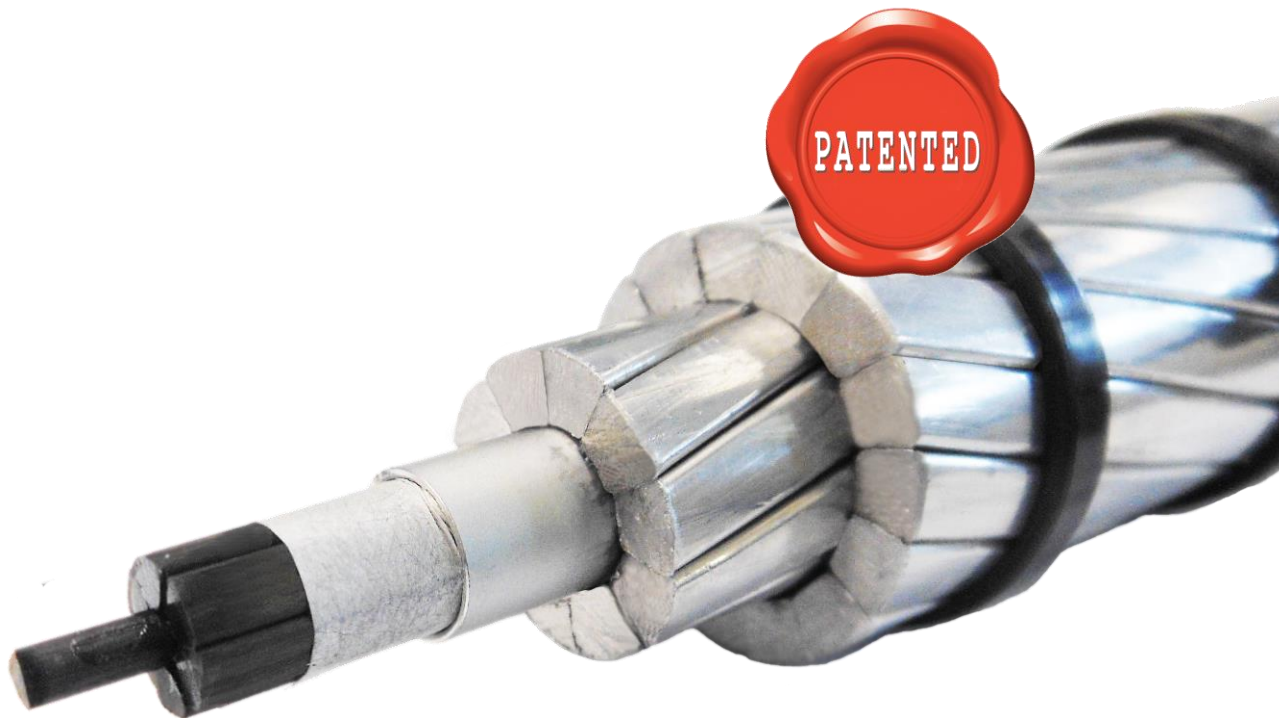


New Technologies

Aluminium Conductor Carbon Fiber Core



ENGINEERED FOR HIGH PERFORMANCE

Aluminium Conductor Carbon Fiber Core

Design / Research and Develop Department

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ABSTRACT

De Angeli Prodotti has developed an innovative conductor with carbon fiber core. This solution allows reduced sag and combined with a particular type of aluminium, determines a significant increase of ampacity compared to the common ACSR conductors.

INTRODUCTION

Bare overhead electrical lines are currently made of conductor with aluminium wires, thanks to their good conductivity, low price and lightness, if compared to other conductors for electrical applications, such as copper, gold and silver. However, due to the modest mechanical properties of the aluminium, the conductors are generally internally reinforced with steel wires which make possible the installation. The recent demands have led to a continuing search for increased power along the existing lines, this can be achieved for example increasing the aluminium cross section. Therefore, it is necessary to reduce the core weight while maintaining adequate mechanical properties.

De Angeli Prodotti, constantly involved in the development and design of innovative conductors for the substitution of conventional conductors made of aluminium and steel, has found a solution with materials coming from the aerospace industry.

ENGINEERING

The solution developed by De Angeli Prodotti uses a core of stranded trapezoidal carbon fiber wires placed inside an extruded aluminium tube;

the conductive layers are of thermal resistant aluminium wires.

This configuration gives a core 50% lighter and 20% more resistant than the steel core of a common ACSR conductor⁽¹⁾.

Using hard aluminium alloy resistant up to 150°C, and compacting the conductive layers with trapezoidal wires, the Aluminium Conductor with Carbon Fiber Core will reduce the line losses up to 10% and increases the ampacity of more than 60%⁽¹⁾.

The Figure 1. shows the comparison of the ampacity-temperature curve between the ACSR conductor and a conductor with carbon fiber core.

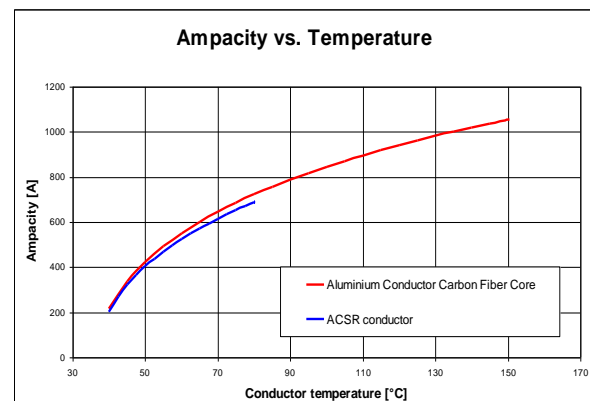


Figure 1. Comparison between ACSR and Aluminium Conductor Carbon Fiber Core

CONCLUSIONS

De Angeli Prodotti is ready to offer a conductor with unmatched features in terms of lightness, strength and line loss reduction. The R&D department can design tailor made conductor with carbon fiber core, suitable for the various needs of the customers.

⁽¹⁾ Example calculated with ACSR Ø 22.80 mm