

Fighting ice with a twist of steel

Increased capacity and efficiency

Safe ground clearance

Less maintenance & repair costs



Sag increase under ice load, and ice galloping affect power lines in the entire ice belt. This causes conductors to break and damage or even destroy power transmission structures. Thanks to its steel core, the ACSR twisted pair conductor helps to resist the sag increase, and fight poorly understood phenomenon of ice galloping.

Improved safety under freezing conditions

Ice galloping is an oscillation of the overhead conductor caused by wind forces on ice-covered conductors. This is a reality populations from the northern hemisphere - including vast areas of North America, Europe, and Asia - need to cope with. When excessive ice galloping causes damage to the transmission system, line crews have to work in cold and hazardous conditions to restore power. In the meantime, homes, farms, factories, and businesses suffer from cold and dark. Even livestock are endangered if their drinking water freezes.

The ACSR twisted-pair conductor's specific design allows to resist this type of extreme weather. It reduces the severity of ice galloping and avoids major damage should galloping occur.

Steel core twisted pair conductor

A twisted-pair conductor is constructed by twisting two standard conductors together so that the cross-section is a figure-8 shape. The twisting is made possible thanks to the steel core's ability to maintain full strength even after the arduous twisting operation.

For overhead lines in the ice belt, steel has two commanding advantages:

1. Rugged yet flexible

Steel is rugged enough to use in twisted pair conductors. None of the composite core options are suitable for twisted-pair conductors because they do not tolerate the required bending during manufacturing of the twisted pair.

2. Lower Total Cost of ownership

Steel core conductors are more cost-effective than their composite counterparts.

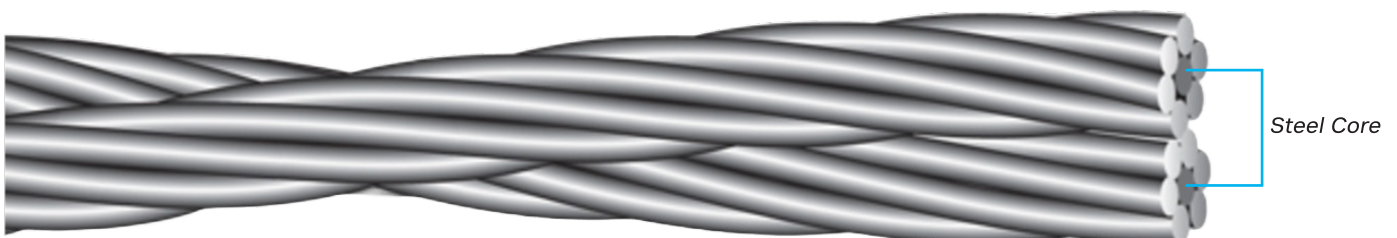
More efficient and safer power supply



Increased capacity and efficiency. The twisted-pair conductor has a greater surface area for cooling, which means less energy loss and more electrical capacity before its temperature limits are exceeded.



Safe ground clearance under all conditions. The worst-case sag occurs due to added ice weight. This sag will consequently determine the highest safety threat on ground level and how tall the pylons need to be.



Twisted-pair ACSR with Steel Core

These advantages of the ACSR twisted pair over other types of conductors are clearly shown in the graph below. ACSR conductors that use a steel core offer advantages over conductors with a carbon composite core for sag, cost, and capacity in regions coping with extreme ice loads. Comparing the ACSR twisted pair conductor to the ACCC conductor, the ACSR twisted pair has **20% more capacity, is 44% lower in cost and has 3.5% less sag with 1 inch of radial ice.**

Conductors of Approximately Equal Aluminum Area, Sag, Cost and Capacity

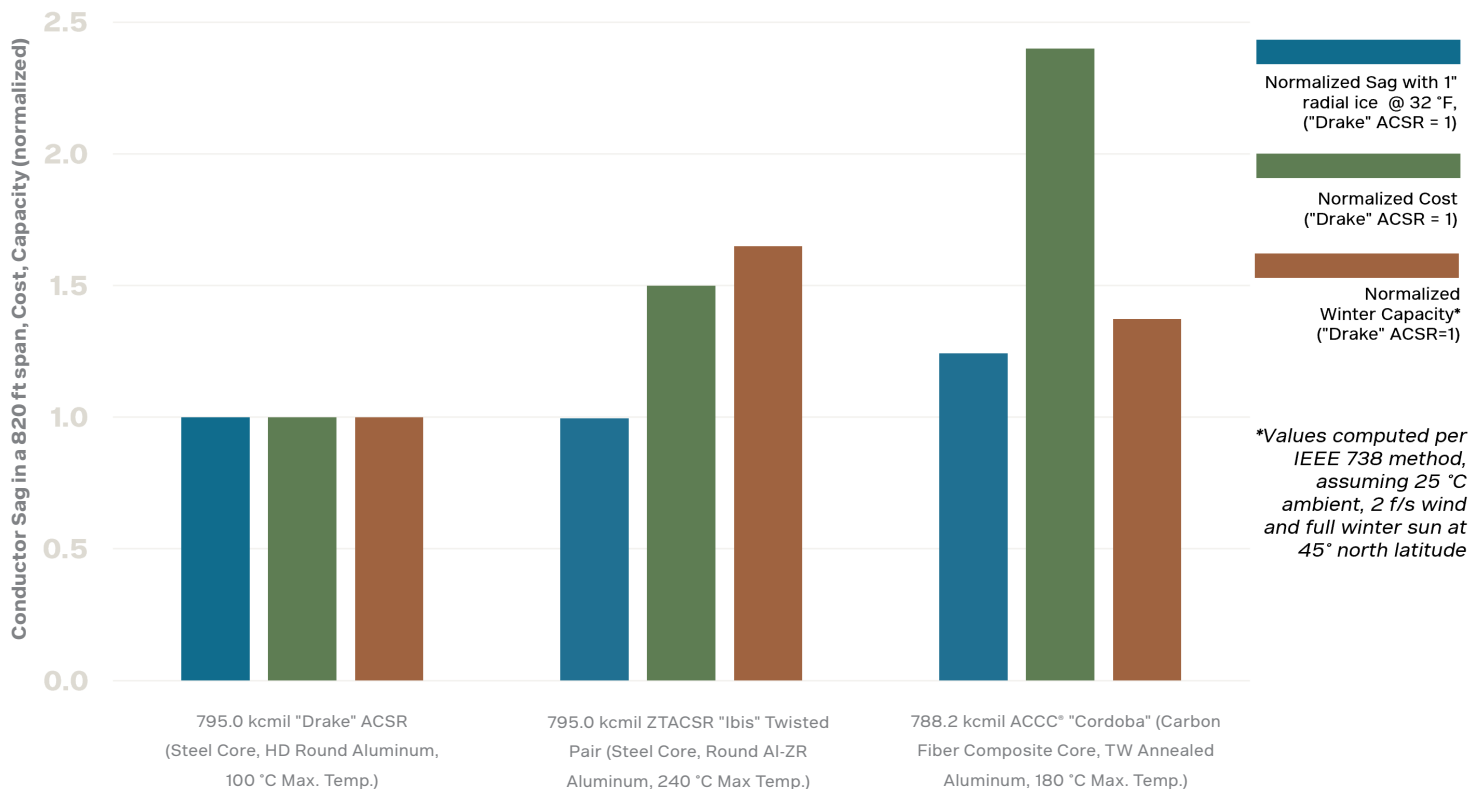


Figure 1: Conductors of Approximately Equal Aluminum Area, Sag, Cost and Capacity

Meeting international clean energy goals with steel core

Steel core is critical in fighting against ice galloping in the ice belt and improves the power supply reliability for populations in those regions. But this is not the only benefit of steel core in transmission lines. Steel core conductors offer capacity, efficiency, and cost advantages to make steel a perfect fit to help reach the international clean energy goals.

As delivery of renewable energy resources requires new transmission lines and upgrades to existing lines for more capacity, steel core is often the sensible option due to its performance advantage in many applications, and its major cost advantage compared to high-cost composite cores. These characteristics of steel make it possible to afford larger conductors for greater capacity and efficiency. Many renewable lines are located in the ice belt and are therefore perfect candidates to use the twisted-pair design with a steel core.

[Click here to read our Conductor Efficiency Whitepaper](#)

A large, white, stylized letter 'B' graphic that is the central focus of the page, set against a background of a snowy mountain landscape with power lines.

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Responsible editor: NV Bekaert SA - 03 2024