

APPLICATION

Conductors used in short distance overhead distribution in high voltage power substations. Also used as covered conductors for low and medium voltage, suitable for be insulated or covered.

CONSTRUCTION CHARACTERISTICS

Conductors are formed by (hard drawn) aluminium bare wires concentrically stranded in layers. All wires have the same nominal diameter. For covered conductors the bare conductors can be compacted in order to reduce the amount of insulation material.

AAC – “All Aluminium Conductor”.

GENERAL CHARACTERISTICS

Aluminium with a conductivity of 61% IACS

Good electrical features

Good resistance to corrosion

Easy to compress

ELECTRICAL AND DIMENSIONAL CHARACTERISTICS

CENELEC EN50182:2001 standard

Characteristics of aluminium conductors – Type AL 1 – Spain

Code	Old code	Conductor area (mm ²)	N.º of wires	Wire diameter (mm)	Nominal diameter (mm)	Linear mass (kg/km)	Rated strength (kN)	Electrical resist. dc, 20°C (Ω/km)
28-AL1	L 28	27,8	7	2,25	6,75	76,1	5,01	1,0268
43-AL1	L 40	43,1	7	2,80	8,40	117,8	7,33	0,6630
55-AL1	L 56	54,6	7	3,15	9,45	149,1	9,00	0,5239
76-AL1	L 80	75,5	19	2,25	11,3	207,6	13,60	0,3804
117-AL1	L 110	117,0	19	2,80	14,0	321,5	19,89	0,2456
148-AL1	L 145	148,1	19	3,15	15,8	407,0	24,43	0,1941
188-AL1	L 180	188,1	19	3,55	17,8	516,9	30,09	0,1528
279-AL1	L 280	279,3	37	3,10	21,7	770,2	46,08	0,1033
381-AL1	L 400	381,0	61	2,82	25,4	1 054,1	64,77	0,0759
454-AL1	L 450	454,5	61	3,08	27,7	1 257,5	74,99	0,0637
547-AL1	L 550	547,3	61	3,38	30,4	1 514,4	90,31	0,0529
638-AL1	L 630	638,3	61	3,65	32,9	1 766,0	102,12	0,0453

Note 1 – Outer layer stranding direction: Right-hand (Z).



CENELEC EN50182:2001 standard

Characteristics of aluminium conductors – Type AL 1 – Germany

Code	Old code	Conductor area (mm ²)	N. ^o of wires	Wire diameter (mm)	Nominal diameter (mm)	Linear mass (Kg/km)	Rated strength (kN)	Electrical resist. d.c. 20°C (Ω/km)	Final modulus of elasticity (N/mm ²)	Final coefficient of linear expansion (1/K)	Current carrying capacity A (1)
16-AL1	16	15,9	7	1,70	5,10	43,4	3,02	1,798 6	60 000	2,30E-05	110
24-AL1	25	24,2	7	2,10	6,30	66,3	4,36	1,178 7	60 000	2,30E-05	145
34-AL1	35	34,4	7	2,50	7,50	93,9	6,01	0,831 7	60 000	2,30E-05	180
49-AL1	50	49,5	7	3,00	9,00	135,2	8,41	0,577 6	60 000	2,30E-05	225
48-AL1	50	48,3	19	1,80	9,00	132,9	8,94	0,594 4	57 000	2,30E-05	225
66-AL1	70	65,8	19	2,10	10,5	180,9	11,85	0,436 7	57 000	2,30E-05	270
93-AL1	95	93,3	19	2,50	12,5	256,3	16,32	0,308 1	57 000	2,30E-05	340
117-AL1	120	117,0	19	2,80	14,0	321,5	19,89	0,245 6	57 000	2,30E-05	390
147-AL1	150	147,1	37	2,25	15,8	405,7	26,48	0,196 0	57 000	2,30E-05	455
182-AL1	185	181,6	37	2,50	17,5	500,9	31,78	0,158 8	57 000	2,30E-05	520
243-AL1	240	242,5	61	2,25	20,3	671,1	43,66	0,119 3	55 000	2,30E-05	625
299-AL1	300	299,4	61	2,50	22,5	828,5	52,40	0,096 6	55 000	2,30E-05	710
400-AL1	400	400,1	61	2,89	26,0	1 107,1	68,02	0,072 3	55 000	2,30E-05	855
500-AL1	500	499,8	61	3,23	29,1	1 382,9	82,47	0,057 9	55 000	2,30E-05	990
626-AL1	625	626,2	91	2,96	32,6	1 739,7	106,45	0,046 4	55 000	2,30E-05	1 140
802-AL1	800	802,1	91	3,35	36,9	2 228,3	132,34	0,036 2	55 000	2,30E-05	1 340
1000-AL1	1 000	999,7	91	3,74	41,1	2 777,3	159,95	0,029 1	55 000	2,30E-05	1 540

Note 1 – (1) Guideline values of current carrying capacity are valid up to a frequency of 60 Hz, assuming a wind velocity of 0,6 m/s, the effect of solar radiation for Germany, an initial ambient temperature of 35° C and a conductor temperature of 80° C. For special applications, when there is no air turbulence, the values should be reduced by 30 %.

Note 2 – Values of final modulus of elasticity and coefficient of linear expansion for the conductor sizes listed in the Table are used in Germany. Values for other conductor constructions may be calculated using the method given in IEC 61597.

Note 3 – Outer layer stranding direction: Right-hand (Z).

CENELEC EN50182:2001 standard

Characteristics of aluminium conductors – Type AL 1 – United Kingdom

Code	Code word	Conductor area (mm ²)	N.º of wires	Wire diameter (mm)	Nominal diameter (mm)	Linear mass (kg/km)	Rated strength (kN)	Electrical resist. d.c. 20°C (Ω/km)
23-AL1	MIDGE	23,3	7	2,06	6,18	63,8	4,20	1,2249
27-AL1	GNAT	26,9	7	2,21	6,63	73,4	4,83	1,0643
37-AL1	MOSQUITO	36,9	7	2,59	7,77	100,8	6,27	0,7749
43-AL1	LADYBIRD	42,8	7	2,79	8,37	117,0	7,28	0,6678
53-AL1	ANT	52,8	7	3,10	9,30	144,4	8,72	0,5409
64-AL1	FLY	63,6	7	3,40	10,2	173,7	10,49	0,4497
74-AL1	BLUEBOTTLE	73,6	7	3,66	11,0	201,3	11,78	0,3880
79-AL1	EARWIG	78,6	7	3,78	11,3	214,7	12,57	0,3638
84-AL1	GRASSHOPPER	84,1	7	3,91	11,7	229,7	13,45	0,3400
96-AL1	CLEGG	95,6	7	4,17	12,5	261,3	15,30	0,2989
106-AL1	WASP	106,0	7	4,39	13,2	289,6	16,95	0,2697
106-AL1	BEETLE	106,4	19	2,67	13,4	292,4	18,08	0,2701
132-AL1	BEE	132,0	7	4,90	14,7	360,8	21,12	0,2165
158-AL1	HORNET	157,6	19	3,25	16,3	433,2	26,01	0,1823
186-AL1	CATERPILLAR	185,9	19	3,53	17,7	511,1	29,75	0,1546
213-AL1	CHAFER	213,2	19	3,78	18,9	586,0	34,12	0,1348
238-AL1	SPIDER	237,6	19	3,99	20,0	652,9	38,01	0,1210
266-AL1	COCKROACH	265,7	19	4,22	21,1	730,4	42,52	0,1081
323-AL1	BUTTERFLY	322,7	19	4,65	23,3	886,8	51,63	0,0891
373-AL1	MOTH	373,1	19	5,00	25,0	1 025,3	59,69	0,0770
372-AL1	DRONE	372,4	37	3,58	25,1	1 027,1	59,69	0,0774
415-AL1	CENTIPEDE	415,2	37	3,78	26,5	1 145,1	66,43	0,0695
486-AL1	MAYBUG	486,1	37	4,09	28,6	1 340,6	77,78	0,0593
530-AL1	SCORPION	529,8	37	4,27	29,9	1 461,2	84,77	0,0544
628-AL1	CICADA	628,3	37	4,65	32,6	1 732,9	100,54	0,0459

Note 1 – Outer layer stranding direction: Right-hand (Z).

ASTM B-231 standard

Characteristics of aluminium conductors – Countries with North American influence

Code word	Size (AWG or kcmil)	Class	Composition	Conductor area (mm ²)	Outer diameter (mm)	Linear mass (Kg/km)	Rated strength (kN)	Electrical resist. d.c. 20°C (Ω/km)	Electrical resist. a.c. 25°C (Ω/km)	Electrical resist. a.c. 75°C (Ω/km)	Current carrying capacity A (1)
PEACHBELL	6	A	7 x 1,56	13,21	4,65	36,6	2,500	2,1702	2,2129	2,6499	110
ROSE	4	A	7 x 1,96	21,12	5,88	58,3	3,290	1,3638	1,3914	1,6663	145
IRIS	2	A,AA	7 x 2,47	33,54	7,41	92,7	6,010	0,8570	0,8750	1,0486	195
PANSY	1	A,AA	7 x 2,78	42,49	8,34	116,8	7,300	0,6801	0,6942	0,8310	225
POPPY	1/0	A,AA	7 x 3,12	53,52	9,36	147,5	8,860	0,5390	0,5499	0,6588	260
ASTER	2/0	A,AA	7 x 3,50	67,34	10,50	185,9	11,170	0,4275	0,4374	0,5226	305
PHLOX	3/0	A,AA	7 x 3,93	84,91	11,79	234,4	13,530	0,3392	0,3468	0,4150	350
OXLIP	4/0	A,AA	7 x 4,42	107,4	13,26	295,6	17,050	0,2689	0,2747	0,3288	410
SNEEZEWORTH	250,0	AA	7 x 4,80	127,6	14,40	349,3	20,120	0,2273	0,2324	0,2784	455
VALERIAN	250,0	A	19 x 2,91	126,4	14,55	349,3	20,740	0,2273	0,2324	0,2784	455
DAISY	266,8	AA	7 x 4,96	135,3	14,88	372,0	21,500	0,2133	0,2181	0,2610	475
LAUREL	266,8	A	19 x 3,01	135,2	15,05	372,0	22,120	0,2133	0,2181	0,2610	475
PEONY	300,0	A	19 x 3,19	151,9	15,95	419,1	24,380	0,1897	0,1945	0,2324	515
TULIP	336,4	A	19 x 3,38	170,5	16,90	470,0	27,370	0,1691	0,1734	0,2076	555
DAFFODIL	350,0	A	19 x 3,45	177,6	17,25	489,0	28,450	0,1626	0,1666	0,1995	565
CANNA	397,5	A,AA	19 x 3,68	202,1	18,40	555,4	31,640	0,1431	0,1473	0,1659	615
GOLDENTUFT	450,0	AA	19 x 3,91	228,1	19,55	682,6	35,110	0,1264	0,1299	0,1560	665
COSMOS	477,0	AA	19 x 4,02	241,2	20,10	666,4	37,200	0,1193	0,1224	0,1467	690
SYRINGA	477,0	A	37 x 2,88	241,0	20,16	666,4	38,670	0,1193	0,1224	0,1467	690
ZINNIA	500,0	AA	19 x 4,12	253,3	20,60	698,6	38,980	0,1138	0,1168	0,1398	715
HYACINTH	500,0	A	37 x 2,95	252,9	20,65	698,6	40,540	0,1138	0,1168	0,1398	715
DAHLIA	556,5	AA	19 x 4,35	282,4	21,75	777,4	43,390	0,1022	0,1089	0,1262	765
MISTLETOE	556,5	A	37 x 3,11	281,1	21,77	777,4	44,250	0,1022	0,1089	0,1262	765
MEADOWSEET	600,0	A,AA	37 x 3,23	303,2	22,61	838,1	47,620	0,09482	0,09820	0,01168	800
ORCHID	636,0	A,AA	37 x 3,33	322,2	23,31	888,4	50,730	0,08947	0,09262	0,11063	835
HEUCHERA	650,0	AA	37 x 3,37	330,0	23,59	908,1	51,840	0,08747	0,09098	0,10853	855
VERBENA	700,0	AA	37 x 3,49	354,0	24,43	977,9	55,630	0,08123	0,08451	0,10069	880
FLAG	700,0	A	61 x 2,72	354,5	24,48	977,9	57,415	0,08123	0,08451	0,10069	880
VIOLET	715,5	AA	37 x 3,53	362,1	24,71	999,6	56,960	0,07953	0,08264	0,09820	900
NASTURTIUM	715,5	A	61 x 2,75	362,3	24,75	999,6	58,300	0,07953	0,08264	0,09820	900
PETUNIA	750,0	AA	37 x 3,62	380,8	25,34	1 047,7	58,300	0,07585	0,07894	0,09446	922
CATTAIL	750,0	A	61 x 2,82	381,0	25,38	1 047,7	60,080	0,07585	0,07894	0,09446	922
ARBUTUS	795,0	AA	37 x 3,72	402,1	26,04	1 110,6	61,860	0,07156	0,07457	0,8888	960
LILAC	795,0	A	61 x 2,90	402,9	26,10	1 110,6	63,650	0,07156	0,07457	0,8888	960
FUCHSIA	800,0	AA	37 x 3,75	408,7	26,25	1 115,2	62,300	0,07116	0,07421	0,08825	960
HELIOTROPE	800,0	A	61 x 2,92	408,5	26,28	1 115,2	64,080	0,07116	0,07421	0,08825	960

Code word	Size (AWG or kcmil)	Class	Composition	Conductor area (mm ²)	Outer diameter (mm)	Linear mass (Kg/km)	Rated strength (kN)	Electrical resist. d.c. 20°C (Ω/km)	Electrical resist. a.c. 25°C (Ω/km)	Electrical resist. a.c. 75°C (Ω/km)	Current carrying capacity A (I)
ANEMONE	874,5	AA	37 x 3,91	444,3	27,37	1 221,8	66,750	0,06506	0,06837	0,08081	1 020
CROCUS	874,5	A	61 x 3,04	442,8	27,36	1 221,8	70,310	0,06506	0,06837	0,08081	1 020
COCKCOMB	900,0	AA	37 x 3,96	455,7	27,72	1 257,4	68,530	0,06332	0,06650	0,07894	1 040
SNAPDRAGON	900,0	A	61 x 3,09	457,4	27,81	1 257,4	70,760	0,06332	0,06650	0,07894	1 040
MAGNOLIA	954,0	AA	37 x 4,08	483,7	28,56	1 332,8	72,980	0,05965	0,06276	0,07457	1 080
GOLDENROD	954,0	A	61 x 3,18	484,5	28,62	1 332,8	72,215	0,05965	0,06276	0,07457	1 080
HAWKWEED	1 000,0	AA	37 x 4,17	505,3	29,19	1 397,0	76,540	0,05689	0,06004	0,07146	1 110
CAMELLIA	1 000,0	A	61 x 3,25	506,0	29,25	1 397,0	78,770	0,05689	0,06004	0,07146	1 110
BLUEBELL	1 033,5	AA	37 x 4,24	522,4	29,68	1 443,8	78,770	0,05505	0,05830	0,06906	1 135
LARKSPUR	1 033,5	A	61 x 3,31	524,9	29,79	1 443,8	81,450	0,05505	0,05830	0,06906	1 135
MARIGOLD	1 113,0	A,AA	61 x 3,43	563,6	30,87	1 555,2	87,670	0,05112	0,05456	0,06437	1 190
HAWTHORN	1 192,5	A,AA	61 x 3,55	603,8	31,95	1 665,3	93,900	0,04770	0,05121	0,06033	1 240
NARCISSUS	1 272,0	A,AA	61 x 3,67	645,3	33,03	1 776,9	97,900	0,04472	0,04816	0,05673	1 290
COLUMBINE	1 351,5	A,AA	61 x 3,78	684,5	34,02	1 888,5	104,130	0,04209	0,04560	0,05377	1 340
CARNATION	1 431,0	A,AA	61 x 3,89	725,0	35,01	1 998,6	108,140	0,03976	0,04344	0,05102	1 390
GLADIOLUS	1 510,0	A,AA	61 x 4,00	766,5	36,00	2 110,3	113,920	0,03766	0,04134	0,04852	1 430
COREOPSIS	1 590,0	AA	61 x 4,10	805,4	36,90	2 222,0	120,150	0,03579	0,03960	0,04636	1 480
JESSAMINE	1 750,0	AA	61 x 4,30	885,8	38,70	2 445,1	132,170	0,03251	0,03642	0,04262	1 565

Note 1 – With the following conditions: Ambient temperature = 25°C; Conductors' temperature = 75°C; Wind velocity = 0,6 m/s. Without solar radiation.

Note 2 – Outer layer stranding direction: Right-hand (Z).