluminium Area	Stranding and wire diameter	Overall diameter	Total Area
	mm2	mm		mm^2
-	10	7/1.47	4.41	11.88
Box	15	7/1.85	5.55	18.82
Acacia	20	7/2.08	6.24	23.78
Almond	25	7/2.34	7.02	30.1
Cedar	30	7/2.54	7.62	35.47
-	35	7/2.77	8.31	42.18
Fir	40	7/2.95	8.85	47.84
Hazel	50	7/3.30	9.90	59.87
Pine	60	7/3.61	10.83	71.65
-	70	7/3.91	11.73	84.05
Willow	75	7/4.04	12.12	89.73
-	80	7/4.19	12.57	96.52
-	90	7/4.45	13.35	108.87
Oak	100	7/4.65	13.95	118.87
-	100	19/2.82	14.1	118.67
Mulberry	125	19/3.18	519	150.90
Ash	150	19/3.45	17.4	180.71
Elm	175	19/3.76	18.8	210.96
Poplar	200	37/2.87	20.09	239.36
-	225	37/3.05	21.35	270.32
Sycamore	250	37/3.23	22.61	303.17
Upas	300	37/3.53	24.71	362.10
-	350	37/3.81	26.67	421.82
Yew	400	37/4.06	28.42	478.99

Weight	Nominal breaking load	Maximum de Resistance at 20°c	Maximum AC Resistance		Current Rating Ambient Temp.	
			25°c	75°c	25°c	40°c
kg/km	kgf	Ohm/km	Ohm/km		A	
32	340	2.7969	2.8534	3.4169	79	66
51	538	1.7659	1.8016	2.1574	107	90
65	680	1.397	1.4253	1.7068	125	105
82	860	1.1038	1.1262	1.3486	146	12
97	1014	0.9368	0.9560	1448	163	137
115	1206	0.7877	0.8038	9626	183	153
131	1368	0.6945	0.7087	8487	199	167
164	1711	0.5550	0.5666	6785	231	193
196	2048	0.4638	0.4737	5672	260	218
230	2402	0.3953	0.4038	4835	289	242
245	2565	0.3703	0.3782	4529	302	253
264	2759	0.3443	0.3519	4215	317	266
298	3112	0.3052	0.3120	0.3736	343	288
325	3398	0.2795	0.2861	3426	364	305
326	3392	0.2814	0.2880	0.3449	364	305
415	4313	0.2213	0.2269	2717	427	358
497	5165	0.1848	0.1895	2269	481	404
580	6030	0.1583	0.1627	1948	533	447
659	6842	0.1398	0.1441	1726	579	486
744	7727	0.1238	0.1281	1534	627	526
835	8666	0.1104	0.0966	1393	671	562
997	10350	0.0924	0.0966	1157	758	636
1162	12057	0.0793	0.0836	1001	836	701
1319	13691	0.0699	0.0743	889	907	760

OPGW

Optical Ground Wire



Features & Benefits

- Our high quality standards for designing, testing and manufacturing with the highest grade materials available to ensure long-term reliability.
- Maximum fiber counts up to 72 fibers with minimized cable diameter due to variable designs.
- Superior optical performance over a broad temperature range from -40°C to +85°C.
- Engineering support, supervising and providing its own line of accessory hardware.
- Excellent tensile performance under cable elongation and contraction due to extreme tension and variation of temperature.
- Moisture-proof jelly filled core for superior protection to the optical fibers due to hydrogen generation in metal structure.
- Continuous and seamless tube for superior protection to the optical fibers from moisture and extreme environmental conditions such as lateral force.

Applicable Standards

- **Optical Fiber**
  - ITU-T G.650 / ITU-T G.652
  - ITU-T G.653 / ITU-T G.655
  - IEC 60793
- **Aluminum-Clad Steel Wire**
  - IEC 61232 / ASTM B 415
- **Aluminum Alloy Wire**
  - IEC 60104 / ASTM B 398
- **Complete OPGW**
  - IEC 61089 / IEC 60794
  - IEC 60794-4
  - ASTM B 416 / IEEE 1138

Steel Tube Specification

Item	Unit	Description
Material		Stainless Steel Tape
Inner Diameter	mm	(2.6,3.1,3.6)± 0.05
Outer Diameter	mm	(3,3.5,4.1)± 0.05
Filling Component		Water Repellent, Thixotropic
Fiber Number		24
Fiber Types		G655
Elongation	%	Min. 2.0
Fiber Excess Length	%	0.5 - 0.7

Fiber Specification (before Tubing)

Optical Specifications:

Maximum Attenuation

Wavelenght (nm)	Maximum Value (dB/km)
1383 ± 3*	≤ 0.34
1410	≤ 0.28
1450	≤ 0.24
1550	
1625	

* Attenuation values at this wavelength represent post hydrogen aging performance

Attenuation & Wavelength

Range (nm)	Ref.λ (nm)	Max.α Difference (dB/km)
1525 - 1575	1550	0.02
1625	1550	0.03

The attenuation in a given wavelength range does not exceed the attenuation of the reference wavelength(λ) by more the value α.

Macrobend Loss

Mandrel Diameter (mm)	Number of Turns	Wavelenght (nm)	Induced Attenuation*
32	1	1550&1625	≤ 0.50
60	100	1550&1625	≤ 0.05

* The induced attenuation due to fiber wrapped around a mandel of a specified diameter

Point Discontinuity

Wavelenght (nm)	Point Discontinuity (dB)
1550	≤ 0.05

Mode-Field Diameter

Wavelenght (nm)	MFD (μm)
1550	9.6 ± 0.4

Dispersion

Wavelenght (nm)	Dispersion Value [ps/(nm.km)]
1530	2.0 - 5.5
1565	4.5 - 6.0
1625	5.8 - 11.2

Polarization Mode Dispersion (PMD)

Wavelenght (nm)	Dispersion Value [ps/(nm.km)]
PMD Link Design Value	≤ 0.04*
Max Individual Fiber PMD	≤ 0.1

* Complies with IEC 60794-3: 2001, Sec 5.5, Method 1, (m = 20, Q = 0.01%), September 2001

The PMD link design value is a term used to describe the PMD of concatenated length of fiber. This value represents a statistical upper limit for total link PMD. Individual PMD values may change when cabled. Coming's fiber specification supports emerging network design requirements for high-data rate systems operating at 10Gb/s rates and higher.

Standards Compliance

- ITU-T G 655 (Table A,B,C,D)
- IEC Specifications 60793-2-50 Type B4
- TIA/EIA 492-EA00
- Telcordia's GR-20

Dimensional Specification:

Glass Geometry

Wavelenght (nm)	Maximum Value (dB/km)
Fiber Curl	≥ 4.0 m radius of curvature
Cladding Diameter	125.0 ± 0.7 µm
Core-Clad Concentricity	≤ 0.5 µm
Clad Non-Circularity	≤ 0.5 %

Coating Geometry

Coating Diameter	242 ± 5 µm
Coating Cladding Concentricity	<12 µm

Environmental Specification:

Environmental Test	Test Condition	Induced Attenuation 1150nm & 1625nm (dB/km)
Temperature Dependence	-60˚C to +85˚C *	≤ 0.05
Temperature Humidity Cycling	-10˚C to +85˚C up to 98% RH	≤ 0.05
Water Immersion	23˚±2˚ C	≤ 0.05
Heat Aging	85˚±2˚ C *	≤ 0.05
Damp Heat	85 ˚C at 85% RH	≤ 0.05

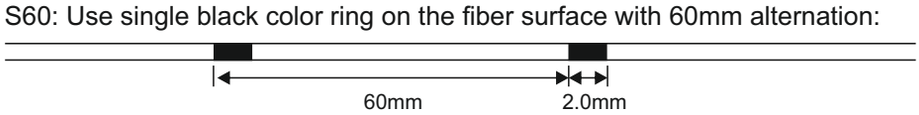
Color Identification of Fiber in the Stainless Steel Tube Unit

Without Color Ring		With S60 Color Ring		With D80 Color Ring		With S90 Color Ring	
Fiber No.	**Color**	**Fiber No.**	**Color**	**Fiber No.**	**Color**	**Fiber No.**	**Color**
1	Red	**13**	Red	**25**	Red	**37**	Red
2	Green	**14**	Green	**26**	Green	**38**	Green
3	Blue	**15**	Blue	**27**	Blue	**39**	Blue
4	Yellow	**16**	Yellow	**28**	Yellow	**40**	Yellow
5	Gray	**17**	Gray	**29**	Gray	**41**	Gray
6	Brown	**18**	Brown	**30**	Brown	**42**	Brown
7	Violet	**19**	Violet	**31**	Violet	**43**	Violet
8	Aqua	**20**	Aqua	**32**	Aqua	**44**	Aqua
9	Black	***21**	Black (White)	***33**	Black (White)	***45**	Black (White)
10	Orange	**22**	Orange	**34**	Orange	**46**	Orange
11	White	**23**	White	**35**	White	**47**	White
12	Pink	**24**	Pink	**36**	Pink	**48**	Pink

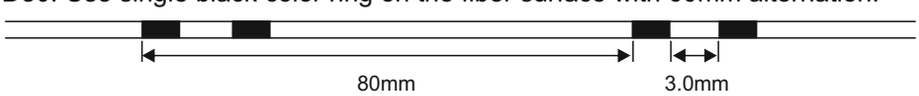
* **Remark:** The black color with color ring is changed to white color

Color Ring Method:

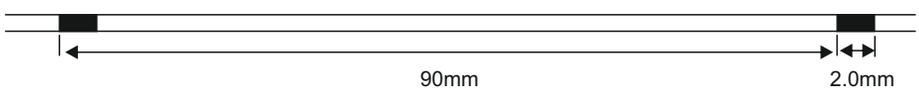
S60: Use single black color ring on the fiber surface with 60mm alternation:



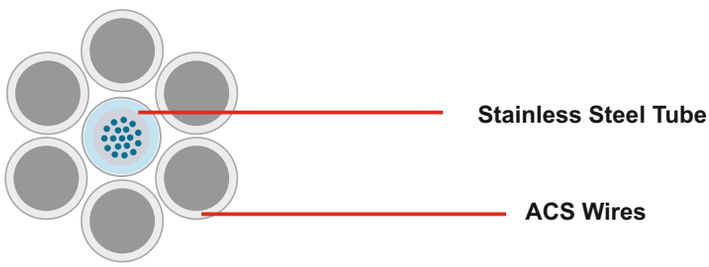
D80: Use single black color ring on the fiber surface with 60mm alternation:



S90: Use single black color ring on the fiber surface with 60mm alternation:

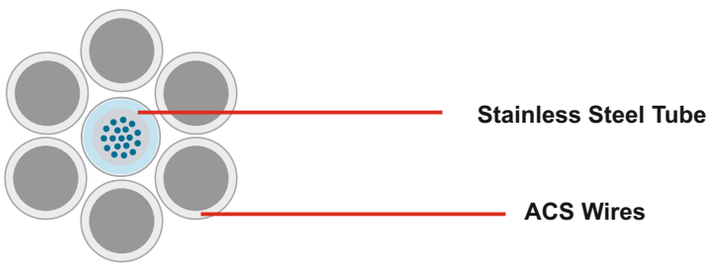


OPGW Datasheet 10.5



OPGW	ACS / 57.7	24/48 SM/NZDSF		10.5	
Item	**Technical Data**	**Number**	**Material**	**Value**	**Unit**
01	**Tube**	1	SSLT	3.5	[mm]
02	**Total number of fibers**	24			
03	**Central tube**	1	SSLT	3.5	[mm]
04	**First layer roundwire**	6	ACS	3.5	[mm]
06	**Cable diameter**			10.50	[mm]
07	**Supporting Cross-section**			57.7	[mm²]
07/1	**Cross-section ACS**			57.7	[mm²]
08	**Cable weight**			406.8	[kg/km]
08/1	**weight of ACS wires**			381.9	[kg/km]
08/2	**weight of S.S TUBE**			23.7	[kg/km]
08/3	**weight of Grease**			1.2	[kg/km]
9	**Calculated breaking load**			68.6	[KN]
10	**Modulus of elasticity**			159.0	[kN/mm²]
11	**Coefficient of thermal expansion ..x10-6**			13.0	[1/K]
12	**Maximum tensile stress**			546.6	[N/mm²] at 46% UTS
13	**Everyday stress**			190.1	[N/mm²] at 16% UTS
14	**Permanent tensile stress**			855.4	[N/mm²] at 72% UTS
15	**D.C. Resistance at 20 °C**			1.493	[Ohm/km]
16	**Conductive cross-section**			14.4	[mm²]
17	**Calculated IEC60857 Short Circuit current from 20 to 180 °C**		- at (0.5) s	5.5	[kA]
18	**Calculated IEC60857 Short Circuit current from 20 to 200 °C**		- at (0.5) s	6.6	[kA]

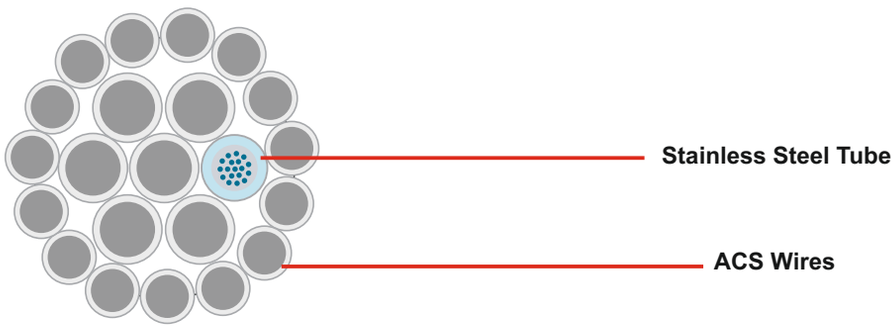
OPGW Datasheet 12



OPGW	ACS / 75.4	24/48 SM/NZDSF	12

Item	Technical Data	Number	Material	Value	Unit	
1	Tube	1	SSLT	4	[mm]	
2	Total number of fibers	24				
3	Central tube	1	SSLT	4.0	[mm]	
4	First layer roundwire	6	ACS	4.0	[mm]	
5	Second layer	0				
6	Cable diameter			12.00	[mm]	
7	Supporting Cross-section			75.4	[mm²]	
7/1	Cross-section ACS			75.4	[mm²]	
8	Cable weight			530.1	[kg/km]	
8/1	weight of ACS wires			499.7	[kg/km]	
8/2	weight of S.S TUBE			28.8	[kg/km]	
8/3	weight of Grease			1.6	[kg/km]	
9	Calculated breaking load			89.6	[KN]	
10	Modulus of elasticity			159.0	[kN/mm²]	
11	Coefficient of thermal expansion ..x10-6			13.0	]1/K]	
12	Maximum tensile stress			546.6	[N/mm²]	at 46% UTS
13	Everyday stress			190.1	[N/mm²]	at 16% UTS
14	Permanent tensile stress			855.0	[N/mm²]	at 72% UTS
15	D.C. Resistance at 20 °C			1.143	[Ohm/km]	
16	Conductive cross-section			18.8	[mm²]	
17	Calculated IEC60857 Short Circuit current from 20 to 180 °C			7.5	[kA]	
18	Calculated IEC60857 Short Circuit current from 20 to 200 °C			7.87	[kA]	

OPGW Datasheet 13.5



OPGW	ACS / 102.1	24 SM/NZDSF			13.5
Item	**Technical Data**	**Number**	**Material**	**Value**	**Unit**
1	Tube	1	SSLT	3.0	[mm]
2	Total number of fibers	24			No
3	Central tube	1	Steel tube	3.0	[mm]
4	First layer roundwire	5	ACS	3.0	[mm]
		1	SSLT	3.0	[mm]
5	Second layer roundwire	15	ACS	2.25	[mm]
6	Cable diameter			13.50	[mm]
7	Supporting Cross-section			102.1	[mm²]
7/1	Cross-section ACS			102.1	[mm²]
8	Cable weight			701.4	[kg/km]
8/1	weight of ACS wires			681.5	[kg/km]
8/2	weight of S.S TUBE			19.0	[kg/km]
8/3	weight of Grease			0.9	[kg/km]
9	Calculated breaking load			123.1	[KN]
10	Modulus of elasticity			159.0	[kN/mm²]
11	Coefficient of thermal expansion			13.0	[1/K]
12	Maximum tensile stress			506.5	[N/mm²]
13	Everyday stress			193.0	[N/mm²]
14	Permanent tensile stress			868.3	[N/mm²]
15	D.C. Resistance at 20 °C			0.731	[Ohm/km]
16	Conductive cross-section			25.5	[mm²]
17	Calculated IEC60857 Short Circuit current from 20 to 180 °C		- at (0.5) s	10.5	[kA]
18	Calculated IEC60857 Short Circuit current from 20 to 200 °C		- at (0.5) s	11	[kA]

General Installation

Complete Fiber Optic Solution

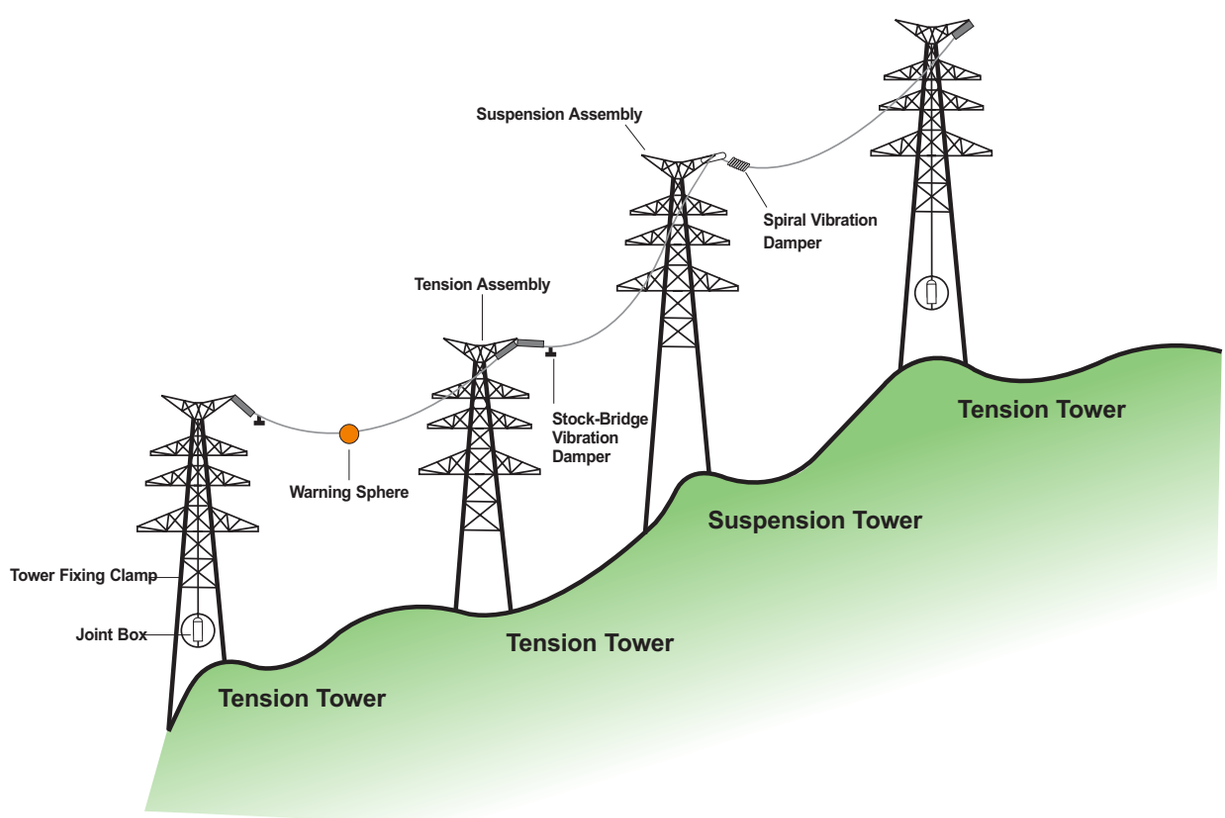
We supply a complete fiber optic solution. Sim Noor Yazdan Cable is ready to provide whatever assistance you require to install and integrate fiber technology into your aerial cable system.

Engineering & Installation Service

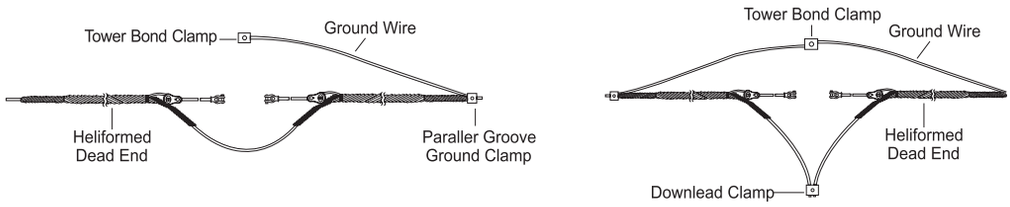
- Pre-Installation Planning
- Complete Turn-Key Installation
- Training / Commissioning
- Sag and Tension Calculations

Hardware & Accessories

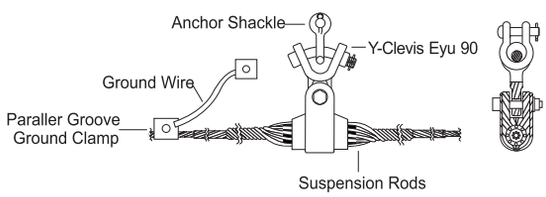
All Hardware & Accessories necessary for installation.



Tension Assembly Set

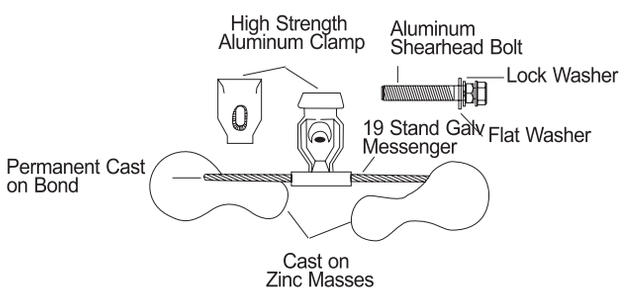


Suspension Assembly Set

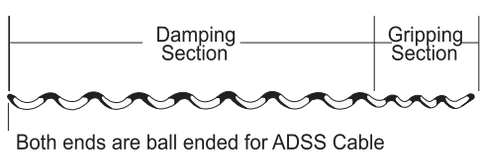


Vibration Damper

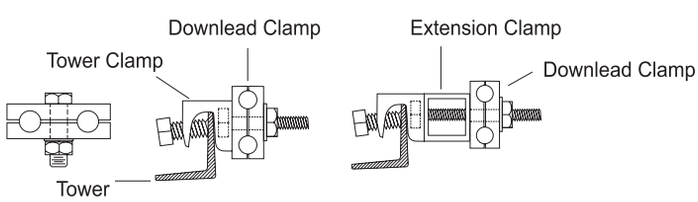
- Stock-Bridge Type



- Spiral Type



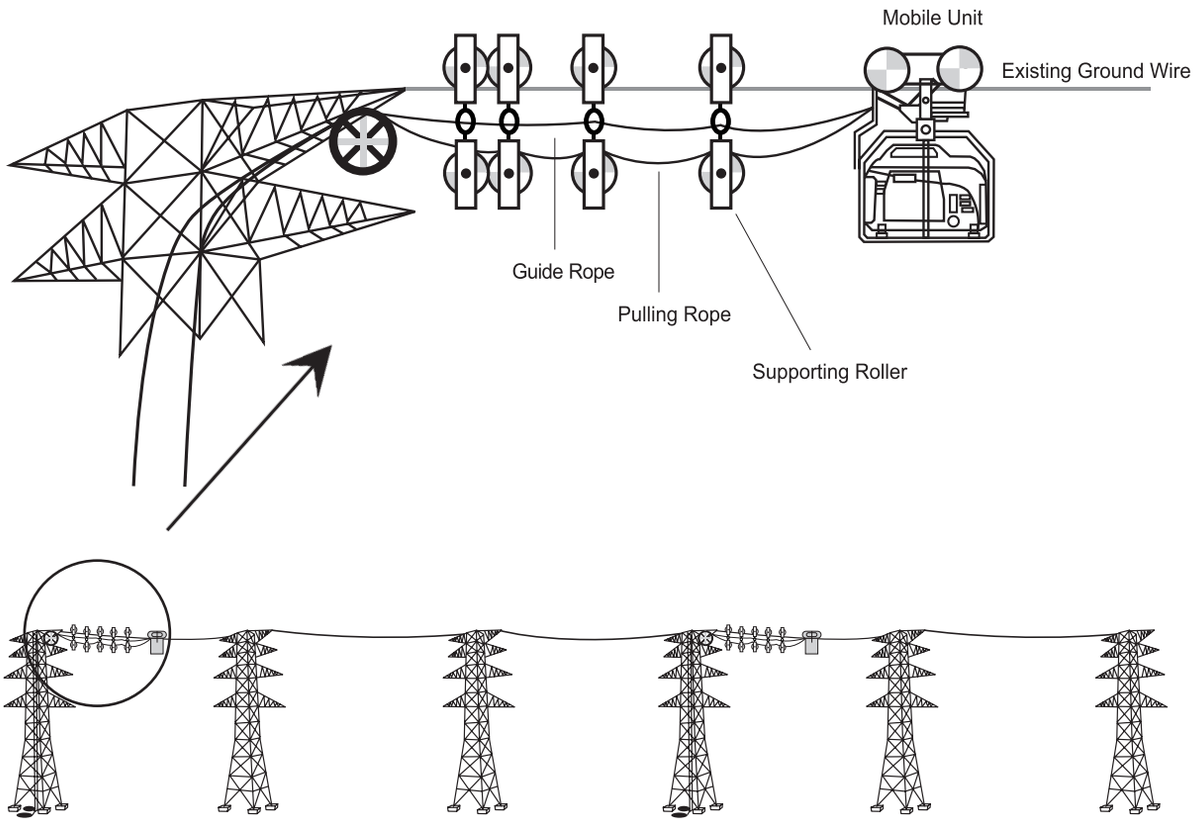
Tower Fixing & Earthing



Live-Line Installation

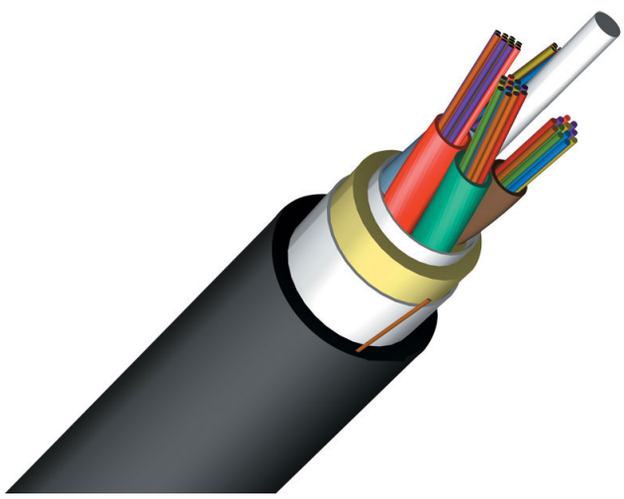
Features

- Preparation
- Analysis of Safety
- Attaching & Developing Supporting Roller
- Stringing & Turning-Over
- Recovering Existing Ground Wire
- Recovering & Supporting Roller & Rope
- Splicing & Testing


Mobile Unit
Existing Ground Wire
Guide Rope
Pulling Rope
Supporting Roller

ADSS

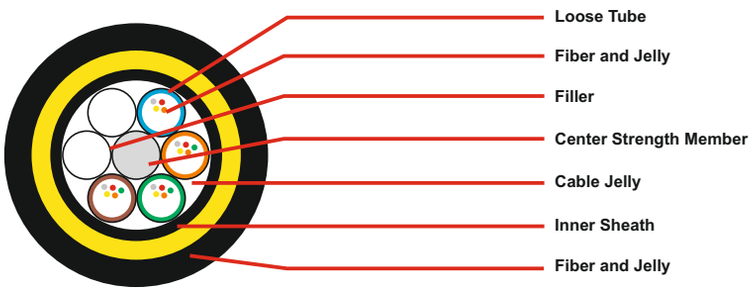
All Dielectric Self-Supporting Cable



Characteristic & Application

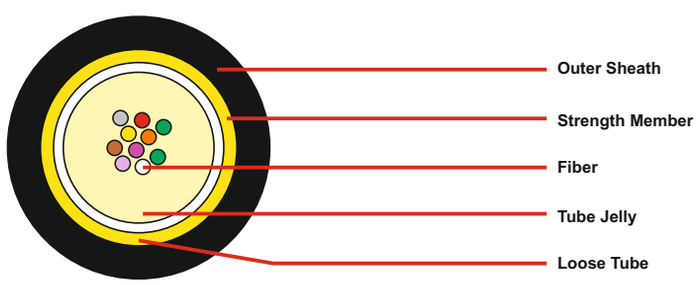
- ADSS are mainly installed at existing 220kV or lower voltage power lines.
- Layer or central tube design
- Aramid yarn is used as the strength member to assure the tensile and strain performance, and Du Pont is our only partner.
- Outer sheath can be classified into PE and tracking resistance PE to correspond the space potential below and more than 12kV.
- ADSS (stranded layer type) maximum fiber count: 312.
- ADSS (stranded layer type) maximum spancan be up to 1500m.

Typical Parameters:



Standard Layer Type

SNY Standard	Weather Conditions	Max Span (m)	RTS (kN)	MAT (kN)	Crush (N/10cm)	Weight (kg/km)		Diameter (mm)
						PE	AT	
ADSS-24B1-100m	Temperature Range: -40~+70 C Max.ice Thickness:5mm Max Wind Speed: 25 m/s	100	8.5	3.4	2200	124	133	11.6
ADSS-24B1-200m		200	15.3	6.1	2200	131	139	12.0
ADSS-24B1-300m		300	20.4	8.2	2200	136	145	12.3
ADSS-24B1-400m		400	25.5	10.2	2200	141	150	12.5
ADSS-24B1-500m		500	30.6	12.2	2200	146	156	12.8
ADSS-24B1-600m		600	39.1	15.6	2200	166	176	13.8
ADSS-24B1-700m		700	45.9	18.4	2200	179	190	14.2
ADSS-24B1-800m		800	52.7	21.1	2200	186	197	14.5
ADSS-24B1-900m		900	59.5	23.8	2200	192	204	14.8
ADSS-24B1-1000m		1000	66.3	26.5	2200	197	209	151.0
ADSS-24B1-1100m		1100	71.4	28.6	2200	202	214	15.3
ADSS-24B1-1200m		1200	76.5	30.6	2200	215	226	15.5
ADSS-24B1-1500m		1500	90.0	36.0	2200	230	245	16.1



Central Tube Type

SNY Standard	Weather Conditions	Max Span (m)	RTS (kN)	MAT (kN)	Crush (N/10cm)	Weight (kg/km)		Diameter (mm)
						PE	AT	
ADSS-X-24B1-50m	Temperature Range: -40~+70 C Max.ice Thickness:5mm Max Wind Speed: 25 m/s	50	5.0	2.0	2200	55	59	8
ADSS-X-24B1-100m		100	7.5	3.0	2200	57	61	8.2
ADSS-X-24B1-200m		200	12.5	5.0	2200	65	70	8.6

* The above designs are Simnoor Yazdan typical options and Simnoor Yazdan can provide any specific cable according to your requirement.

Aluminum 1350 & Aluminum Alloy Rods

Chemical Composotion

Elements		Composition (%)			
		1350	6201	6101	1120
Silicon	Max.	0.10	0.5 ~0.9	0.4 ~0.7	0.10
Iron	Max.	0.40	0.50	0.50	0.40
Copper	Max.	0.05	0.10	0.10	0.05 ~0.35
Manganese	Max.	0.01	0.03	0.03	0.01
Magnesium	Max.	-	0.6 ~0.9	0.4 ~0.7	0.20
Chromium	Max.	0.01	0.03	0.03	0.01
Zinc	Max.	0.05	0.10	0.10	0.05
Boron	Max.	0.05	0.06	0.06	0.05
Gallium	Max.	0.03	-	-	0.03
Vanadium & Titanium, Total	Max.	0.02	-	-	0.02
Other Elements, Each	Max.	0.03	0.03	0.03	0.03
Other Elements, Total	Max.	0.10	0.10	0.10	0.10
Aluminum	Min.	99.50	Remainder	Remainder	99.20

Mechanical & Electrical Properties

Elements	Tensile Strength	Conductivity	Volume Resistivity
	Kgf/mm	% IACS	Ohm.mm^2/m
Aluminum 1350 Rod			
1350 - O	6.0 ~9.9	61.8	0.027899
1350 - H12 & H22	8.5 ~11.9	61.5	0.028035
1350 - H14 & H24	10.5 ~ 14.1	61.4	0.028080
1350 - H16 & H26	11.9 ~ 15.5	61.3	0.028126
Aluminum Alloy Rod *			
6201	16 ~19	51	0.033806
6101	16 ~19	52	0.033156
1120	17 ~18.5	58.8	0.029300

Diameter Tolerance

Specified Diameter	Deviation of mean Diameter from Specified Diameter	Deviation at any point from Specified Diameter
mm		
9.5	0.5	0.76
7.6	0.4	0.061

Electrical Properties of Aluminum Alloy Wires as per ASTM B398 & IEC 60104

Nominal Diameter (mm)		Tolerance	Resistivity	Conductivity
Over	Up to and including	mm	Ohm.mm^2/m	% IACS
-	3.00	0.03	0.03284	52.5
3.00	-	1%	0.03284	52.5

Galvanized Steel Wires as per ASTM B498

Tensile Requirements									
Specified Diameter (mm)	Stress at 1% Extension, min, Mpa			Ultimate Tensile Strength, min, Mpa			Elongation in 250 mm, min %		
	Class A	Class B	Class C	Class A	Class B	Class C	Class A	Class B	Class C
1.60 to 2.30 incl	1310	1240	1170	1450	1380	1310	3.0	3.0	3.0
Over 2.30 to 3.05 incl	1280	1210	1140	1410	1340	1280	3.5	3.0	3.0
Over 3.05 to 3.60 incl	1240	1170	1100	1410	1340	1280	4.0	3.0	3.0
Over 3.60 to 4.80 incl	1170	1100	1070	1380	1280	1240	4.0	4.0	4.0

Aluminum Wires as per ASTM B230

Standard Increments due to Stranding

Stranding of ACSR/AW Number of Wires		Increment (Increase), % Mass and Electrical Resistance	
Aluminum	Aluminum-Clad Steel	Aluminum	Aluminum-Clad Steel
2	5	0.75	1.5
3	4	1.5	1.1
4	3	1.1	1.5
5	2	1.2	1.5
6	1	1.5	0
7	1	1.5	0
8	1	2.0	0
18	1	2.0	0
36	1	2.0	0
12	7	2.5	0.4
24	7	2.5	0.4
26	7	2.5	0.4
30	7	2.75	0.4
42	7	2.5	0.4
45	7	2.5	0.4
48	7	2.5	0.4
54	7	2.5	0.4
72	7	3.0	0.4
16	19	2.5	0.6
30	19	2.75	0.6
54	19	3.0	0.6
76	19	3.0	0.6
84	19	3.0	0.6

Rating Fctors

A For purposes of determining strength rating factors, mixed layers are considered to be full layers for each material.

B Central aluminum-clad steel wire only; the 96% rating factor is applied to the single aluminum- clad steel wire core as a factor of safety in the event the aluminum-clad steel wire contains a weld (made prior to drawing)

Stranding				Rating Fctors, %	
Number of Wires		Number of Layers^A			
Aluminum	Aluminum-Clad Steel	Aluminum	Aluminum-Clad Steel	Aluminum	Aluminum-Clad Steel
2	5	1	1	96	96
3	4	1	1	96	96
4	3	1	1	96	96
5	2	1	1	96	96
6	1	1	B	96	
7	1	1	B	96	
8	1	1	B	96	
18	1	2	B	93	
36	1	3	B		
		1	1	96	96
	7	2	1	93	96
	7	2	1	93	96
	7	2	1	93	96
	7	3	1	91	96
	7	3	1	91	96
	7	3	1	91	96
	7	3	1	91	96
	7	4	1	90	96
16	19	1	2	96	93
30	19	2	2	93	93
54	19	3	2	91	93
76	19	4	2	90	93
84	19	4	2	90	93

Steel Wires as per ASTM B230

Tensile Requirements Aluminum Clad

Nominal Diameter, in. (mm)	Stress at 1.0% Extention min, MPa(psi)	Ultimate Tensile Strength, min, psi (Mpa)	Elongation , min ,% ,10 in, (250mm)
0.0770 to 0.1289 (1.956 to 3.274) ,incl	175 000 (1206)	195 000 (1344)	1.5
0.1290 to 0.1369 (3.275 to 3.477), incl	170 000 (1172)	190 000 (1310)	1.5
0.1370 to 0.1443 (3.478 to 3.665) ,incl	165 000 (1137)	185 000 (1275)	1.5
0.1444 to 0.1549 (3.666 to 3.934) ,incl	160 000 (1103)	180 000 (1241)	1.5
0.1550 to 0.1620 (3.935 to 4.115) ,incl	160 000 (1103)	175 000 (1206)	1.5
0.1621 to 0.1729 (4.116 to 4.392) ,incl	155 000 (1068)	170 000 (1172)	1.5
0.1730 to 0.1819 (4.393 to 4.620) ,incl	150 000 (1034)	165 000 (1137)	1.5
0.1820 to 0.1880 (4.621 to 4.775) ,incl	145 000 (1000)	160 000 (1103)	1.5

Table for Properties of Various Types of ACSR

Number of Stranding (No)	N	Total Number of ACSR = $N_a + N_s$
	N_a	Number of Aluminum Wires
	N_s	Number of Steel Wires
Area (mm^2)	A	Total sectional area of ACSR = $N_a a_s + N_a a_s = \frac{\pi}{4}(N_a d_a^2 + N_s d_s^2)$
	A_a	Total sectional area of Aluminum part of ACSR = $N_a a_a$
	A_s	Total sectional area of Aluminum part of ACSR = $N_s a_s$
	a_a	Sectional area of aluminum wire = $\frac{\pi}{4} d_a^2$
	a_s	Sectional area of steel wire = $\frac{\pi}{4} d^2$
Weight (kg / km)	W	Total weight of ACSR = $W_a + W_s$
	W_a	Total weight of aluminum part of ACSR = $w_a + N_a + P_a$
	W_s	Total weight of steel part of ACSR = $w_s + N_s + P_s$
	w_a	Total weight of aluminum wire = $\frac{\pi}{4} d_a^2 \times 2.70 = 0.5498\ d_a^2$
	w_s	Weight of steel wire = $\frac{\pi}{4} d_s^2 \times 7.80 = 0.6283\ d_s^2$
Tensile Strenth (kg)	T	Tensile strength of ACSR = $0.9\ (N_a t_a + N_s t_s)$
	t	Tensile strength of aluminum wire = $\frac{\pi}{4} d_a^2\ \sigma_a$
	t_s	Tensile strength of steel wire = $\frac{\pi}{4} d_s^2\ \sigma_s$
Tensile Stress (kg/mm^2)	Σ	Equivalent tensile of ACSR = $\frac{\sigma_s + n\sigma}{1 + n}$
	σ_a	Tensile stress of aluminum wire
	σ_s	Tensile stress of steel wire
Coefficient of Linear Expansion ($1/^{\circ}c$)	α	Coefficient of linear expansion of ACSR = $\frac{\alpha_a n + \alpha_s m}{n + m} = \frac{0.000023\ n + 0.00003833}{n + 3.333}$
	α_a	Coefficient of linear expansion of aluminum wire = 23×10^{-6}
	α_s	Coefficient of linear expansion of steel wire = 11.5×10^{-6}
Moduls of Elasticity (kg/mm^2)	E	Resultant modulous of elasticity $\frac{E\ n + E_s m}{n + 1} = \frac{6300n + 210000}{n + 1}$
	E_a	Modulous of elastisity of aluminum wire = 6300
	E_s	Modulous of elastisity of steel wire = 21000
Constants	n	$\frac{A_a}{A_s}$
	m	$\frac{E_s}{E_a} = 3.333$

Compariso of Aluminum and Copper

Item	Aluminum		Copper	
	Hard-draw	Al-alloy	Hard-draw	Anealed Standard
Melting Point,°C	658	Approx. 650	1.083	1.083
Electricity Resistivity at 20°C , μΩ . in	1.11277	1.30536	0.69978	0.67879
μΩ . cm	2.8264	3.3156	1.7774	1.7241
Conductivity at 20°C, % IACS	61	52	97	100
Temperature Coefficient of Resistance at 20 C, per°C	0.004	0.0036	0.00381	0.00393
Density at 20°C, g/cub, in	2.7	2.7	8.89	8389
lb/cub, in	0.09765	0.09765	0.321	0.321
Coefficient of Linear Expansion per °C	23×10^{-6}	23×10^{-6}	17×10^{-6}	17×10^{-6}
Weight Ratio, same Volume	30.371	30.371	100	100
Resistance Ratio, Same Size	163.93	192.3	103.09	100
	159.01	186.54	100	
Resistance Ratio, Same Lenght and Same Weight	48.29	56.65	100	
Tensile Strenght Ratio	Approx. 40	Approx. 73	100	
For Same Length and Resistance, Cross Sectional Area	159.01	185.54	100	
Diameter	126.12	136.58	100	
Weight	48.295	56.653	100	
Breaking Strenght	Approx. 60	Approx. 135	100	

Conversion Factors

1 in = 25.4 mm
1 mil = 2.54×10^{-2} mm
1 lb/1000 ft = 1.488 kg/lm
1 ft = 3.048×10^{-1} m
1 lb = 4.536×10^{-1} kg
1 in^3 = 1.639×10^{-5} m^3
1 mil = 0.001 in = 0.0254
1 cmil (Circular Mil) = 5.067×10^{-3} mm^2

1 cmil (Circular Mil) = 0.7854×10^{-6} in^2
1 ksi = 10^3 psi
1 psi = 6.9 Kpa
1 ksi = 6.9 Mpa
1 kgf/mm^2 = 1.42 ksi
1 ksi = 0.704 kgf/mm
kgf = 9.80665 newtons (N)

Loading, Delivering and Downloading Instructions:

In order to deliver the products to the customer(s):

1 -First all the immediate office works such as order confirmation, delivery order and the product's release permission should be processed to get the factory manager confirmation. After all the office works are done a suitable vehicle according to the amount and size of the products will be arranged to deliver the products.

2-The vehicle will be depleted from any other extra loads and then its weight will be measured with no loads.

3- The vehicle will be sent to the location for loading.

4- If the vehicle is a trailer, the wood planks for placing the cable reels (pulleys) would be set on the trailer, and then the products on the reels will be placed on the trailer by lift trucks.

5- Meanwhile, the release permission should be taken from the base office in Tehran.

6- Maximum number of the load for each embankment on the trailer is 6 reels for pulley flanges with 2000 millimeters diameter and 7 for pulley flanges with 1600 millimeters diameter.

7- The pulleys or reels will be placed in stand position.

8- They can be laid down according to the customer's request.

9- The pulleys will be fastened tightly with a lashing separately and then the last pulley is tightened to iron chains for more security and restrain.

10- The trailer will be measured with the load.

11- After getting the release documents signed, the load will be delivered to the customers along with a quality guarantee documents and certificate.

12- The maximum vehicle speed is according to the country driving rules.

13- In cases that the number of pulleys are less than 6 (between 1 to 3) the vehicle type need to be smaller than the trailers (lorries or trucks), hence for the security reasons the reels (pulleys) need to be placed laid instead of stand position. This should be discussed and confirmed with the buyer and the main office to finalize the release permission.

14- It should be noted that the store house manager is at the charge of such responsibility.

Pulling Transportation

1- Lift trucks should be used to carry and move the pulleys containing wire or they either should be moved. If under any circumstances the customer's need to roll it on the ground, it strictly must be according to the direction of the arrows painted on the pulley.
2- While moving it on the truck or trailer, avoid pushing or connoting the pulley to the truck back or any straddle to support the pulley.
3- Try to move the pulleys using the steel hook at the top pf the joint axis: The lift truck forks should be attached to the pulley from edges on the sides of the pulley.

Notice:

4-1-Never carry the pulley.
4-2- Do not carry more than one pulley with one lift truck at once. If there is more than one pulley in one pallet then the whole pallet should be moved.
4-3- Loading and the downloading should be done by lift trucks.
5- If there are no lifting machines available at the time of loading and downloading, the pulleys should be rolled on the ground by two pieces of iron bars. For loading and downloading pulleys, using a trundle and a vinch can be helpful to move the pulleys.
6- Avoid dropping the pulleys from the trailer on the ground.

Retension & Maintenance

1- The pulleys should be maintained stand not laid.
2-To store the pulleys use two pieces of wedges and never use one piece.
4- To keep the pulleys in one place, avoid putting different pulleys on the top of each other.
5- Put a wood boards under the pulley: the boards should be installed 20 centimeters above the ground.
6- Avoid placing the pulleys (especially the ones contain OPGW) close to boilers and other heating systems.
6-1- Do not Keep the clad steel pulleys in the exposure of the moist and wet places.
6-2- The body of the pulleys (the ones contain no wire) can be kept in both open and close doors.
6-3- Pulleys with wires should be kept in close doors.