GRANDCABLE



IEC 61089 · CLASS A1 · ROUND WIRE CONCENTRIC LAY STRANDED

# AAC

## All Aluminum Conductor — Bare, Overhead Distribution & Transmission



| 10 | 1500 | 7–91 | A1 |
|---|---|---|---|
| MM² MIN. | MM² MAX. | WIRES | CLASS DESIGNATION |

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Overhead Bare Conductor · Yixing, Jiangsu, China

# All Aluminum Conductor (AAC) — IEC 61089, Class A1

AAC to IEC 61089 is designated class A1 — a bare conductor stranded from hard-drawn aluminum round wires in a concentric-lay construction. IEC 61089 harmonizes the mechanical and electrical requirements for round wire concentric lay stranded overhead conductors, making class A1 the reference AAC for international tenders and cross-border projects.

## Also manufactured to

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

ASTM B 231 / B 231M · DIN 48 201-5 · BS 215-1 · AS 1531 · UNE 21018 · SANS 182-2 · JIS C 3109 · GOST 839

### 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

Hard-drawn aluminum round wires with a maximum resistivity of 0.028264 Ω·mm²/m at 20 °C (equivalent to 61.0 % IACS conductivity). Wires are concentric-lay stranded in successive layers with opposite lay direction per IEC 61089.

## Construction summary

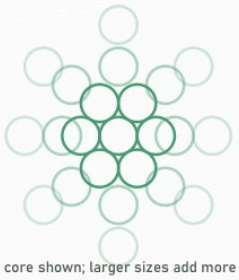
| | |
|---|---|
| Standard | IEC 61089 — Round wire concentric lay stranded electrical conductors |
| Designation | Class A1 + nominal area, e.g. A1 500 |
| Wire material | Hard-drawn aluminum, resistivity at 20 °C max. 0.028264 Ω·mm²/m |
| Size range | 10 – 1500 mm², 24 standard sizes |
| Constructions | 7, 19, 37, 61 or 91 wires — according to size |
| Surface | Bare — no insulation or covering |

## Concentric-lay stranding

A1 conductors are built up in concentric layers around a central wire: 7, 19, 37, 61 and 91-wire constructions cover the range from 10 to 1500 mm². 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 hard-drawn aluminum wire at the core.
2. **Concentric layers** — 6, 12, 18 and 24 wires added per layer, giving the 7 / 19 / 37 / 61 / 91-wire series.
3. **Lay direction** — successive layers opposite; outer layer right-hand (Z) as standard. Left-hand outer lay on request.

> Lay ratios and stranding geometry follow the class A1 requirements of IEC 61089, so dimensions and D.C. resistance are interchangeable between compliant manufacturers.



7-wire core shown; larger sizes add more layers

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

## Design options

| | |
|---|---|
| Stranding | Class A1 geometries per IEC 61089; 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 for resistivity, elongation and torsional ductility to IEC 61089 before stranding; finished conductor is checked for lay length, diameter and D.C. resistance on every production lot. Third-party inspection on request.

# IEC 61089 — dimensions & technical data

Class A1, nominal sizes 10 to 1500 mm². The code name column is the nominal cross-section in mm².

| Code Name mm² | Stranding No. × Ø mm | Section mm² | Overall Dia. mm | Weight kg/km | Rated Strength kN | D.C. Resistance at 20 °C, Ω/km |
|---|---|---|---|---|---|---|
| 10 | 7/1.35 | 10.02 | 4.05 | 27.4 | 1.95 | 2.8633 |
| 16 | 7/1.71 | 16.08 | 5.12 | 43.8 | 3.04 | 1.7896 |
| 25 | 7/2.13 | 24.94 | 6.40 | 68.4 | 4.50 | 1.1453 |
| 40 | 7/2.70 | 40.08 | 8.09 | 109.4 | 6.80 | 0.7158 |
| 63 | 7/3.39 | 63.18 | 10.20 | 172.3 | 10.39 | 0.4545 |
| 100 | 19/2.59 | 100.10 | 12.90 | 274.8 | 17.00 | 0.2877 |
| 125 | 19/2.89 | 124.63 | 14.50 | 343.6 | 21.25 | 0.2302 |
| 160 | 19/3.27 | 159.57 | 16.40 | 439.8 | 26.40 | 0.1798 |
| 200 | 19/3.66 | 199.90 | 18.30 | 549.7 | 32.00 | 0.1439 |
| 250 | 19/4.09 | 249.63 | 20.50 | 687.1 | 40.00 | 0.1151 |
| 315 | 37/3.29 | 314.55 | 23.00 | 867.9 | 51.97 | 0.0916 |
| 400 | 37/3.71 | 399.98 | 26.00 | 1102.0 | 64.00 | 0.0721 |
| 450 | 37/3.94 | 451.11 | 27.50 | 1239.8 | 72.00 | 0.0641 |
| 500 | 37/4.15 | 500.48 | 29.00 | 1377.6 | 80.00 | 0.0577 |
| 560 | 37/4.39 | 560.04 | 30.70 | 1542.9 | 89.60 | 0.0515 |
| 630 | 61/3.63 | 631.30 | 32.60 | 1738.3 | 100.80 | 0.0458 |
| 710 | 61/3.85 | 710.14 | 34.60 | 1959.1 | 114.60 | 0.0407 |
| 800 | 61/4.09 | 801.43 | 36.80 | 2207.4 | 128.00 | 0.0361 |
| 900 | 61/4.33 | 898.25 | 39.00 | 2483.3 | 144.00 | 0.0321 |
| 1000 | 61/4.57 | 1000.58 | 41.10 | 2759.2 | 160.00 | 0.0289 |
| 1120 | 91/3.96 | 1120.78 | 43.50 | 3093.5 | 179.20 | 0.0258 |
| 1250 | 91/4.18 | 1248.77 | 46.00 | 3452.6 | 200.00 | 0.0231 |
| 1400 | 91/4.43 | 1402.62 | 48.70 | 3866.9 | 224.00 | 0.0207 |
| 1500 | 91/4.58 | 1499.21 | 50.40 | 4143.1 | 240.00 | 0.0193 |

Electrical resistance: maximum D.C. values at 20 °C for hard-drawn aluminum. Weights nominal. Rated strength = sum of wire minimum breaking loads. For A.C. ratings add skin and proximity effects per project conditions.

## 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.

## 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 homogeneous aluminum conductor, AAC gives the highest ampacity per unit weight of any stranded overhead type.

## How to specify

| Information needed | Example |
|---|---|
| Type designation | AAC — All Aluminum Conductor, bare |
| Standard and class | IEC 61089 — class A1 |
| Designation and size | A1 — 500 mm² (37 wires × 4.15 mm) |
| Stranding | 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 IEC 61089: resistivity, 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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