ASTM B 231 / B 231 M · ALUMINUM 1350, CONCENTRIC-LAY-STRANDED

AAC

All Aluminum Conductor — Bare, Overhead Distribution & Transmission



6	3,500,000	13.3–1773	1350-H19
AWG MIN.	KCMIL MAX.	MM² SECTION	ALUMINUM WIRES

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Overhead Bare Conductor · Yixing, Jiangsu, China

All Aluminum Conductor (AAC) — ASTM B 231 / B 231 M

AAC is a bare concentric-lay-stranded conductor made entirely of hard-drawn aluminum 1350-H19 wires, manufactured to ASTM B 231/B 231M. With its simple construction, low line cost, large transmission capacity and easy installation and maintenance, AAC is widely used in overhead power transmission and distribution lines of various voltage levels, and is particularly suitable for short spans and for crossings over rivers and valleys where special geographical features exist.

Also manufactured to

The same construction is available to other national and international AAC standards on request:

IEC 61089 | DIN 48 201-5 | BS 215-1 | AS 1531 | UNE 21018 | SANS 182-2 | JIS C 3109 | GOST 839-80

Typical applications

Primary and secondary overhead distribution lines with short spans where high mechanical strength is not required; river and valley crossings; busbar and jumper connections in substations. As a homogeneous aluminum conductor, the ampacity of AAC is used to best advantage.

Wire material

Aluminum 1350-H19 hard-drawn wires per ASTM B 230 — minimum electrical conductivity 61.0 % IACS at 20 °C, minimum elongation in 250 mm gauge as required by the wire standard. Wires are concentric-lay stranded in successive layers with opposite lay direction.

Construction summary

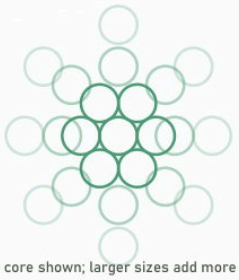
Conductor material	Aluminum 1350-H19, hard-drawn (ASTM B 230)
Construction	Concentric-lay-stranded, class AA stranding geometry
Size range	6 AWG to 3,500,000 kcmil (13.3 – 1773 mm²)
Number of wires	7, 19, 37, 61, 91 or 127 — according to size
Size designation	AWG for small sizes; circular mils (kcmil) from 250,000
Max. operating temperature	90 °C continuous · 250 °C short-circuit (5 s max.)
Surface	Bare — no insulation or covering

Concentric-lay stranding

AAC is built up in concentric layers around a central wire: 7, 19, 37, 61, 91 and 127-wire constructions cover the range from 6 AWG to 3,500,000 kcmil. Successive layers are laid up with opposite directions of lay, and the outermost layer is right-hand (Z) lay as standard.

1. **Central wire** — single aluminum 1350-H19 wire at the core.
2. **Concentric layers** — 6, 12, 18, 24, 30 and 36 wires added per layer, giving the 7 / 19 / 37 / 61 / 91 / 127-wire series.
3. **Lay direction** — successive layers opposite; outer layer right-hand (Z) as standard. Left-hand outer lay on request.

> For most sizes above 250,000 kcmil two strandings are listed under different code names (e.g. COSMOS 19/4.02 and SYRINGA 37/2.88 at 477,000 kcmil) — the section, weight and resistance are identical, while breaking strength and flexibility differ slightly. Both constructions can be supplied.



7-wire core shown; larger sizes add more layers

Concentric-lay stranding — schematic; numbers refer to the layers listed opposite.

Design options

Stranding class	Standard geometries per ASTM B 231 tables; compressed or compacted constructions on request
Lay direction	Right-hand outer layer (Z) standard; left-hand (S) on request
Jointing	Fully compatible with standard compression fittings and automatic splices
Packaging	Returnable steel or wooden reels, lengths to suit project stringing plans

Why homogeneous aluminum

With no steel core there is no bi-metallic corrosion cell, no magnetic loss and no need for grease — the full cross-section conducts, and the ampacity of AAC is used to best advantage. The trade-off is lower rated strength, which is why AAC is normally chosen for shorter spans.

Quality & testing

Wire samples are tested per ASTM B 230 for conductivity, elongation and torsional ductility before stranding; finished conductor is checked for lay length, diameter, and D.C. resistance on every production lot. Third-party inspection on request.

ASTM B 231 / B 231 M — dimensions & technical data (1 of 2)

Sizes 6 AWG to 1,000,000 kcmil. For most sizes from 250,000 kcmil two strandings are listed under different code names — section, weight and resistance are identical.

Code Name	Size AWG / kcmil	Stranding No. × Ø mm	Section mm²	Overall Dia. mm	Weight kg/km	Rated Strength kN	D.C. Resistance at 20 °C, Ω/km
PEACHBELL	6	7/1.55	13.3	4.65	36.6	2.53	2.1702
ROSE	4	7/1.96	21.1	5.88	58.2	3.91	1.3638
IRIS	2	7/2.47	33.6	7.41	92.6	5.99	0.857
PANSY	1	7/2.78	42.4	8.34	116.6	7.30	0.6801
POPPY	1/0	7/3.12	53.5	9.36	147.2	8.84	0.539
ASTER	2/0	7/3.50	67.4	10.50	185.7	11.10	0.4275
PHLOX	3/0	7/3.93	85.0	11.79	233.9	13.50	0.3392
OXLIP	4/0	7/4.42	107.2	13.26	295.2	17.00	0.2689
VALERIAN	250,000	19/2.91	126.7	14.55	348.6	20.70	0.2273
SNEEZEWORT	250,000	7/4.80	126.7	14.40	348.8	20.10	0.2273
LAUREL	266,800	19/3.01	135.2	15.05	372.2	22.10	0.2133
DAISY	266,800	7/4.96	135.2	14.88	372.3	21.40	0.2133
PEONY	300,000	19/3.19	152.0	15.95	418.3	24.30	0.1891
TULIP	336,400	19/3.38	170.5	16.90	469.5	27.30	0.1691
DAFFODIL	350,000	19/3.45	177.3	17.25	487.9	28.40	0.1626
CANNA	397,500	19/3.68	201.4	18.40	554.9	31.60	0.1431
GOLDENTUFT	450,000	19/3.91	228.0	19.55	627.6	35.00	0.1264
SYRINGA	477,000	37/2.88	241.7	20.16	664.8	38.60	0.1193
COSMOS	477,000	19/4.02	241.7	20.10	664.8	37.00	0.1193
HYACINTH	500,000	37/2.95	253.3	20.65	696.8	40.50	0.1138
ZINNIA	500,000	19/4.12	253.3	20.60	697.1	38.90	0.1138
MISTLETOE	556,500	37/3.11	282.0	21.77	775.7	44.30	0.1022
DAHLIA	556,500	19/4.35	282.0	21.75	775.8	43.30	0.1022
MEADOWSWEET	600,000	37/3.23	304.0	22.61	836.3	47.50	0.09482
ORCHID	636,000	37/3.33	322.3	23.31	886.9	50.40	0.08947
HEUCHERA	650,000	37/3.37	329.4	23.59	907.4	51.70	0.08747
FLAG	700,000	61/2.72	354.7	24.48	975.4	57.10	0.08123
VERBENA	700,000	37/3.49	354.7	24.43	975.7	55.40	0.08123
NASTURTIUM	715,500	61/2.75	362.6	24.73	998.5	58.40	0.07953
VIOLET	715,500	37/3.53	362.6	24.71	998.5	56.70	0.07953
CATTAIL	750,000	61/2.82	380.0	25.34	1046.0	60.30	0.07587
PETUNIA	750,000	37/3.62	380.0	25.38	1046.0	58.60	0.07585
LILAC	795,000	61/2.90	402.8	26.04	1110.0	63.80	0.07156
ARBUTUS	795,000	37/3.72	402.8	26.10	1109.0	61.80	0.07156
SNAPDRAGON	900,000	61/3.09	456.0	27.72	1256.0	70.80	0.06332
COCKSCOMB	900,000	37/3.96	456.0	27.81	1256.0	68.40	0.06332
GOLDENROD	954,000	61/3.18	483.4	28.56	1331.0	75.00	0.05965
MAGNOLIA	954,000	37/4.08	483.4	28.62	1331.0	72.60	0.05965
CAMELLIA	1,000,000	61/3.25	506.7	29.19	1394.0	78.30	0.05689

Electrical resistance: maximum D.C. values at 20 °C for aluminum 1350-H19. Weights nominal. Rated strength = sum of wire breaking loads. Sizes from 250,000 kcmil in circular mils; smaller sizes in AWG. Data per the published ASTM B 231/B 231M tables. Continued overleaf.

ASTM B 231 / B 231 M — dimensions & technical data (2 of 2)

Sizes 1,000,000 to 3,500,000 kcmil.

Code Name	Size AWG / kcmil	Stranding No. × Ø mm	Section mm²	Overall Dia. mm	Weight kg/km	Rated Strength kN	D.C. Resistance at 20 °C, Ω/km
HAWKWEED	1,000,000	37/4.17	506.7	29.25	1395.0	76.20	0.05689
LARKSPUR	1,033,500	61/3.31	523.7	29.68	1442.0	81.30	0.05505
BLUEBELL	1,033,500	37/4.24	523.7	29.79	1441.0	78.80	0.05505
MARIGOLD	1,113,000	61/3.43	564.0	30.87	1553.0	87.30	0.05112
HAWTHORN	1,192,500	61/3.55	604.2	31.95	1662.0	93.50	0.0477
NARCISSUS	1,272,000	61/3.67	644.5	33.03	1774.0	98.10	0.04472
COLUMBINE	1,351,000	61/3.78	694.8	34.02	1884.0	104.00	0.04209
CARNATION	1,431,000	61/3.89	725.1	35.01	1997.0	108.00	0.03976
GLADIOLUS	1,510,500	61/4.00	765.4	36.00	2108.0	114.00	0.03766
COREOPSIS	1,590,000	61/4.10	805.7	36.90	2216.0	120.00	0.03579
JESSAMINE	1,750,000	61/4.30	886.7	38.70	2442.0	132.00	0.03251
COWSLIP	2,000,000	91/3.78	1013.0	41.36	2787.0	153.00	0.02845
SAGEBRUSH	2,250,000	91/3.99	1140.0	43.89	3166.0	167.00	0.02547
LUPINE	2,500,000	91/4.21	1267.0	46.31	3519.0	186.00	0.02298
BITTERROOT	2,750,000	91/4.41	1393.0	48.51	3872.0	205.00	0.0207
TRILLIUM	3,000,000	127/3.90	1520.0	50.70	4226.0	223.84	0.01915
BLUEBONNET	3,500,000	127/4.22	1773.0	54.86	4977.0	261.22	0.01657

1,000,000 kcmil appears in both tables: CAMELLIA (61 wires) on the previous page and HAWKWEED (37 wires) here — two concentric-lay strandings of the same section, both to ASTM B 231/B 231 M.

Reading the table

Stranding is the number of aluminum wires and their individual diameter. **Rated strength** is the sum of the wire breaking loads — for engineering use apply the stringing limits of the project. **Resistance** is the maximum D.C. value at 20 °C; for A.C. ratings add skin and proximity effects per project conditions.

Ampacity

Steady-state ampacity of bare AAC depends on ambient temperature, wind and emissivity and is calculated per IEEE 738 on request for the specific span conditions. As a guide, 4/0 OXLIP carries about 380 A and 954,000 kcmil MAGNOLIA about 980 A at 75 °C conductor, 25 °C ambient, 1 m/s wind.

How to specify

Information needed	Example
Type designation	AAC — All Aluminum Conductor, bare
Standard	ASTM B 231 / B 231 M (other standards on request)
Code name and size	OXLIP — 4/0 AWG (211,600 kcmil)
Stranding	7 wires × 4.42 mm — concentric lay, right-hand outer layer
Options and delivery	Reel lengths to suit stringing plans · left-hand outer lay on request

Quality & testing

Routine tests — every production lot

Wire samples per ASTM B 230: conductivity, elongation and torsional ductility. Finished conductor: lay length, overall diameter and D.C. resistance measured on every production lot before despatch.

Certification & documentation

Mill certificates for the wire, routine test reports and inspection certificates issued on request. Third-party inspection (SGS, BV or nominated) welcome before shipment.

Packing & delivery

Reels & lengths

Supply on returnable steel or wooden reels in single lengths to suit the project stringing plan. Conductor ends are secured and tagged; reels are battened and marked for identification.

Export packing

Reel lagging and additional weather protection available for sea freight and long-term outdoor storage. Delivery ex works or CIF — Incoterms 2020 — as agreed.

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