



APAR

Tomorrow's solutions today

CONDUCTORS



ABOUT

APAR

APAR Industries Limited, founded by Late Mr. Dharmsinh D. Desai in the year 1958 is one among the best established companies in India operating in the diverse fields of electrical, metallurgical and chemical engineering. Over the ensuing years it has evolved to be a 1 Billion US Dollar diversified company offering value added products and services in Power Conductors, OPGW Products, Wire & Cables, Copper Products and Petroleum Specialities.

A technology - driven and customer - focused vendor to some of the most brand enhancing power companies in India and abroad, APAR has strengthened the business of its customers through proactive product development, timely product delivery and superior product attributes by

reinforcing product innovation, cost leadership and premium quality and living its vision 'Tomorrow's Solution Today' resulting in Reliability, Respect, Reputation and Repeat business across customers of Power Conductors, OPGW, Wire & Cables, Copper Products and Petroleum Specialities.



ABOUT

CONDUCTORS

DIVISION

“ **Leading the innovation curve in over 125+ countries**

- ✓ **Largest Overhead Conductor manufacturer in the world.**
 - ✓ **Third largest transformer oil manufacturer in the world.**
 - ✓ **Manufacturers of the widest range of cables in India.**
- ”

Aluminium alloy rods and conductors were developed first in India by APAR through its own R&D initiatives. Factors that enabled APAR to emerge as the lowest - cost producer of aluminium conductors in the world include increase in the installed capacity, strategic location of manufacturing facilities in favorable geographies, tax jurisdictions, backward integration and increased productivity. APAR's backward integration enables it to make complete range of aluminum conductors by altering chemical properties at the alloying stage and tailoring products to match customer needs.

APAR enjoys the reputation of being a reliable long-term supplier in a market marked by fluctuating raw material availability and cost spikes. It supplies to all the top 25 turnkey operators in the world and also to all the leading utilities in Asia, Africa, Latin America.

As a member of the standardizing committee formed by the Bureau of Indian Standards, Govt. of India for preparing National Standards (ISI) for the transmission & distribution conductors up to 800 KVA and the standardizing committee formed by the Rural Electrification Company Ltd., Government of India.

APAR's modern plants at Silvassa and Odisha in India enable us to produce world-class quality in massive capacities. We maintain total in-house control over the design, manufacturing and testing process. This enables us to guarantee innovation and quality while maintaining cost competitiveness.

Our commitment to leading the innovation curve is why we've pioneered turnkey solutions for re-conductoring with HTLS, OPGW live line installation and environmentally-friendly packaging solutions. Six decades of experience and expertise is hard to replicate.



APAR

CONDUCTORS

MANUFACTURES

ALUMINIUM WIRE RODS for various applications:

- EC Grade Aluminium Wire Rods
- Aluminium Alloy Wire Rods (6201 Alloy Rod in T-4 & M Temper - online solutionized)
- Mechanical Grade Alloy Wire Bundles (T- 81temper)

ACSR/AACSR/ACAR/AAA/ACSR-AW CONDUCTORS for Overhead Power Transmission & Distribution:

- AAC (All Aluminium Conductors)
- ACSR (Aluminium Conductor Steel Reinforced),
- ACSR/AW (Aluminium Conductor Aluminium Clad Steel Reinforced)
- AACSR (Aluminium Alloy Conductor Steel Reinforced),
- AACSR/AW (Aluminium Alloy Conductor Clad Steel Reinforced)
- AAAC (All Aluminium Alloy Conductors),
- ACAR (Aluminium Conductor Alloy Reinforced)

ALUMINIUM WIRE RODS for various applications:

- High Conductivity Alloy Conductors (AL 59, AL-57, AAAC 1120 etc.)
- High Temperature Thermal Resistant Alloy conductors (TACSR, TACSR/AW, STACIR/AW, TACSR/TW etc.)
- High Temperature Low Sag conductors (ACSS & ACSS/TW & GZTACSR/GTACSR)



APAR INDUSTRIES LTD, CONDUCTORS DIVISION

Manufacturer of Conductor, OPGW & Wire Rods for Power Transmission and Distribution, shall aim to achieve and sustain excellence in all activities.

We are committed to total Customer Satisfaction and continual improvement by providing quality products and services to comply quality requirements which meet customer expectations at all times.

WE ARE FURTHER COMMITTED TO PROVIDE:

- 1** Safe and healthy working environment for all employees including contract persons.
- 2** Training to all employees for skill and competence building and involvement at all levels in QHSE Activities.
- 3** Compliance to all applicable legal and other requirements.
- 4** Continual improvement of QHSE performance.
- 5** Prevention of pollution, injury and ill health.
- 6** Conservation and optimum use of Natural Resources.

APAR

QUALITY
POLICY





POWERLINE

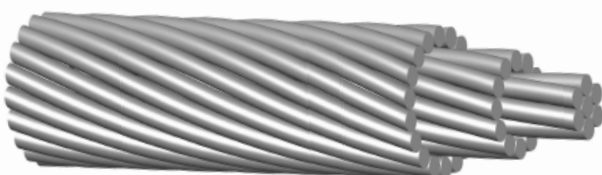
PRODUCT FEATURES

- 1 EC GRADE ALUMINIUM WIRE ROD -**
7.60 mm, 9.50 mm, 12.0 mm (For all kinds of Cables & Conductors)
- 2 AL. ALLOY WIRE RODS (6101 & 6201 GRADE) & MECHANICAL ALLOY WIRE RODS (6061,6063 & 65032 GRADE)-**
7.60 mm, 9.50 mm, 12.0 mm (For all kinds of Cables & Conductors)
- 3 MECHANICALLY ALLOY WIRE**
3.0 to 12.0 mm, TS temper- (Sol. treated, Cold worked & artificially aged)
- 4 ALL ALUMINIUM CONDUCTOR(AAC):**
is made up of one or more strands of hard drawn Aluminum Wires. The EC grade aluminum Conductor has a minimum conductivity of 61.0% IACS.

FEATURES:

- High current carrying capacity.
- Suitable for low and medium voltage lines in urban area
- Excellent resistance to corrosion
- Ideal for use in low humid and low corrosive areas

[Aluminum 1350-H19 Wires](#)



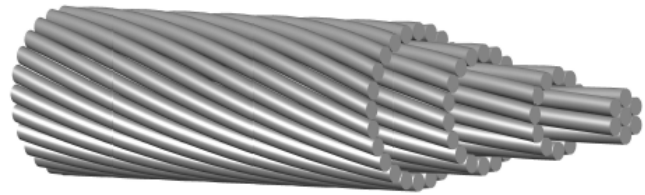
[Wire Rods & Specialty Wires](#)



ACSR Overhead Conductors



Aluminum Alloy Conductor - AAAC



5 ALUMINIUM CONDUCTOR STEEL REINFORCED (ACSR):

These are concentrically stranded conductor with one or more layers of hard drawn Aluminium wire on galvanized steel wire core which are coated with zinc with Class A Coating. The core can be single wire or stranded depending on the size of the conductors.

FEATURES:

- High Tensile strength
- Better sag properties
- Economic design
- Suitable for remote applications involving long spans

6 ALL ALUMINIUM ALLOY CONDUCTORS (AAAC):

These are made out of high strength Aluminium Magnesium-Silicon alloy. As compared to conventional ACSR, AAAC are of lighter weight, comparable strength & current carrying capacity, lower electrical losses and superior corrosion resistance, This has given AAAC a wide acceptance in the distribution and transmission lines.. This conductor has a minimum conductivity of 52.5% I ACS.

FEATURES:

- High strength to weight ratio
- Better sag characteristics
- Improved electrical properties
- Excellent resistance to corrosion



7 Aluminium Alloy Conductor Steel Reinforced Conductors (AACSR):

is a concentrically stranded conductor composed of one or more layers of Aluminium-Magnesium-Silicon alloy wire stranded with a high-strength coated steel core. AACSR Conductors have approx. 40% to 60% more strength than comparable standard ACSR with only 8 to 10% decrease in conductivity.

FEATURES:

- Offers optimal strength for line design
- Improved strength to weight ratio
- Ideal for extra long spans and heavy load conditions
- Excellent resistance to corrosion

8 Aluminium Conductor Steel Reinforced Conductors (ACAR):

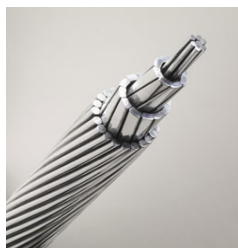
is formed by concentrically stranded Wires of Aluminium on high strength Aluminium-Magnesium-Silicon (AlMgSi) Alloy core. ACAR has got a better mechanical and electrical properties as compared to an equivalent conductors of ACSR, AAC or AAAC. A very good balance between the mechanical and electrical properties therefore makes ACAR the best choice where the ampacity, strength, and light weight are the main consideration of the line design. These conductors are extensively used in overhead transmission and distribution lines.

FEATURES:

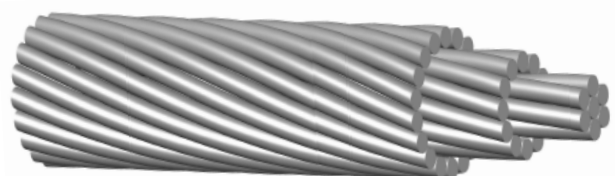
- Improved strength to weight ratio
- Improved mechanical properties
- Improved electrical properties
- Excellent resistance to corrosion Specifications



[AACSR Overhead Conductors](#)



[ACAR – Overhead Conductor](#)

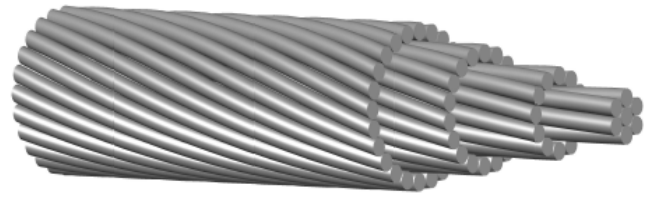




[ACSR/AW & AAA 1120 Overhead Conductors](#)



[Aluminum Alloy Conductors – AL-59 & AL-57](#)



9 Aluminium Conductor Aluminium Clad Steel Reinforced (ACSR/ AW or ACSR/ AS):

are concentrically stranded conductors with one or more layers of hard drawn Aluminium wires on Aluminium Clad steel wire core. The mechanical properties of ACSR/AS conductors are similar to ACSR conductors but offers improved ampacity and resistance to corrosion because of the presence of Aluminium clad steel wires in the core. These conductors are better replacement for ACSR conductors where corrosive conditions are severe.

FEATURES:

- Good mechanical properties
- Improved electrical characteristics
- Excellent corrosion resistance
- Better Sag properties.

10 High Conductivity Alloy Conductor (AL 59, AL 57, AAAC 1120 etc):

These are low resistance High Conductivity alloy conductors with excellent electrical characteristics, excellent sag-tension characteristics and superior corrosion resistance to that of ACSR. As compared to ACSR they have lighter weight, comparable strength and current carrying capacity, lower electrical losses and superior corrosion resistance have given this conductor wide acceptance as a transmission conductor. It has found limited use, however, as a distribution conductor

FEATURES:

- Better Conductivity, so better power transmission.
- Lower Operating costs due to lower ohmic losses.
- Can be recycled easily



11 High Temperature Thermal Resistant Alloy Conductor (TACSR, TACSR/AW, TACIR/AW etc.)

These are high ampacity conductors with inner core composed of galvanized steel, Al. clad Steel, Al. clad Invar Steel etc. & outer layer composed of thermal resistant aluminium alloy.

FEATURES:

- These can operate upto 150°C degree with specified strength loss, Can carry 50 % to 60 % more current as that of ACSR of the same size.
- For uprating lines, no modifications or reinforcement is required to the existing towers.

12 Aluminium Conductor Steel Supported (ACSS and ACSS/TW):

is constructed of fully annealed Aluminium wires formed into a Round or trapezoidal shape. The Aluminium wires are stranded around a steel core of seven or more wires as described in ASTM B-856 & ASTM B-857. ACSS & ACSS/TW can be designed with both equal area or equal diameter, compared to conventional round stranded conductors, to optimize line design options.

FEATURES:

- The improved conductor can operate continuously at **temperatures** up to 250°C without loss of strength;
- Its sag is less than that of conventional composite conductors;
- Final sags are not affected by creep;
- It has excellent self-damping characteristics

13 High Temperature Super Thermal Resistant Alloy Conductor (STACIR/ AW) :

These are high ampacity conductors with inner core composed of galvanized steel, Al. clad Steel, Al. clad Invar Steel etc. & outer layer composed of thermal resistant aluminum alloy. These can operate up to 210°C degree with specified strength loss, Can carry 100% more current as that of ACSR of the same size.

For uprating lines, no modifications or reinforcement is required to the existing towers.

14 Gap-type Conductor- GTACSR/GZTACSR:

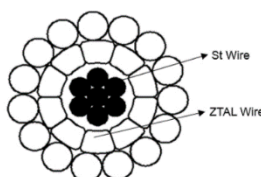
These conductors have a special construction feature with a small gap filled with grease between the high strength steel core and the thermal resistant Al-Zr alloy conductive layers. Installation method of GZTACSR is well but requires skilled specialists because at the time of sagging, a special sagging method is required to apply all the tension to the steel core only. Gap-type conductors are particularly suitable to replace ACSR conductors in flat lands or in any case with small difference in level.

FEATURES:

- Tension the core and the external layer independently to have the knee-point at the installation temperature
- Limiting the sag increase with the increase of the temperature by the thermal expansion coefficient above knee-point related to the steel core
- Maintaining the mechanical strength of the conductor with continuous operating temperature up to 150°C & 210°C
- Reduced cost due to no expensive materials being required



[GAP Type Overhead Conductors](#)



[INVAR Type Overhead Conductors](#)



15 GSW Earth Wire, Stay Wire, Guy Wires, Spaces Cables, etc.

are used as overhead ground wire or static wire on transmission lines, as pole or structure guy wires, and as messenger cable for field-erected aerial cable.

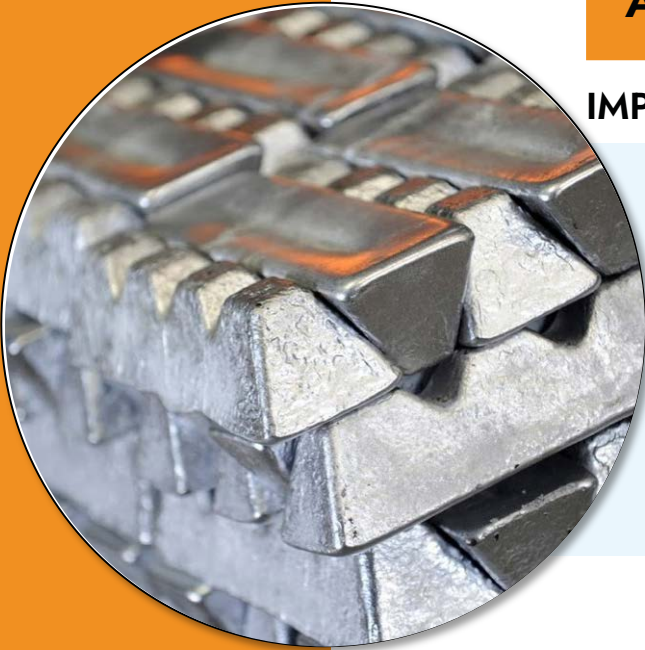
“ OUR ACCOLADES SPEAK FOR THEMSELVES
&
WE HAVE THE QUALITY CERTIFICATES TO PROVE THEM ”





PLANT

OVERVIEW



AL. SAW INGOT

IMPORTANT RAW MATERIALS & ITS SOURCES

- EC grade aluminium, high carbon wire rod, high grade electrolytic zinc, magnesium, silicon etc.
- London metal exchange
- All prime producers in India

- For conversion of aluminium ingots to aluminium wire rods.
- Aluminium ingots to aluminium alloy online solution treated wire rods in t-4 temper & m temper
- We have inhouse testing facility to



CC & R PLANT



PLANT

OVERVIEW

EC/AL. ALLOY WIRE

Final EC / Alloy wire rods

- EC grade aluminium wire rods (9.5 mm & 7.6 mm)
- Aluminium alloy wire rods (6201 alloy rod in T-4 temper - online solutionised).
- Aluminium alloy wire rods (6201 alloy rod in M temper).



- Drawing of E.C. / Al alloy wire rod to required size as drawn wires as per relevant technical specifications.

EC/ALLOY WIRE DRAWING M/C



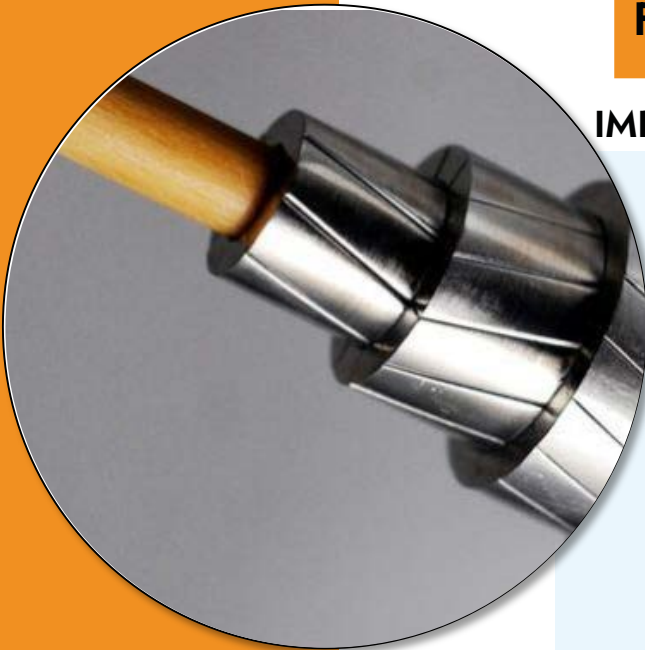
PLANT

OVERVIEW

FINAL CONDUCTOR STRANDING

IMPORTANT RAW MATERIALS & ITS SOURCES

- 37/61/89 strand transmission & 7/19 strand distribution conductor & **GSW** core wire.
- Stranding drawn/aged wire and steel core together to form stranded conductor as per **requisite** technical specification.
- Stranding HTGS wire to form steel core required for ACSR conductors as per relevant specification (intermediate production stage of ACSR conductor).





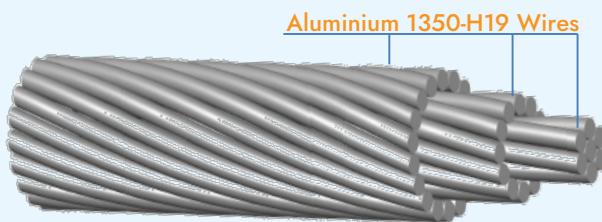
POWERLINE

ALL ALUMINIUM CONDUCTOR (AAC)

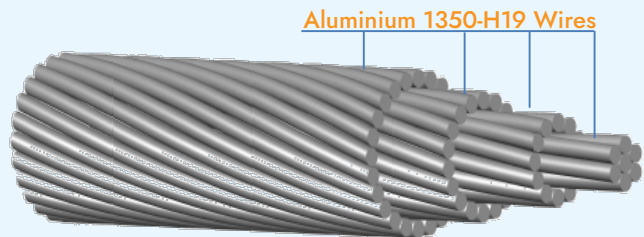
Is made up of one or more strands of hard drawn Aluminium Wires. The EC grade **Aluminium** Conductor has a minimum conductivity of **61.0%** IACS.

CONSTRUCTION:

Aluminium 1350–H19 Wires, concentrically stranded over a central wire of Aluminium 1350–H19.



Aluminium 1350-H19 Wires



Aluminium 1350-H19 Wires

FEATURES:

- High current carrying capacity.
- Suitable for low and medium voltage lines in urban area
- Excellent resistance to corrosion
- Ideal for use in low humid and low corrosive areas

* Current capacity based on referenced conductor temperature, 0.56 m/s wind, 0 m Elevation, 0.45 Emissivity, 0.80 absorptivity, 45°C Ambient temperature, 1045 W/m² Solar radiation.



POWERLINE

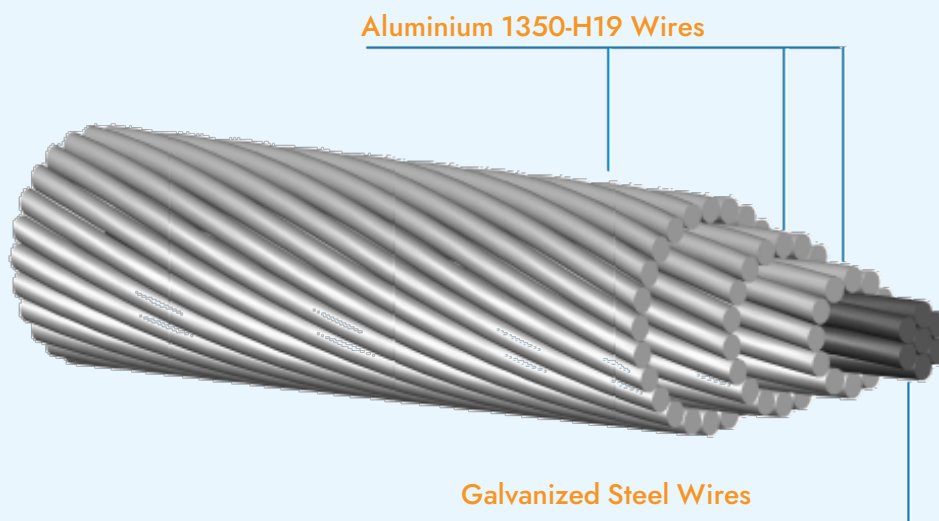
ALUMINIUM

CONDUCTOR STEEL REINFORCED (ACSR)

These are concentrically stranded conductor with one or more layers of hard drawn Aluminium wire on galvanized steel wire core which are coated with zinc with Class A / Class B Coating. The core can be single wire or stranded depending on the size of the conductors.

CONSTRUCTION:

Aluminium 1350–H19 Wires, concentrically stranded over a central wire/core of Galvanized steel



FEATURES:

- High Tensile strength
- Better sag properties
- Economic design
- Suitable for remote applications involving long spans

* Current capacity based on referenced conductor temperature, 0.56 m/s wind, 0 m Elevation, 0.45 Emissivity, 0.80 absorptivity, 45°C Ambient temperature, 1045 W/m² Solar radiation.



POWERLINE

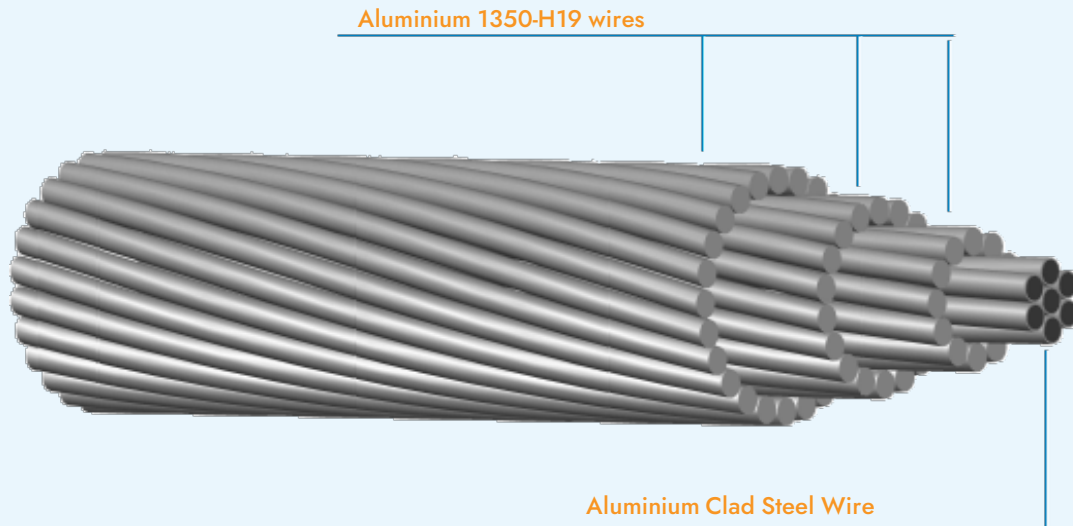
ALUMINIUM

CONDUCTOR ALUMINIUM CLAD STEEL REINFORCED (ACSR/AW or ACSR/AS)

These are concentrically stranded conductors with one or more layers of hard drawn Aluminium wires on Aluminium Clad steel wire core. The mechanical properties of ACSR/AS conductors are similar to ACSR conductors but offers improved ampacity and resistance to corrosion because of the presence of Aluminium clad steel wires in the core. These conductors are better replacement for ACSR conductors where corrosive conditions are severe.

CONSTRUCTION:

Aluminium 1350–H19 Wires, concentrically stranded over a central wire/core of Aluminium clad steel.



FEATURES:

- Good mechanical properties
- Improved electrical characteristics
- Excellent corrosion resistance
- Better Sag properties

* Current capacity based on referenced conductor temperature, 0.56 m/s wind, 0 m Elevation, 0.45 Emissivity, 0.80 absorptivity, 45°C Ambient temperature, 1045 W/m² Solar radiation.



POWERLINE

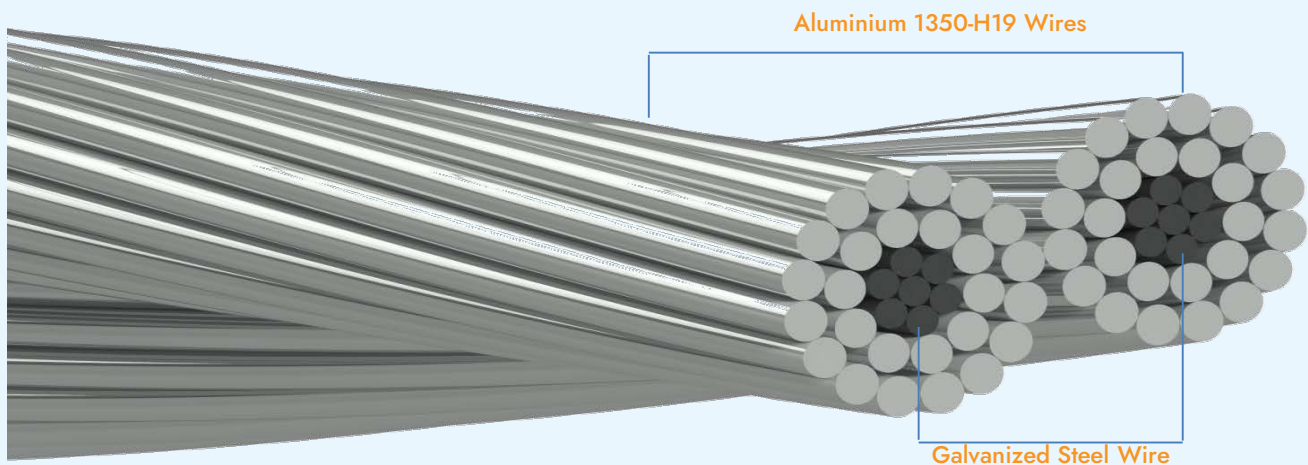
ALUMINIUM

CONDUCTOR STEEL REINFORCED, TWISTED PAIR CONDUCTOR (ACSR/TP)

These conductors are composed of two identical bare ACSR conductors twisted together with a left-hand lay. This gives the conductor a spiral shape which allows the conductor to protect against the effect of aeolian vibration and ice galloping to which many transmission and distribution projects are exposed.

CONSTRUCTION:

ACSR/TP consists of two ACSR conductors with long lay lengths twisted around each other.



FEATURES:

- Resist Aeolian vibration and galloping due to wind and ice
- Twisted shape offers low torsional stiffness.
- ACSR/TP conductors permit higher line tensions, which help reduce line costs by permitting lower sag and/or longer spans.

* Current capacity based on referenced conductor temperature, 0.56 m/s wind, 0 m Elevation, 0.45 Emissivity, 0.80 absorptivity, 45°C Ambient temperature, 1045 W/m² Solar radiation.



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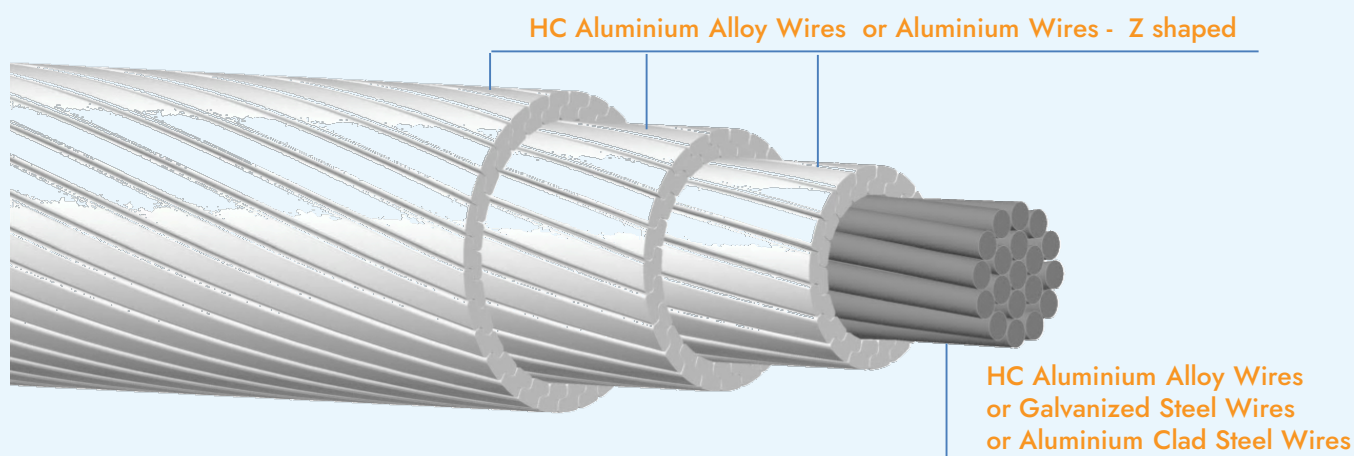
"POWER-ZAD"

CONDUCTOR

This conductor is a concentrically stranded conductor composed of one or more layers of High Conductivity Aluminium alloy wire or Aluminium Wires of Round or Z-shaped stranded over a central core of round shaped HC Aluminium Alloy Wires or Galvanized Steel Wires or Aluminium Clad Steel Wires. The external surface is smoother than that of round wires, can reduce the load against climatic influences and significantly reduce aerodynamic drag and the dance of wires.

CONSTRUCTION:

Aluminium or Aluminium Alloy Wires of Round / Z- shaped, concentrically stranded over a central core of Round Wires



FEATURES:

- Reduced drag coefficient (Aerodynamic Drag).
- Greater useful cross section
- Improved shock absorption & Self-damping
- Superior behavior in ice and snow climates
- The central core is filled with Superior quality grease (Optional)

* Current capacity based on referenced conductor temperature, 0.56 m/s wind, 0 m Elevation, 0.45 Emissivity, 0.80 absorptivity, 45°C Ambient temperature, 1045 W/m² Solar radiation.



POWERLINE

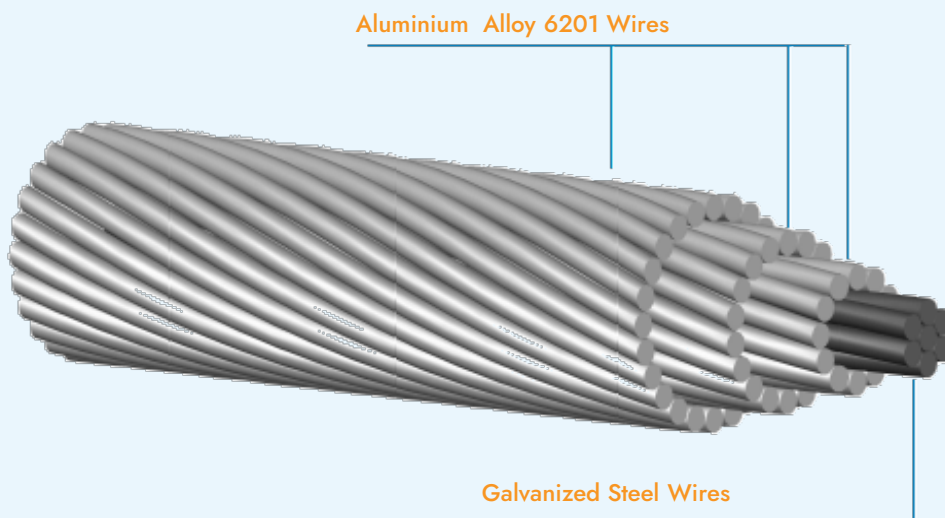
ALUMINIUM

ALLOY CONDUCTOR STEEL REINFORCED (AACSR)

It is a concentrically stranded conductor composed of one or more layers of Aluminium-Magnesium-Silicon alloy wire stranded with a high-strength coated steel core. AACSR Conductors have approx. 40% to 60% more strength than comparable standard ACSR with only 8 to 10% decrease in conductivity.

CONSTRUCTION:

Aluminium 6201 Wires, concentrically stranded over a central wire/core of Aluminium Galvanized steel.



FEATURES:

- Offers optimal strength for line design
- Improved strength to weight ratio
- Ideal for extra long spans and heavy load conditions
- Excellent resistance to corrosion

* Current capacity based on referenced conductor temperature, 0.56 m/s wind, 0 m Elevation, 0.45 Emissivity, 0.80 absorptivity, 45°C Ambient temperature, 1045 W/m² Solar radiation.



POWERLINE

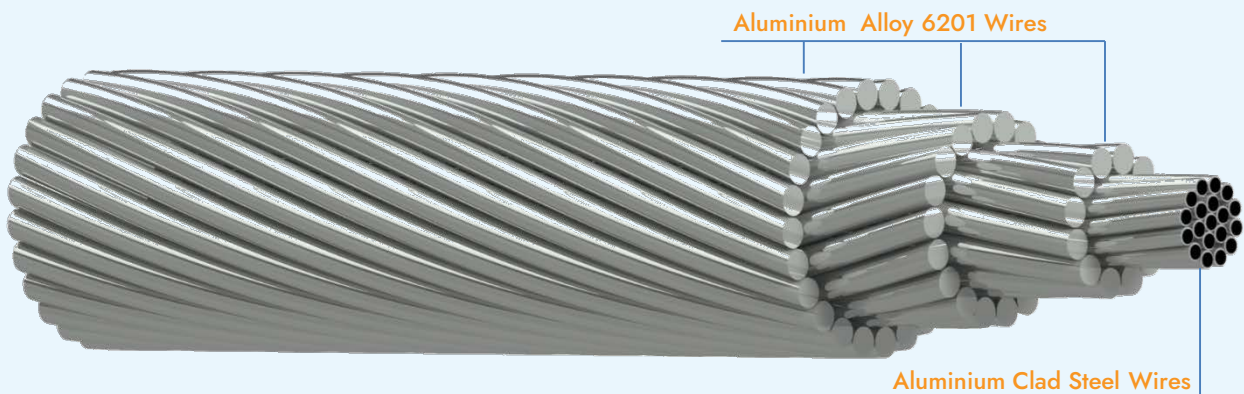
ALL ALUMINIUM

ALLOY CONDUCTOR, ALUMINIUM CLAD STEEL REINFORCED (AACSR/AW)

It is a concentrically stranded conductor composed of one or more layers of Aluminium-Magnesium-Silicon alloy wire stranded over a High Strength Aluminium Clad Steel core. AACSR/AW Conductors have approx. 40% to 60% more strength than comparable standard ACSR with only 8 to 10% decrease in conductivity.

CONSTRUCTION:

Aluminium 6201 Wires, concentrically stranded over a central wire/core of Aluminium Galvanized steel.



FEATURES:

- Offers optimal strength for line design
- Improved strength to weight ratio
- Ideal for extra long spans and heavy load conditions
- Excellent resistance to corrosion

* Current capacity based on referenced conductor temperature, 0.56 m/s wind, 0 m Elevation, 0.45 Emissivity, 0.80 absorptivity, 45°C Ambient temperature, 1045 W/m² Solar radiation.



POWERLINE

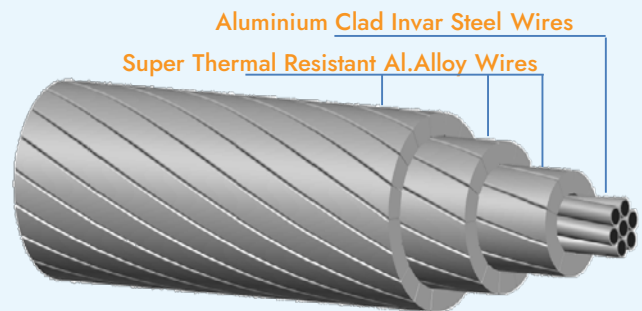
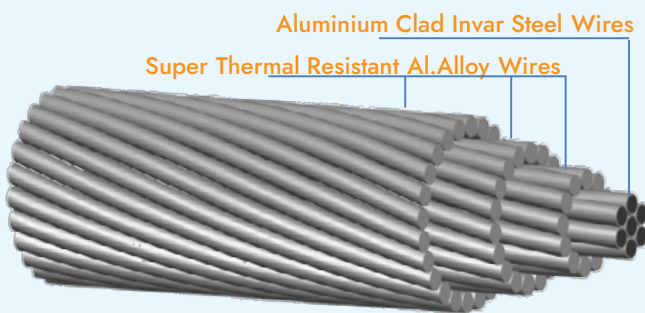
SUPER THERMAL

**RESISTANT ALUMINIUM ALLOY CONDUCTOR,
ALUMINIUM CLAD INVAR REINFORCED
(STACIR & STACIR/TW)**

These are high ampacity conductors with inner core composed of Aluminium clad Invar Steel (Ni-Fe Alloy) & outer layer composed of Super Thermal Resistant Aluminium alloy with round or trapezoidal shaped wires.

CONSTRUCTION:

Aluminium-Zirconium Alloy wires (Type-AT3), concentrically stranded over a Aluminium Clad Invar Steel core.



Values based on following Specifications:

- Super Thermal-resistant aluminium alloy wires (Type-AT3) for overhead line conductor as per IEC 62004
- Concentric lay overhead electrical stranded conductors IEC 61089, IEC 62219 or ASTM B779
- Aluminium-clad steel wires for electrical purposes IEC 61232, JCS 1404 & More

FEATURES:

- Offers optimal strength for line design
- Improved strength to weight ratio
- Ideal for extra long spans and heavy load conditions
- Excellent resistance to corrosion

* Current capacity based on referenced conductor temperature, 0.56 m/s wind, 0 m Elevation, 0.45 Emissivity, 0.80 absorptivity, 45°C Ambient temperature, 1045 W/m² Solar radiation.



POWERLINE

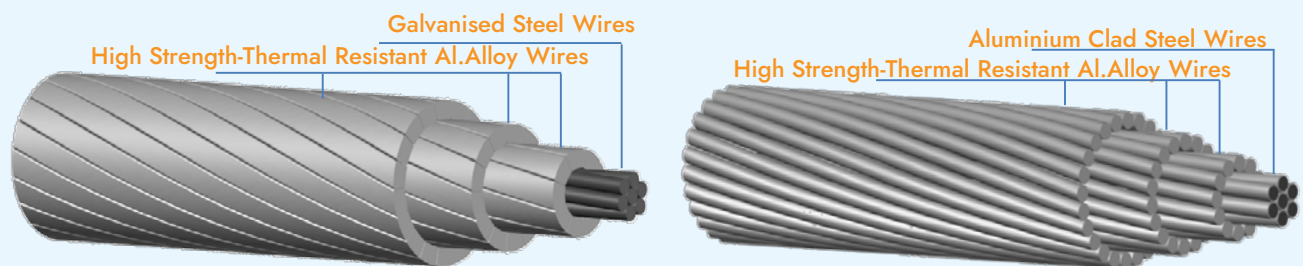
HIGH STRENGTH -

THERMAL RESISTANT ALUMINIUM CONDUCTOR STEEL REINFORCED (KTACSR & KTACSR/AW)

These are high ampacity conductors with inner core composed of Galvanized steel or Aluminum clad Steel & outer layer composed of high Strength - thermal resistant aluminium alloy with round or trapezoidal shaped.

CONSTRUCTION:

Aluminum-Zirconium Alloy wires (Type-AT2), concentrically stranded over a steel core.



Values based on following Specifications:

- High Strength - Thermal resistant aluminium alloy wires (Type-AT2) for overhead line conductor as per IEC 62004
- Round wire concentric lay overhead electrical stranded conductors IEC 61089
- Zinc-coated steel wires for stranded conductors IEC 888, ASTM B957 & more
- Aluminium Clad Steel Wires, IEC 61232, ASTM B415, EN 50540 & More

FEATURES:

- These can operate upto 150°C with specified strength loss
- Can carry 50 % to 80 % more current as that of ACSR of the same size.
- For large-crossing sections with reduced wind load of the tower.

* Current capacity based on referenced conductor temperature, 0.56 m/s wind, 0 m Elevation, 0.45 Emissivity, 0.80 absorptivity, 45°C Ambient temperature, 1045 W/m² Solar radiation.



POWERLINE

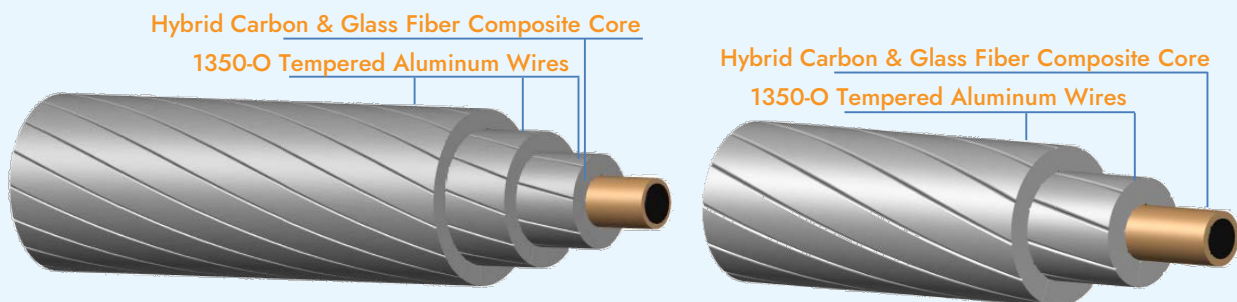
ALUMINUM CONDUCTOR

**Composite Core
(ACCC®)**

These are "High-temperature low-sag" (HTLS) Conductors with excellent electrical characteristics, excellent sag-tension characteristics and superior corrosion resistance to that of ACSR. As compared to ACSR they have lighter weight, comparable strength and current carrying capacity, lower electrical losses and superior corrosion resistance have given this conductor wide acceptance as a transmission conductor. It has found limited use, however, as a distribution conductor.

CONSTRUCTION:

Fully annealed trapezoidal shaped aluminium wires concentrically stranded over hybrid carbon and glass fiber core (Composite Core)



Values based on following Specifications:

- 1350-O tempered aluminum wires as per ASTM B 609 or EN 50540
- Hybrid carbon and glass fiber core (Composite Core) according to ASTM B987
- ACCC® Conductors are required to exhibit lay lengths (ratios) that conform to ASTM B 857 or EN 50540.

FEATURES:

- Can be operated up to 180°C
- Lowest sag among the HTLS category due to lowest coefficient of thermal expansion and higher strength to weight ratio.
- Highest Conductivity Conductor.

* Current capacity based on referenced conductor temperature, 0.56 m/s wind, 0 m Elevation, 0.45 Emissivity, 0.80 absorptivity, 45°C Ambient temperature, 1045 W/m² Solar radiation.



POWERLINE

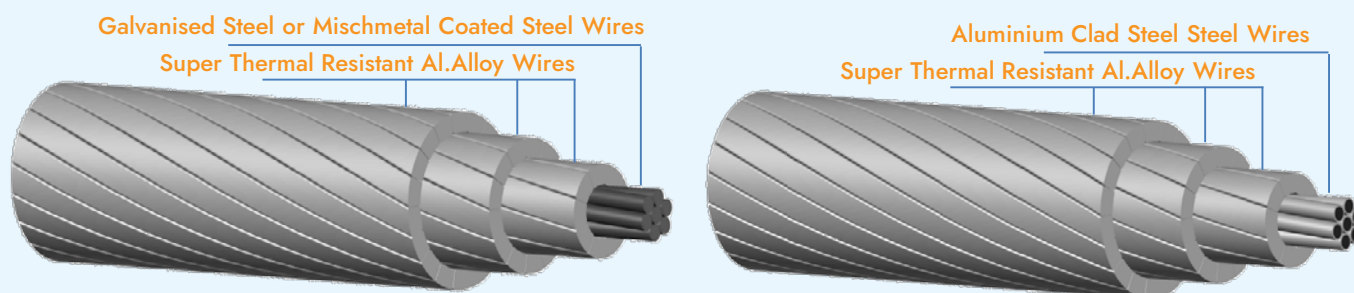
SUPER THERMAL

RESISTANT ALUMINIUM ALLOY CONDUCTOR STEEL REINFORCED (ZTACSR & ZTACSR/TW)

These are high ampacity conductors with inner core composed of Galvanized steel, Mischmetal Alloy Coated Steel or Aluminum clad Steel & outer layer composed of Super Thermal Resistant Aluminium alloy with round or trapezoidal shaped.

CONSTRUCTION:

Aluminum-Zirconium Alloy wires (Type-AT3), concentrically stranded over a steel core.



Values based on following Specifications:

- Thermal-resistant aluminium alloy wires (Type-AT3) for overhead line conductor as per IEC 62004
- Round wire concentric lay overhead electrical stranded conductors IEC 61089, IEC 62219 or ASTM B779
- Zinc-coated steel wires for stranded conductors IEC 888, ASTM B957 & more
- Zinc–5% Aluminum-Mischmetal Alloy-Coated Steel Core Wire EN 50540, ASTM B802, ASTM B803 or ASTM B958.
- Aluminium Clad Steel Wires, IEC 61232, ASTM B415, EN 50540 & More

FEATURES:

- These can operate up to 210°C with specified strength loss
- Can carry 100~150% more current as that of ACSR of the same size.
- For uprating lines, no modifications or reinforcement is required to the existing towers

* Current capacity based on referenced conductor temperature, 0.56 m/s wind, 0 m Elevation, 0.45 Emissivity, 0.80 absorptivity, 45°C Ambient temperature, 1045 W/m² Solar radiation.



POWERLINE

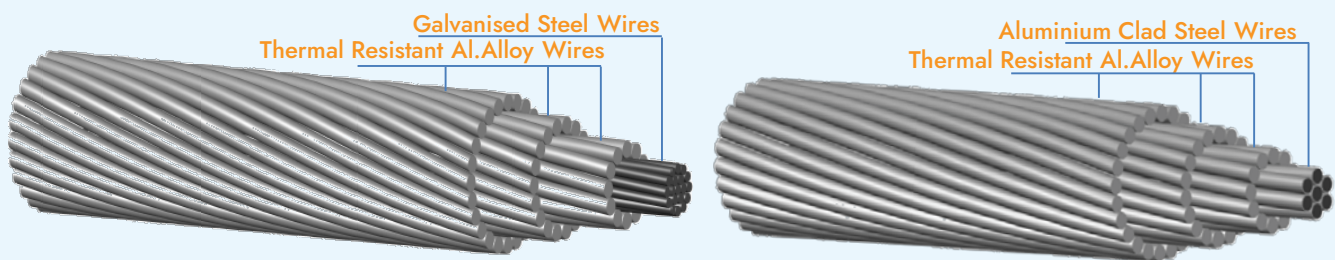
THERMAL RESISTANT

ALUMINIUM CONDUCTOR STEEL REINFORCED (TACSR & TACSR/AW)

These are high ampacity conductors with inner core composed of Galvanized steel or Aluminum clad Steel & outer layer composed of thermal resistant aluminium alloy with round or trapezoidal shaped.

CONSTRUCTION:

Aluminium-Zirconium wires (Type-AT1), concentrically stranded over a steel core.



Values based on following Specifications:

- Thermal-resistant aluminium alloy wires (Type-AT1) for overhead line conductor as per IEC 62004
- Round wire concentric lay overhead electrical stranded conductors IEC 61089
- Zinc-coated steel wires for stranded conductors IEC 888, ASTM B957 & more
- Aluminium Clad Steel Wires, IEC 61232, ASTM B415, EN 50540 & More

FEATURES:

- These can operate upto 150°C with specified strength loss,
- Can carry 50 % to 60 % more current as that of ACSR of the same size.
- For uprating lines, no modifications or reinforcement is required to the existing towers

* Current capacity based on referenced conductor temperature, 0.56 m/s wind, 0 m Elevation, 0.45 Emissivity, 0.80 absorptivity, 45°C Ambient temperature, 1045 W/m² Solar radiation.



POWERLINE

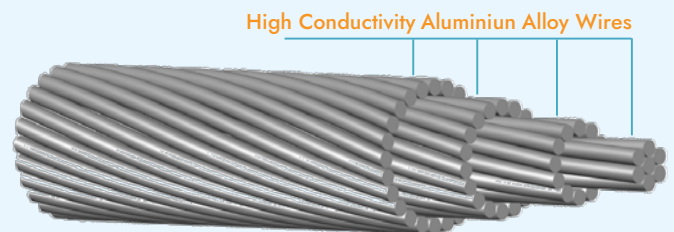
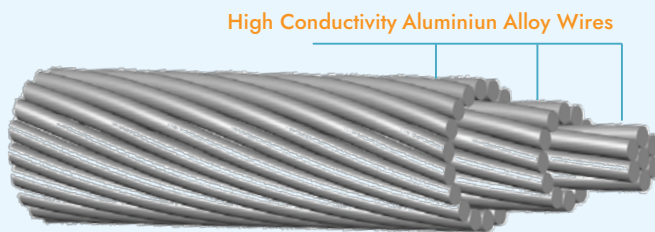
HIGH CONDUCTIVITY

ALLOY CONDUCTOR (AL5, AL6, AL7, AL57, AL59, AL60, AAAC 1120, ETC)

These are low resistance High Conductivity alloy conductors with excellent electrical characteristics, excellent sag-tension characteristics and superior corrosion resistance to that of ACSR. As compared to ACSR they have lighter weight, comparable strength and current carrying capacity, lower electrical losses and superior corrosion resistance have given this conductor wide acceptance as a transmission conductor. It has found limited use, however, as a distribution conductor.

CONSTRUCTION:

Aluminium Alloy wires, concentrically stranded.



Values based on following Specifications:

- Swedish Specification SS 424 08 14, SS 424 08 12, EN 50182, AS 1531 & More.

FEATURES:

- Better Conductivity, so better power transmission.
- Lower Operating costs due to lower ohmic losses.
- Can be recycled easily.

* Current capacity based on referenced conductor temperature, 0.56 m/s wind, 0 m Elevation, 0.45 Emissivity, 0.80 absorptivity, 45°C Ambient temperature, 1045 W/m² Solar radiation.



POWERLINE

ALUMINIUM

CONDUCTOR STEEL SUPPORTED - (ACSS)

ACSS is a composite concentric-lay stranded conductor. Steel strands form the central core of the conductor with one or more layers of aluminium 1350-O wire stranded around it. The steel core carries most or all of the mechanical load of the conductor due to the "O" (fully annealed or soft) temper Aluminium. Steel core wires are protected from corrosion by galvanizing, Aluminum Cladding or mischmetal alloy coating. Corrosion protection should be selected to suit the environment to which the conductor will be exposed.

APPLICATIONS:

ACSS is used for overhead distribution and transmission lines. It is designed to operate continuously at elevated temperatures up to 250°C without loss of strength; it sags less under emergency electrical loadings than ACSR; it is self-damping if pre stretched during installation; and its final sags are not affected by long term creep of Aluminium. The advantages make ACSS especially useful in reconductoring applications requiring increased current with existing tensions and clearances, new line applications where structures can be economized because of reduced conductor sag, new line applications requiring high emergency loadings, and lines where aeolian vibration is a problem.

Values based on following Specifications:

- Swedish Specification SS 424 08 14, SS 424 08 12, EN 50182, AS 1531 & More.

* Current capacity based on referenced conductor temperature, 0.56 m/s wind, 0 m Elevation, 0.45 Emissivity, 0.80 absorptivity, 45°C Ambient temperature, 1045 W/m² Solar radiation.



POWERLINE

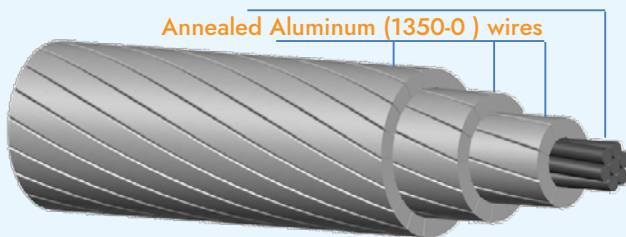
ALUMINIUM

CONDUCTOR STEEL SUPPORTED - (ACSS)

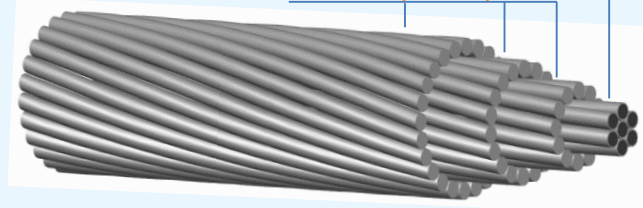
Values based on following Specifications:

- B500 Metallic Coated Stranded Steel Core For Aluminium Conductors, Steel Reinforced.
- B802 Zinc-5% Aluminum-Mischmetal Alloy-Coated Steel Core Wire for Aluminum Conductors, Steel Reinforced
- B803 High-Strength Zinc-5% Aluminum-Mischmetal Alloy-Coated Steel Core Wire for Aluminum and Aluminum-Alloy Conductors, Steel Reinforced
- B958 Extra-High-Strength and Ultra-High-Strength Class A Zinc—5% Aluminum-Mischmetal Alloy-Coated Steel Core Wire
- B498 Zinc-Coated (Galvanized) Steel Core Wire for Aluminum Conductors, Steel Reinforced
- B606 High-Strength Zinc-Coated (Galvanized) Steel Core Wire for Aluminum and Aluminum-Alloy Conductors, Steel Reinforced
- B957 Extra-High-Strength and Ultra-High-Strength Zinc-Coated (Galvanized) Steel Core Wire for Overhead Electrical Conductors
- B502 Aluminum-Clad Steel Core Wire for Aluminum Conductors, Aluminum-Clad Steel Reinforced
- B609 Aluminum 1350 Round Wire, Annealed and Intermediate Tempers, for Electrical Purposes.
- B856 Concentric-Lay-Stranded Aluminium Conductors, Coated Steel Supported (ACSS).
- B857 Shaped Wire Compact Concentric-Lay-Stranded Aluminum Conductors, Coated-Steel Supported (ACSS/TW)

Galvanized / Mischmetal Alloy Coated Steel Wires



Aluminum Clad Steel Wire
Annealed Aluminum (1350-O) wires



* Current capacity based on referenced conductor temperature, 0.56 m/s wind, 0 m Elevation, 0.45 Emissivity, 0.80 absorptivity, 45°C Ambient temperature, 1045 W/m² Solar radiation.



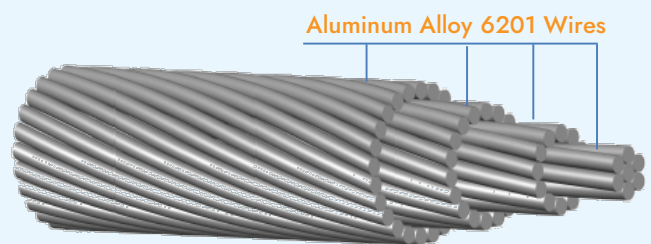
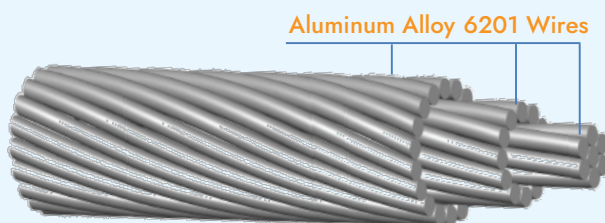
POWERLINE

ALL ALUMINUM ALLOY CONDUCTOR (AAAC)

These are made out of high strength Aluminum-Magnesium-Silicon alloy. As compared to conventional ACSR, AAAC are of lighter weight, comparable strength & current carrying capacity, lower electrical losses and superior corrosion resistance, This has given AAAC a wide acceptance in the distribution and transmission lines.. This conductor has a minimum conductivity of 52.5% IACS.

CONSTRUCTION:

Aluminum Alloy 6201 Wires, concentrically stranded over a central wire of Aluminum Alloy 6201.



FEATURES:

- High strength to weight ratio
- Improved electrical properties
- Excellent resistance to corrosion

* Current capacity based on referenced conductor temperature, 0.56 m/s wind, 0 m Elevation, 0.45 Emissivity, 0.80 absorptivity, 45°C Ambient temperature, 1045 W/m² Solar radiation.

SPECIALITY ALLOYS 6xxx SERIES

Electrical Grade Aluminum Alloy [6101 & 6201]



INTRODUCTION:

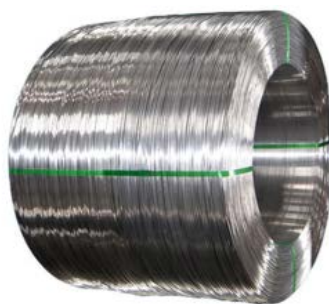
6000 series commercial aluminium alloys contain both silicon and magnesium which forms magnesium silicide – this formation makes the aluminium alloy heat-treatable.

Chemical Composition

ALUMINIUM ALLOY DESIGNATION	% CHEMICAL COMPOSITION										
	SI	FE	CU	CR	ZN	MN	MG	B	OTHER EACH	OTHER TOTAL	AL
6101	0.40 – 0.80	0.50	0.10	0.03	0.10	0.03	0.50 – 0.80	0.06	0.03	0.10	REM
6201	0.50 – 0.90	0.50	0.10	0.03	0.10	0.03	0.60 – 0.90	0.06	0.03	0.10	REM

Electrical & Mechanical Properties of Aluminum Alloy Wire & Wire Rods.

ALUMINIUM ALLOY DESIGNATION	APAR PRODUCT CODE	TEMPER	DIAMETER	TENSILE STRENGTH (MPA)	ELONGATION	RESISTIVITY	CONDUCTIVITY
			(MM)	MIN	(%)	($\mu\Omega m$)	(%IACS)
6101	Alloy 6101 (T4), Sol. Tr.	T4	7.60 $\pm$ 0.40	157	14.0	34.482	50.00
			9.50 $\pm$ 0.50				
			12.50 $\pm$ 0.50				
	Alloy 6101 (T8), Sol. Tr.	T8	6.00 to 3.00	295	3.0	32.53	53.00



- o We develop and manufacture a broad range of alloys.
- o Wires available with different sizes as per customer requirement.
- o Wire Rods can be supplied in Coils of maximum weight 2.0MT, Drawn wire 6.0mm up to 4.0mm in coils of maximum weight 1.0MT, Drawn wire below 4.0mm up to 3.0mm in coils of maximum weight 0.50MT,
- o The table above shows some typical values but we can also produce according various international standards and tailor made customer specifications.

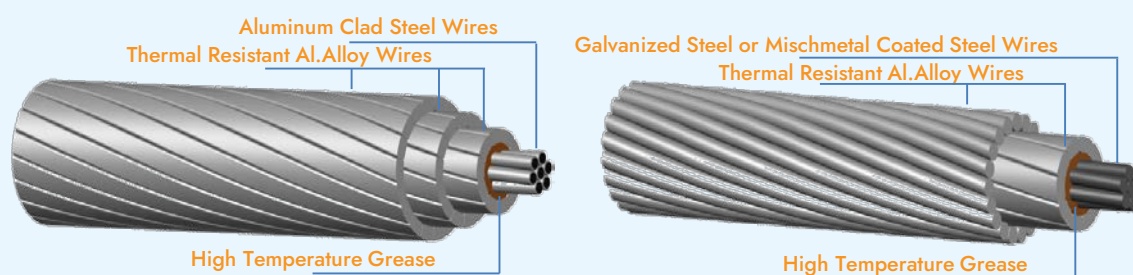
POWERLINE

GAP TYPE THERMAL- RESISTANT ALUMINUM ALLOY CONDUCTOR, STEEL REINFORCED (GTACSR & GZTACSR)

Aluminum-Zirconium wires (Type-AT1 or AT3), concentrically stranded over a steel core having a small gap between the Steel core & thermal-resistant aluminum alloy layer. These combination offers best Mechanical as well as Electrical Characteristics. Extra High Strength Galvanized Steel (EST); or aluminum-clad Extra High Strength Steel (AW). Additional corrosion protection is achieved as High Temperature Grease is applied in Between GAP of Conductor.

CONSTRUCTION:

Aluminum-Zirconium wires (Type-AT3 or AT-1), concentrically stranded over a steel core maintaing gap between the Steel core and first Aluminum Layer.



VALUES BASED ON FOLLOWING SPECIFICATIONS:

- Thermal-resistant aluminum alloy wires (Type-AT3 or AT1) for overhead line conductor as per IEC 62004
- Concentric lay stranded overhead electrical conductors IEC 61089, IEC 62420
- Zinc-coated steel wires for stranded conductors IEC 888, ASTM B957 & more
- Zinc-5% Aluminum-Mischmetal Alloy-Coated Steel Core Wire EN 50540, ASTM B802, ASTM B803 or ASTM B958.
- Aluminum Clad Steel Wires, IEC 61232, ASTM B415, EN 50540 & More

FEATURES:

- These can operate upto 210°C with specified strength loss,
- Can carry 100~150% more current as that of ACSR of the same size.
- For uprating lines, no modifications or reinforcement is required to the existing towers
- Limiting the sag increase with the increase of the temperature by the thermal expansion coefficient above knee-point related to the steel core



POWERLINE

GALVANIZED STEEL

WIRE EARTHWIRE / STAYWIRE / GUYWIRE /
SPACER CABLE (GSW)

GSW Earth Wire, Stay Wire, Guy Wires, Spaces Cables, etc. are used as overhead ground wire or static wire on transmission lines, as pole or structure guy wires, and as messenger cable for field-erected aerial cable.

CONSTRUCTION:

Galvanized steel Wires, concentrically stranded over a central wire of Galvanized steel wire.



GALVANIZED STEEL WIRE EARTHWIRE / STAYWIRE / GUYWIRE / SPACER CABLE (GSW) -BS 183

SECTIONAL AREA	STRANDING		DIAMETER OF EARTHWIRE	WEIGHT	RATED STRENGTH						
	NO. OF WIRES	INDIVIDUAL WIRE DIAMETER			GRADE 350	GRADE 480	GRADE 700	GRADE 850	GRADE 1000	GRADE 1150	GRADE 1300
(MM ²)	(NO.)	(MM)	(MM)	(KG/KM)	(KN)	(KN)	(KN)	(KN)	(KN)	(KN)	(KN)
7.63	3	1.80	3.90	60.00	2.65	3.66	-	-	-	-	-
16.55	3	2.65	5.70	130.00	5.80	7.95	-	-	-	-	-
24.89	3	3.25	7.00	195.00	8.70	11.95	-	-	-	-	-
37.70	3	4.00	8.60	295.00	13.20	18.10	-	-	-	-	-
10.18	4	1.80	4.40	80.00	3.55	4.90	-	-	-	-	-
22.06	4	2.65	6.40	172.00	7.70	10.60	-	-	-	-	-



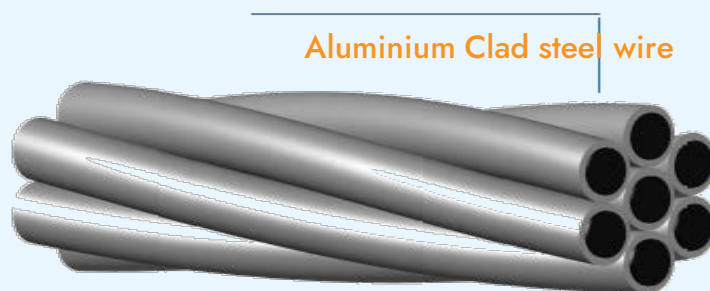
POWERLINE

ALUMINIUM CLAD STEEL WIRE (ACS)

Aluminium-clad steel wire, commonly abbreviated as AW or AS or AC, is an electrical conductor composed of an inner steel core and outer Aluminium cladding. Aluminum clad steel wire is a bimetallic in which aluminum covers on the steel core continuously and evenly.

CONSTRUCTION:

Aluminum clad steel Wires, concentrically stranded over a central wire of Aluminum clad steel wire.



ALUMINUM CLAD STEEL CONDUCTOR (ACS) - EN 50182

CODE NAME	SECTIONAL NAME	STRANDING		OVERALL DIAMETER OF CONDUCTOR	WEIGHT	D C RESISTANCE AT 20°C	RATED STRENGTH
		NO. OF WIRES	INDIVIDUAL WIRE DIAMETER				
	(MM ²)	(NO.)	(MM)	(MM)	(KG/KM)	(Ω/Km)	(KN)
24-A20SA	24.2	7	2.10	6.30	161.5	3.5364	32.49
34-A20SA	34.4	7	2.50	7.50	229.0	2.4953	46.04
49-A20SA	49.5	7	3.00	9.00	329.7	1.7328	66.30
66-A20SA	65.8	19	2.10	10.50	441.0	1.3102	88.18
93-A20SA	93.3	19	2.50	12.50	624.9	0.9245	124.98
117-A20SA	117.0	19	2.80	14.00	783.9	0.7370	156.77
147-A20SA	147.1	37	2.25	15.80	989.2	0.5881	197.13
182-A20SA	181.6	37	2.50	17.50	1 221.2	0.4764	243.38
243-A20SA	242.5	61	2.25	20.30	1 636.1	0.3579	325.00
299-A20SA	299.4	61	2.50	22.50	2 019.8	0.2899	401.24



POWERLINE

MEDIUM VOLTAGE COVERED CONDUCTOR (MVCC)

Construction of Covered Conductor: "Covered conductors consist of a conductor insulated by a covering made of insulating material(s) as protection against accidental contacts with other covered conductors and with grounded parts such as tree branches, etc. In comparison with insulated conductors, this covering has reduced thickness, but is sufficient to withstand the phase-to-earth voltage temporarily"

CONSTRUCTION:

- Aluminum Alloy 6201 Wires, concentrically stranded over a central wire of Aluminum 6201.
- Aluminum 1350—H19 Wires, concentrically stranded over a central wire/core of Galvanized steel.
- 35 mm² to 240 mm² (aluminium alloy), 50 mm² to 150 mm² (total cross-section for steel reinforced aluminium)
- Conductor design: the conductors may be compacted or non-compacted. "Information on bare conductors in frequent use may be found in the national lists, contained in Annex F of EN 50182. "



A – Semiconducting Layer

B – XLPE Insulation

C – UV Protected & Track Resistant Covering

FEATURES:

- Conductor : Longitudinally Water tight ACSR /AAAC/AL7/AL59 Or High Temperature conductor.
- Conductor Screen : Water swellable semi-conducting tape (if required) and extruded semi-conducting compound.
- Inner Insulation: XLPE
- Outer Insulation: UV protected and anti-tracking black colored XLPE / HDPE
- The nominal thickness of the covering shall be not less than 1.20 mm for 11 KV, 2.30 mm for 33 KV & 3.60 mm for 66 KV



POWER CONDUCTORS®

Powering Ahead

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