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Low-creeping energy saving conductor products



The electric power transmission in the world is mainly dependent on aerial transmission lines. The aerial transmission conductor is a kind of necessary carrier for energy transmitting from electricity generating place to electricity receiving place, at the time of transmission energy, transmission conductor also consumes some portion of energy. In China, the power transmission conductor is mainly adopted Concentric-Lay-Stranded Aluminum Conductor, Steel Reinforced (ACSR) products of LGJ series, in the world the application history of this kind of conductor is more than 100 years.

The conductor component in ACSR is made of hard-aluminum, the conductivity of which is about 61% IACS at 20 °C, and the continuous operating temperature is in the range of 70~80 °C. The property of this kind of conductor will be deteriorated at higher temperature, thus the operating temperature of the conductor is restricted, and the rated power transmitting capacity is restricted too. It is a never stopping pursuing for engineers in the world work in this field to research and develop new kinds of conductor so as to realize electric power transmission with high efficiency and low consumption.

We possess independent intellectual property rights: national patent series products of “energy-saving conductor”. The energy-saving conductor series products include:

- I Low-creeping energy saving conductor
- I Energy saving capacity increasing conductor
- I Energy saving capacity expanding conductor

The energy-saving conductor series products have following characteristics:

1. Energy saving: The aluminum conductor in energy-saving conductor is wire or shaped wire made of soft-aluminum with conductivity of 63% IACS (at 20 °C), has much more ascendant electric characteristics compare with ACSR conductor with conductivity of 61% IACS, and reduces about 3% energy consumption in operation.
2. Capacity increasing: The energy-saving conductor series products, according to their different structures, considering the sag value and allowable continuous operating temperature, recommended as 100 °C, 120 °C or 140 °C ~150 °C, could increase capacity 50%, 80%, 100% respectively, compare with the ACSR with same cross-section areas.
3. Small sag value: The creeping value of the steel core with high strength and low creeping is obviously lower than that of ACSR. For energy saving conductor the turn-point temperature of stress transferring due to temperature rising in operation will be appeared in advance. When operating under allowable temperature, the sag value of energy-saving conductor will be basically kept the similar value as corresponding ACSR at 70°C caused by current carrying.
4. Long operating life time: The raw materials of energy saving conductor are almost similar to those of ACSR. Because they are more compact in structure with smooth outer surface and have good self vibration damping characteristics, they have better corrosion-resistance performance and excellent vibration -resistance performance, thus these products possess same or even longer operating life time as conventional conductor products.



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5. Better performance price ratio: The prices of the energy-saving conductor series products are increased not too much compare with prices of conventional conductor products. Considering they could increase electricity transmission capacity and save energy, the construction cost and operating cost of the lines will be much lower.

According to above mentioned characteristics, the energy-saving conductor series products are a new generation of conductor products with high efficiency and low energy consumption. Under the condition of not changing design principles for existing lines, they could dig out about 50%~100% increasing capacity. They will be widely used in construction of new transmission lines, as well as in capacity increasing reconstruction of existing transmission lines, in latter case, existing poles/tower could be kept, only need to replace original conventional conductors to new ones. For power transmission line they are one of the best resource saving conductors.

National patent products resource saving conductors for power transmission line

—energy-saving conductor series products

Energy saving capacity increasing conductor products

- I Aluminum conductor with conductivity of 63%IACS in structure reduce about 3% energy consumption in operation;
- I Allowable continuous operating temperature reaches 120 °C, improve operating current-carrying capacity of the conductor;
- I High strength and low creeping steel core in structure reduces sag of the conductor in operation;
- I When operating at 120 °C, the sag value is the same as that of corresponding conventional conductor at 70°C, increase current carrying capacity 80%; if conductor has same diameter with conventional conductor, could increase current carrying capacity 100%;
- I Small in diameter, reduce wind load of the conductor;
- I Compact in structure, improve corrosion-resistance ability of the conductor;
- I Have smooth outer surface, reduce wind load; Have good self vibration damping characteristics, is of benefit to vibration – resistance; The outer layer wires of conductor are fastened up one by another, with no risk of loose or single wire breakage.
- I Accessories and fittings could be supplied together; allows easy construction.
- I Good performance price ratio.
- I Could be used in construction of new transmission lines, and in capacity-increasing reconstruction for existing transmission lines.

Energy saving capacity increasing conductor products

Main technical parameters

Conductor specification		250/33	250/40	315/41	315/50	400/52	400/64
Conductivity of Aluminum conductor(%IACS)		>=63	>=63	>=63	>=63	>=63	>=63
Steel ratio(%)		13	16	13	16	13	16
Cross sectional area of Aluminum (mm ²)		250	250	315	315	400	400
Conductor diameter (mm)		19.89	20.20	22.32	22.67	25.16	25.54
Mass per length (kg/km)	Aluminum	689.3	689.3	868.5	868.5	1103.8	1103.8
	Steel	253.7	313.2	320.2	394.4	407.5	499.5
	Total	943	1003	1189	1263	1512	1604
Calculated tensile strength at break(N)	Conductor	65320	77000	82400	96400	104600	123000
	Steel core	50320	62000	63500	77500	80600	99000
Tensile strength weight ratio (km)			7.8	7.1	7.8	7.1	7.8
DC resistance at 20°C (ohm/km)			0.1122	0.08905	0.08905	0.07013	0.07013
module of							
Before		73330	75930	73160	75820	73140	75930



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elasticity (N/mm ²)	turn-point*						
	After turn-point*	190000	190000	190000	190000	190000	190000
Linear expansion coefficient x10 ⁻⁶ /°C	Before turn-point*	19.7	19.2	19.7	19.2	19.7	19.2
	After turn-point*	11.5	11.5	11.5	11.5	11.5	11.5
Allowable max operating temperature(°C)			150	150	150	150	150
Calculating conditions		Wind speed:0.5m/s;environment temperature:40°C;sunlight intensity: 1000W/ m ² ;Surface absorbing coefficient:0.9; operating temperature: 70°C ~150 °C					
Current-carrying capacity(A)**	70 °C	441	442	508	510	589	591
	100 °C	691	694	803	808	940	945
	120 °C	804	808	936	942	1099	1105

*:“Before turn-point” and “After turn-point” refer to the values when in operation temperature rises to around turn-point of stress transferring temperature.

**.:In operation, energy consumption of transmission lines is reduced about 3%.

Note: The above values are for reference only.