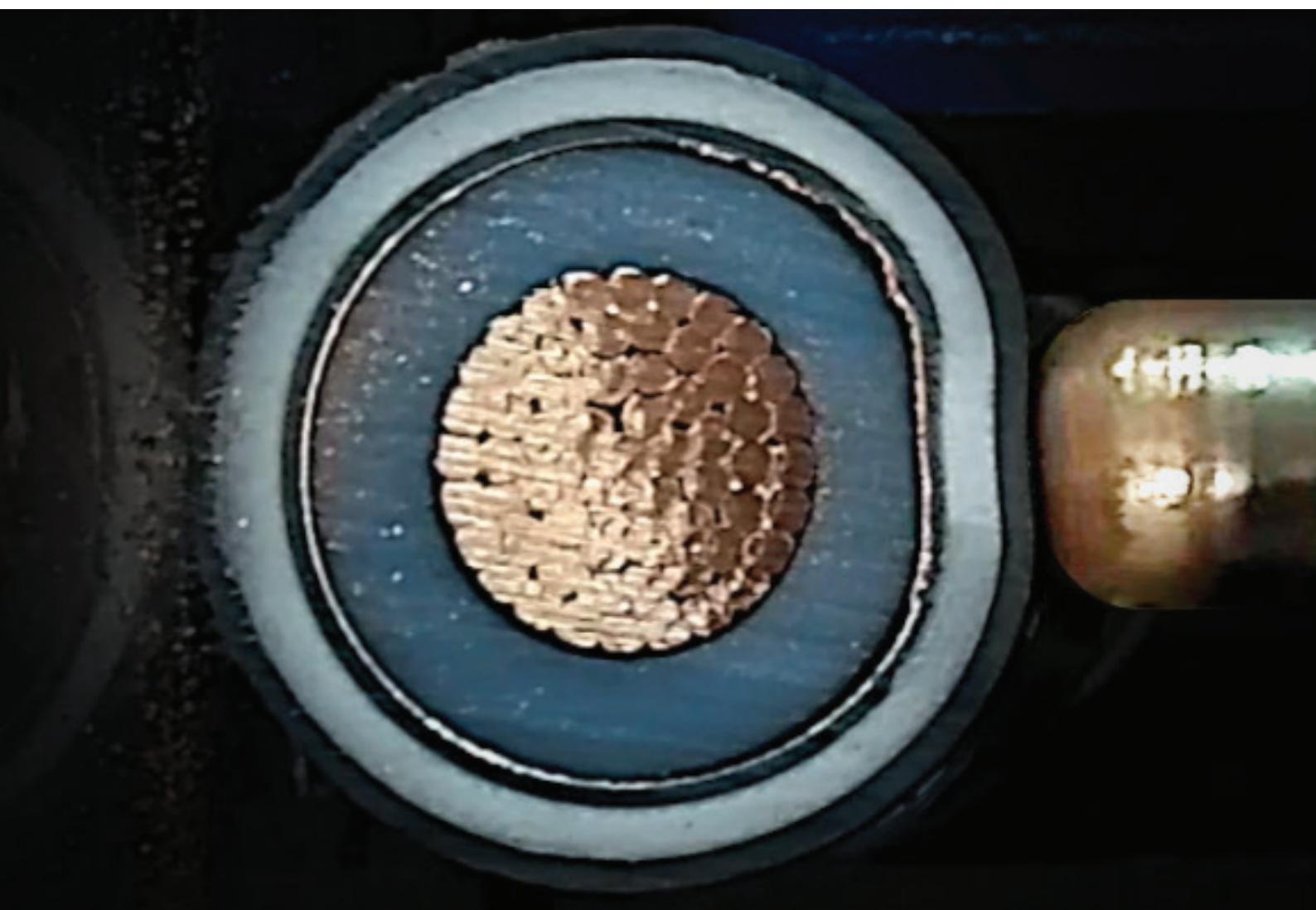




AIR BAG™



A revolutionary system
for all energy cables

"MKXXS012" – 300821

Protection Against Mechanical Damage

Cables can be damaged in many different circumstances and in virtually all operative environments mechanical abuse can often damage cable insulation and protective screens, leading to a premature and unexpected failure and, in any case, to a dramatic decrease of long term reliability. The economic consequences of this and the disruptive effects on service continuity are easy to quantify. Industry's response has been traditionally to protect cables with metal armouring (Applied in tapes, wires, etc) or to install them with additional external protection such as covered trays, pipes etc.

Both solutions involve significant additional costs and longer installation time. In particular the traditional metal armoured cables show a significant disadvantage in terms of weight, flexibility, difficult jointing compared to a standard unarmoured cable.

The AIR BAG™ Revolution

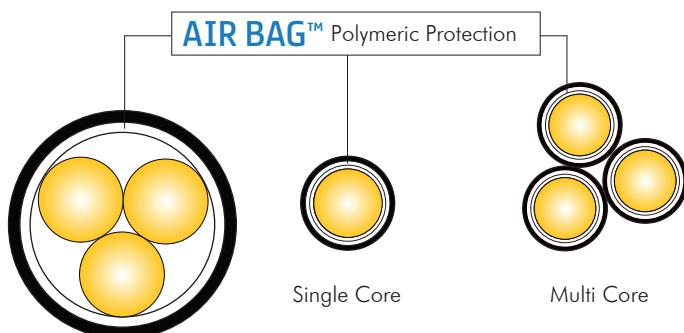
AIR BAG™ is a revolutionary solution that has been designed and patented by Prysmian Group that provides better mechanical protection than traditional metal armoured cable maintaining the functional advantages of unarmoured cables. AIR BAG™ is a radically new design that absorbs the kinetic energy of a shock by its deformation. In this way no residual energy is left to damage the "sensitive" parts of the cable such as insulation and screens. Metal armouring doesn't behave so efficiently: part of the energy of a shock is transmitted to the inner layers of the cable, potentially prejudicing the insulation's integrity.

The level of protection achieved with AIR BAG™ and, by consequence, the reliability is substantially improved. Additionally, the cable is much lighter, flexible and easy to install than a traditional armoured cable. Thanks to AIR BAG™ versatility the range of applications is wide and covers utilities, residential, infrastructures and industry always giving the same benefits in terms of reliability and weight reduction.

Design

The AIR BAG™ system is a mechanical protection that can be applied to multicore and single core cables.

Depending on specific applications different architectures are possible. The polymeric extruded layers work together as a system and provide a very effective defence against impact.



In industry



During laying and digging operations



In civil works



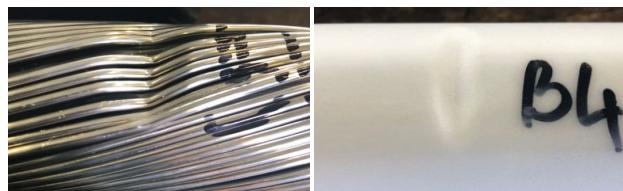
Power Distribution

How it works



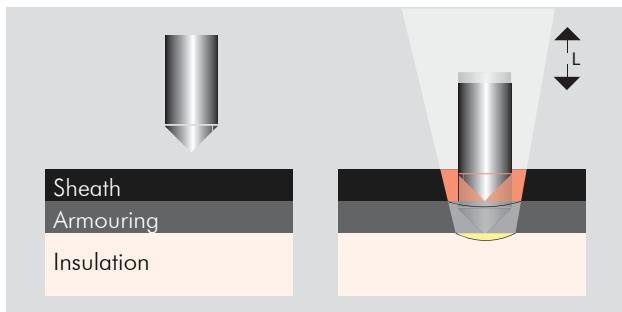
Test device

Standard used as a reference: CEI 20-68:2002-11



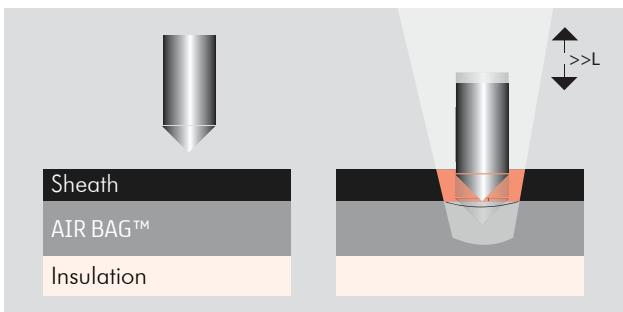
Stiff mechanical response given by metallic armour results in higher permanent deformation AIR BAG™ acts as a shock absorber.

Metal Armoured



Metal armour has a much higher Modulus, thus impact energy is dissipated with a lower deformation (L) and a high dangerous specific force is transmitted to inner layers of the cable.

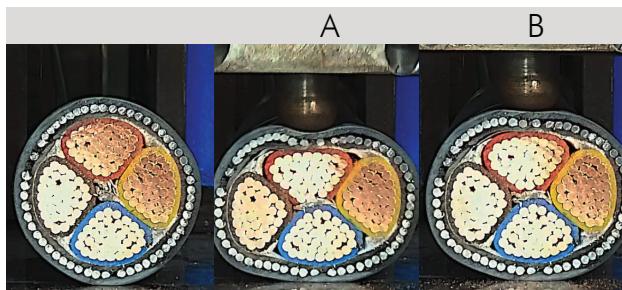
AIR BAG™



AIR BAG™ acts as a shock absorber.

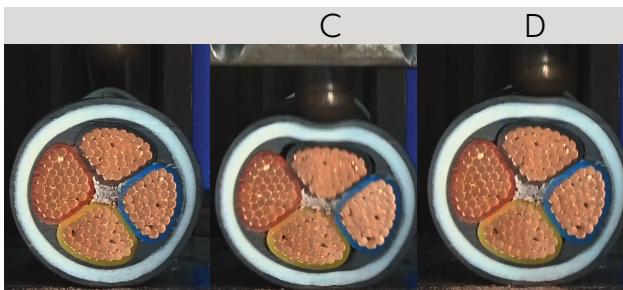
Impact Test

Steel Wire Armoured



Impact at 50 Joule, images taken during a test performance evaluation done at Prysmian HQ R&D laboratories on Oman Cables samples for divulgative purpose

AIR BAG™



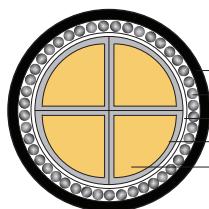
- A During the impact, the cable circularity is compromised
- B Armour wires is a stiff mechanical response with high permanent deformation. As a result the cores can suffer permanent damage
- C AIR BAG™ acts like a shock absorber.
- D AIR BAG™ avoids core damage by absorbing the impact and restoring initial circularity

A REVOLUTIONARY SYSTEM FOR ALL ENERGY CABLES

Low voltage (0.6/1 kV)

Cable type: CU/XLPE/PVC/SWA/PVC

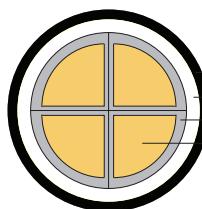
Steel wire armoured
4x95 mm² Cu sectoral



PVC outer sheath
Galvanized steel wires
PVC bedding
XLPE insulation
Sector shaped copper conductor

Cable type: CU/XLPE/PVC/ABL/PE

AIR BAG™
4x95 mm² Cu sectoral



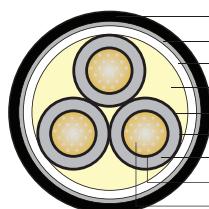
Modified PE outer sheath
AIR BAG™ layer
XLPE insulation
Sector shaped copper conductor

| | ARMOURED | AIR BAG | DELTA |
|-----------------------|----------|---------|-------|
| Overall diameter - mm | 40.6 | 38.4 | -5% |
| Cable weight - kg/m | 5.4 | 3.8 | -29% |

Medium voltage

Cable type: CU/XLPE/PVC/DSTA/PVC - 22 kV

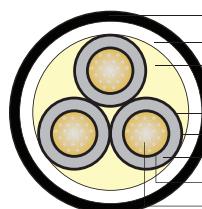
Steel Tape armoured
3x300 mm²



PVC external sheath
Galvanized steel tape armour
PVC separation sheath
Polypropylene fillers
Copper tape screen
Extruded semiconducting layer
XLPE insulation
Extruded semiconducting layer
Stranded copper conductor

Cable type: CU/XLPE/PVC/ABL/PE - 22 kV

AIR BAG™
3x300 mm²



Modified PE outer sheath
AIR BAG™
Penetrating extruded fillers
Copper tape screen
Extruded semiconducting layer
XLPE insulation compound
Extruded semiconducting layer
Stranded copper conductor

| | STEEL TAPE ARMOURED | AIR BAG | DELTA |
|--------------------------|------------------------|---------|-------|
| Cable weight - kg/m | 15.5 | 13 | -16% |
| Standard reel length - m | 250.0 | 300 | +20% |

Benefits



vs ARMOURED CABLE

Replaces traditional metal armour, giving even better impact performances, with lightness and ease of installation typical of unarmoured cables

vs UNARMOURED CABLE

Gives a dramatic improvement in mechanical resistance, with no significant variation in terms of weight and rigidity.

Main advantages compared to Armoured cable



Better impact performance



Reduced Diameter



Lower Weight



Longer cable length on standard drums.



Improved flexibility



Same resistance to oils/chemicals.



Same resistance to effects of water.



Easier installation (easier spliceability).



Lower sensitivity to ground stray currents and harmonics (e.g in installations close to electrified railway lines).



Lower screen/armour losses.

Accessories

The **AIR BAG™** range is fully compatible with traditional joints and terminations. The installation procedures are the same as for traditional accessories

AIR BAG™ Range

| VOLTAGE | INSULATION | ADDITIONAL OPTIONAL PERFORMANCE ON REQUEST |
|---------------|-------------|--|
| FROM LV TO MV | PVC XLPE | PVC Modified PE LSZH |



Certifications

ISO 9001 - Quality Management System

ISO 14001 - Environmental Management System

ISO 45001 - Occupational Health and Safety



Product Certificate Reference – IMQ

CN20-0055782-01 (1x400 mm² 18/30 (36) kV)

CN20-0055782-01 (4x240 mm² 0.6/1 KV)



Scope of testing certified

- IEC 60502-1
- IEC 60502-2
- EN 60811 Series
- IEC 60332-1



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