

# OPGW

## OPTICAL GROUND WIRE CABLE

Prysmian OPGW cable offers a number of distinct advantages over standard OPGW cable. These advantages provide a more reliable, durable and cost efficient cable that we would recommend for use in a number of environments, primarily those found in Australia.

### Construction

There are several designs of OPGW cable on the market, using various combinations of Aluminium and Steel for both the fibre tubing and the armouring. Some designs have potential problems which can cause eventual damage to the fibres inside.

### Tube Material

Cables that hold the fibres inside a steel tube are susceptible to water ingress. The welding joints required to fabricate long lengths of steel tubing can easily suffer from pin holes which allow the water into the tube and consequently can damage the fibre.

Some aluminium tubing is also welded to produce long lengths and the same problem can occur with this design. Prysmian OPGW cable uses extruded aluminium tubing which is produced in one long length and does not require welding or joining in any way, eliminating the risk of water penetration.

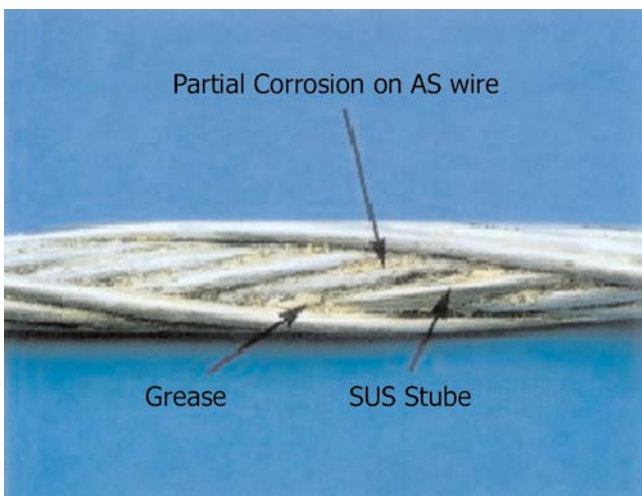
### Cable Corrosion

The second potential problem with some OPGW constructions is the contact between aluminium and steel elements. Some cables use a steel tube with aluminium wire armouring whereas some cables use an aluminium tube with steel wire armouring. In both cases the contact between the aluminium and steel can cause significant problems.

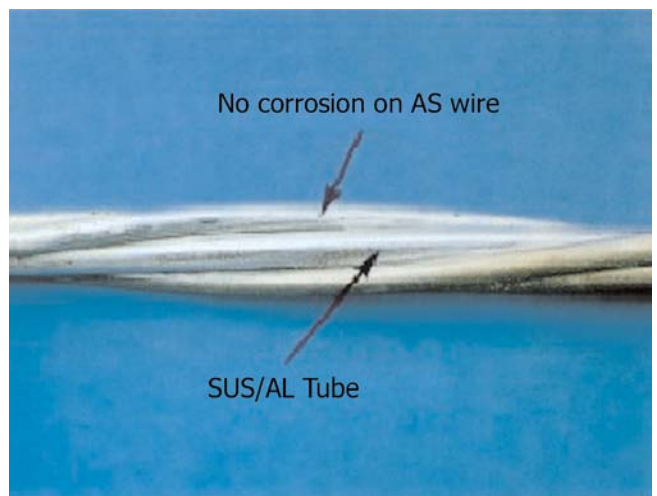
Aluminium and steel are quite a way apart on the galvanic scale which means that they naturally react with one another, resulting in a high risk of corrosion.

Prysmian OPGW cables feature an Aluminium tube with armouring wires fabricated either from aluminium or aluminium clad steel. This eliminates the potentialy corrosive contact between the armouring and tube.

The pictures below demonstrate the effect of corrosion between aluminium wires and a steel tube. In the first picture the aluminium clad armouring wires are in constant contact with the steel tube holding the optical fibre. Corrosion can be seen on the wire and can severely compromise the integrity of the cable. The second picture shows that corrosion does not occur between the aluminium tube and the aluminium clad wires, maintaining the integrity of the cable.



Corrosion between Aluminium armouring wire and steel tube.



Prysmian OPGW cables do not suffer from corrosion.

**Lightning Strike**

Aluminium is a far better conductor of heat and electrical current than steel. This property is very important when a cable is struck by lightning - a very common occurrence for OPGW cables.

When an OPGW cable is hit by lightning there are 3 effects that may take place:

Firstly, the cable may suffer minimal damage and after inspection the cable can remain in full working order.

Secondly, the damage may be severe enough that the cable requires repair, normally using repair rods. This is an expensive operation.

Finally, the cable could be damaged to the point at which it requires replacement. This is a major expense to incur.

If an OPGW cable uses a steel tube and steel armouring then the latter of these effects is far more likely. Steel does not efficiently conduct the heat and current away from the point of impact. This will cause much greater damage to the cable at this point in comparison to an aluminium cable which will dissipate the heat away from the impact zone immediately.

The pictures below show the effect of a lightning strike upon a steel cable (first picture) and an aluminium cable (second picture).



The extensive damage caused by a lightning strike on steel cable. The fibre is exposed and the cable requires replacement.

It can be clearly seen that the steel cable suffers a large amount of damage, exposing the fibre and requiring an expensive replacement.

The aluminium cable, despite being struck by an identical lightning strike, suffers far less damage and can be left alone or repaired if necessary. The fibre is fully protected and is not damaged.

The heightened risk of perforating the inner tube in a stainless steel design during a lightning strike also means that the risk of starting a bush fire is greater. If the stainless steel is perforated during a strike the intense heat can ignite the combustible jelly and plastics inside the tube. These burning materials can drop to the ground with the potential to start a bush fire. The use of extruded aluminium tube technology significantly lowers this risk.

**Termination and Cable Anchoring**

It is extremely important to note that Prysmian OPGW cables must be surely and properly anchored, as per the installation guidelines supplied with the cable. Incorrect termination and anchoring can result in movement of the cable elements, in particular the fibres within the cable. This can cause damage to cable and will not allow the Prysmian OPGW cable to perform as intended.



Aluminium cables suffer far less damage when exposed to an identical lightning strike. No damage is caused to the inner aluminium tube or the fibre.