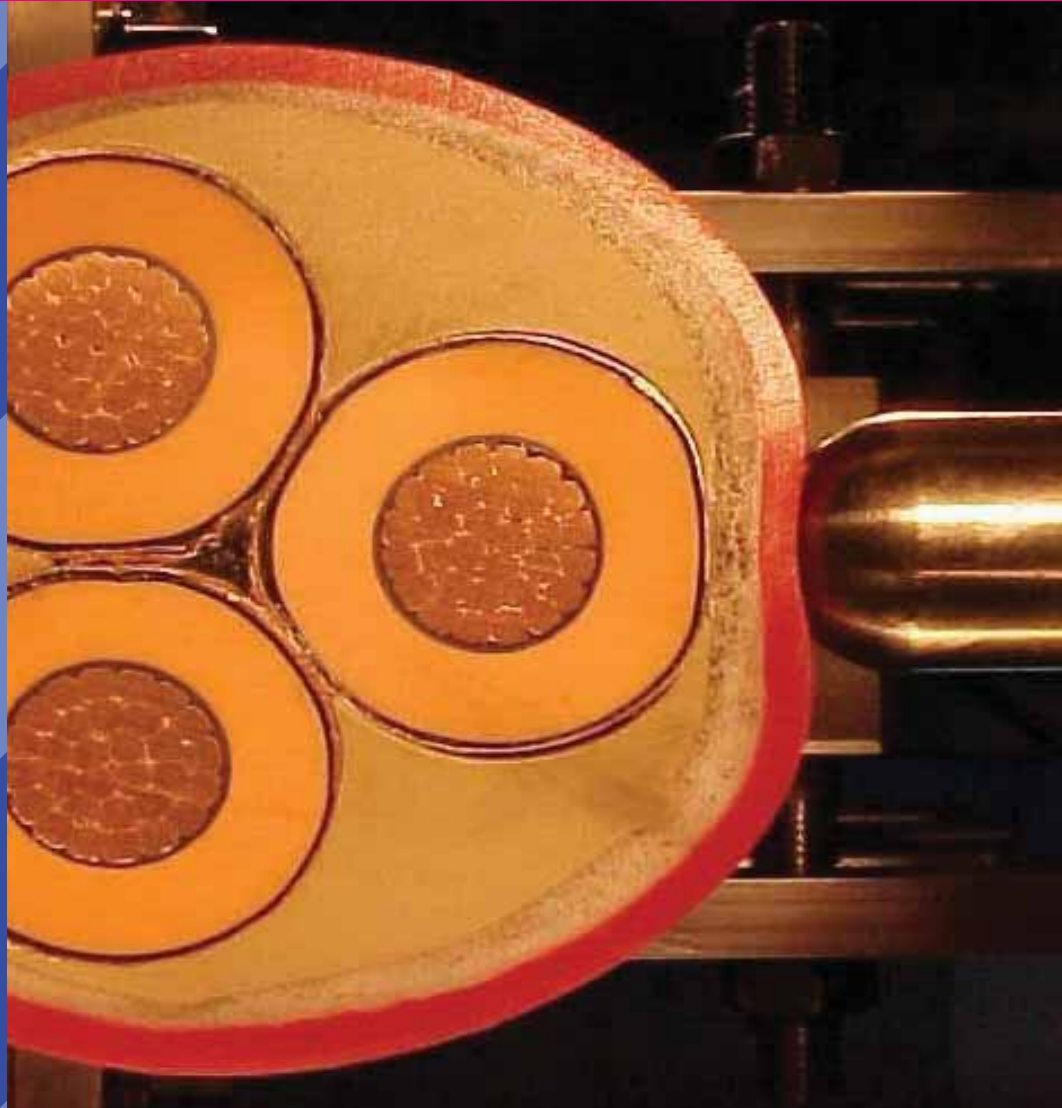




AIR BAG™ CABLE SYSTEM



AIR BAG™
CABLE SYSTEM

**A revolutionary system
for all energy cables**

PROTECTION AGAINST MECHANICAL DAMAGE

Cables can be damaged in many different circumstances and in virtually all operative environments



IN INDUSTRY



DURING LAYING AND DIGGING OPERATIONS



IN CIVIL WORKS

Mechanical abuse can often damage cable insulation and protective screens, leading to 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

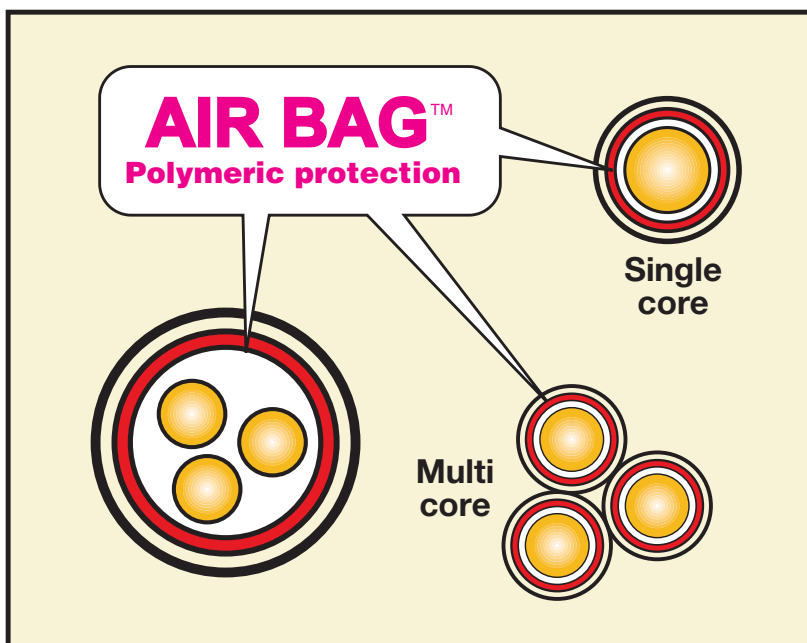
Prysmian has designed and patented a revolutionary solution that provides better mechanical protection than traditional metal armoured cable maintaining the functional advantages of unarmoured cables. **AIR BAG™** is a radically new design that absorbs the kinetic energy of a shock by its deformation. 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 residential, infrastructures, industry and utilities, 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.



HOW IT WORKS



TEST DEVICE:

French specification
for extruded HV cables
(spec. HN 33-S-52 cl.5.3.2.1)

TEST SAMPLE:

Armoured energy cable

IMPACT TEST

70 Jolue impact at 2000 frames/second pictures taken with high speed camera in Prysmian R&D labs by the "Politecnico di Milano" University, Milan Italy

Test Sample:

20 kV 3x150 mm² Copper conductor, EPR insulation

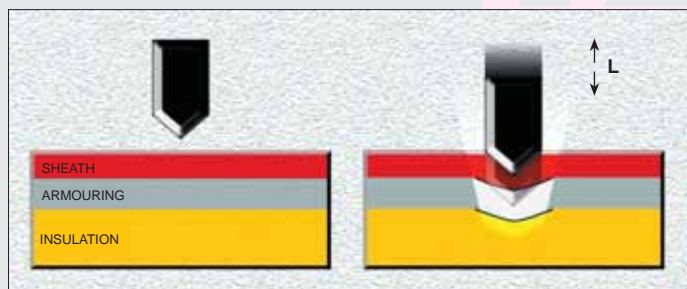


The **AIR BAG™**'s special extruded layers act like a shock absorber



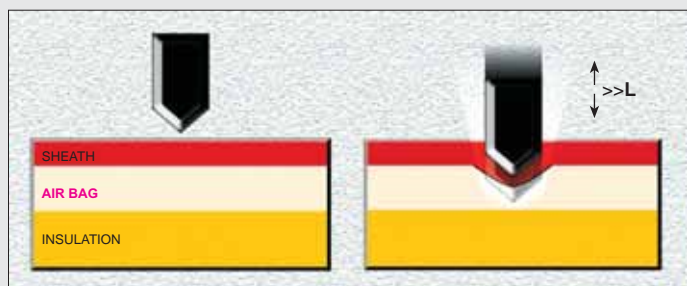
Metal armoring can damage the inner layers

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.

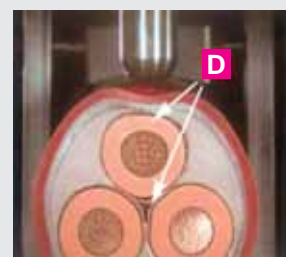
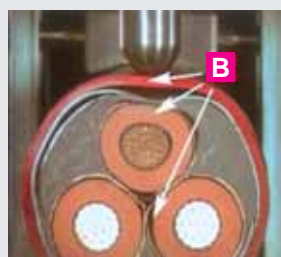
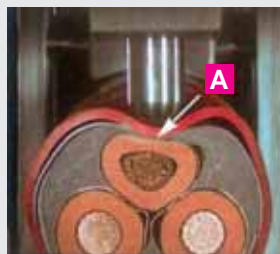
AIR BAG™



AIR BAG™ acts as a shock absorber.

STEEL TAPE
ARMoured

AIR BAG™
CABLE SYSTEM



A Steel tape armour shows high deformation concentrated in a small area

B Due to permanent deformation of metal armour, cable cores cannot recover initial shape, insulation of conductor is permanently damaged, copper screens have been badly detached.

C **AIR BAG™** acts like a shock absorber.

D **AIR BAG™** avoids core damage.

BENEFITS

vs ARMoured CABLE

- Better impact performance
- Reduced diameter, lower weight, improved flexibility
- Longer cable length on standard drums
- Same fire performance
- 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

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

ACCESSORIES



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

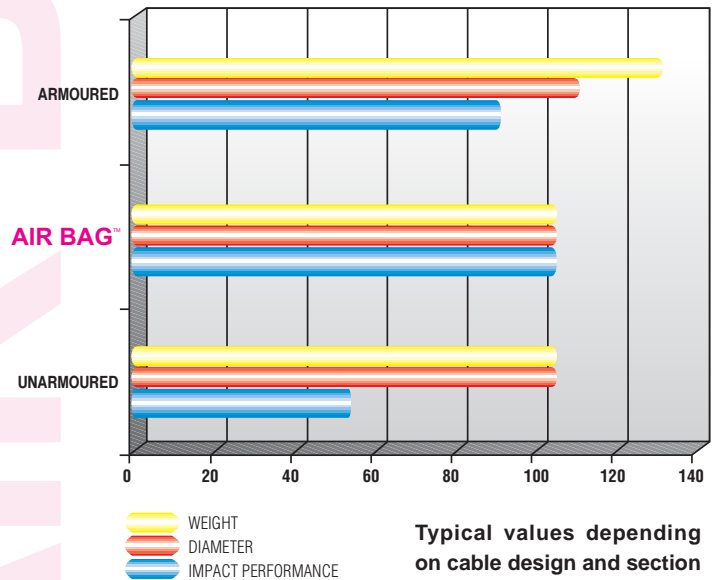
AIR BAG™ PRODUCT RANGE

VOLTAGE	INSULATION	ADDITIONAL OPTIONAL PERFORMANCE ON REQUEST
LV, MV and HV	PVC, PE EPR, XLPE	LSOH (IEC 61034-2, IEC 60754-2) FLAME RETARDANT (IEC 60332-1) FIRE RETARDANT (IEC 60332-3-24 Cat. C)

vs UNARMoured CABLE

- Double impact performance
- Diameter, weight: no significant variation
- Same flexibility
- Same fire performance
- Same resistance to oils / chemicals
- Same resistance to effects of water
- Same ease of installation

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



CERTIFICATIONS



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