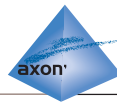


# CUSTOM DESIGNED CABLES

EXPERTISE



## EXPERIENCE



**axon**  
CABLE & INTERCONNECT

AXON' CABLE HAS BEEN A MANUFACTURER OF WIRES, CABLES AND INTERCONNECT SOLUTIONS FOR ADVANCED TECHNOLOGIES FOR 40 YEARS. DURING THIS TIME THE COMPANY HAS GATHERED SIGNIFICANT EXPERTISE IN THE DESIGN AND MANUFACTURE OF COMPOSITE CABLES FOR THE MOST DEMANDING OF APPLICATIONS.



## EXPERTISE

AXON' design and manufacture custom design cables no matter what your application : general industry, aeronautics and military, space, medical, telecommunications, automotive, research, nuclear or consumer electronics...



## HIGH PERFORMANCE EQUIPMENT

Our **Research and Process** department design and continuously improve our manufacturing equipment to increase the reliability of the manufacturing process and ability to adapt to market requirements.

Factories in various world wide locations for better service to local markets.  
Manufacturing capability for small, medium and large volume applications.



PTFE EXTRUSION MACHINE DEVELOPED BY AXON'



## CAPABILITY

Our **Research and Design departments** in both France and our world wide subsidiaries can design cable solutions to meet your exact specifications and requirements.

The teams are supported by our **Research and Development** departments specialising in metallurgy, plastics, microwave, electromagnetic compatibility, micro-mechanics, ... AXON' invests 10% of its turnover in Research and Development.

Our **manufacturing team** managed by skilled engineers who are experienced in the demands of high-tech markets.

AXON' CLEAN ROOM



## QUALITY ASSURANCE

AXON' has committed to improving its quality process and has retained ISO9001:2000 and QS approvals. The company is planning to obtain ISO 14000 and is engaged in Business Excellence Models (EFQM).

The group has also obtained the following qualifications :

- ESA SCC
- VALEO 1000A+
- ISS and Columbus
- Control delegation, ship to stock.



- **Mechanical characteristics** : resistance to flexing, torsion, vibration, shock, abrasion, space saving, ...
- **Environmental and climatic characteristics** : temperature, humidity, salt spray, resistance to oil and fluids, sterilisation, radiation, fire, ...
- **Electrical and electromagnetic characteristics** : frequency, capacity, losses, resistance, ....

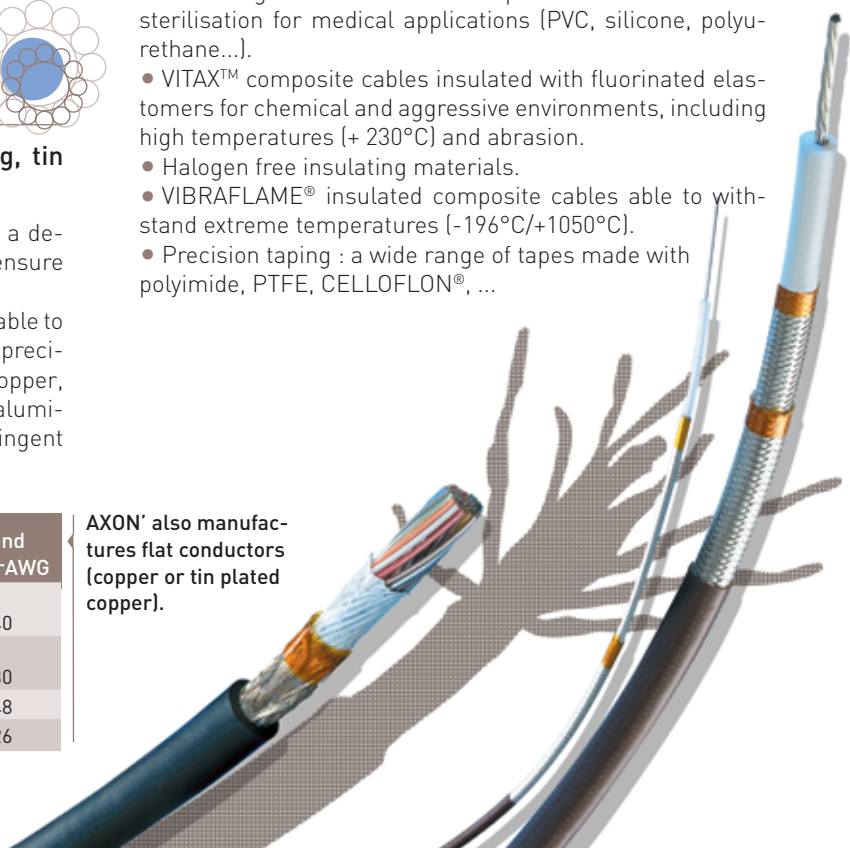
The diameter and composition of the basic strand has a determining role when choosing the right conductor to ensure signal transmission and EMI protection (shielding). By manufacturing conductors at AXON', the company is able to offer a wide range of single-stranded or multi-stranded precision conductors made with bare copper, silver plated copper, tin plated copper, nickel plated copper, silver plated aluminium and special copper alloys which meet the most stringent requirements especially in flex and torsion.

	Plating	Single strand conductor AWG	Multi strand conductorAWG
Copper C1 (OF)	Bare Copper/Silver	20 to 48	00 to 40
Copper A1 ETP	Bare Copper/Tin Silver, Nickel	20 to 40	00 to 30
Copper alloy	Silver	20 to 54	04 to 48
Aluminium	Silver	26 to 38	06 to 26

**Expertise in thermoplastic extrusion, PTFE extrusion and taping.**

- Fluorinated materials (FEP, ETFE, PFA), PEEK, polyimide, ...
- Special materials developed by our plastics specialists.
- Irradiated insulation (X-ETFE).
- Metal free insulating materials.
- A patented product : CELLOFLON® (expanded PTFE) with a low dielectric constant (1.35) for dielectrics to optimise electrical characteristics of coaxial cables.
- Polyimide insulating materials for nuclear applications.
- Thin insulation with a possible covering of 3/100 mm thickness.
- Insulating materials and components able to resist sterilisation for medical applications (PVC, silicone, polyurethane...).
- VITAX™ composite cables insulated with fluorinated elastomers for chemical and aggressive environments, including high temperatures (+ 230°C) and abrasion.
- Halogen free insulating materials.
- VIBRAFLAME® insulated composite cables able to withstand extreme temperatures (-196°C/+1050°C).
- Precision taping : a wide range of tapes made with polyimide, PTFE, CELLOFLON®, ...

AXON' also manufactures flat conductors (copper or tin plated copper).







Any electronic system can disturb its close environment by creating electromagnetic interference or can be influenced by radiation. Efficient shielding of wires, cables and harnesses is then required.

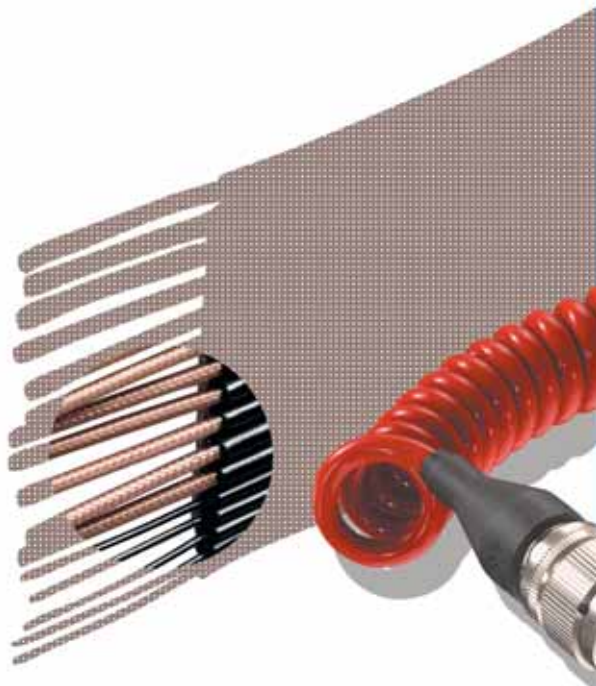
- Expertise in helicoïdal shielding, with braid, tapes (copper, SPC, aluminium, ...).
- Alloy or nickel plated conductors (depending on the temperature).
- Silver plated aluminium or stainless shielding.
- Optimisation of bundles, diameters of shielding strands, braiding angles for mechanical or electromagnetic protection.
- Synthetic fibre, glass fibre for mechanical protection.
- Braiding of round and flat cables.

### Optimised tools :

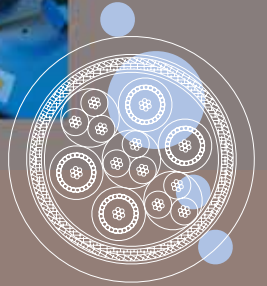
- The AXON' EMI/EMC laboratory has been approved by the French Army to carry out EMC measurement for connectors, cables and connected links.
- Simulation software to measure transfer impedance to define EMC value from the design.
- Study of shielding configuration of the cable.
- Control of transfer impedance after manufacture : triaxial, micro-strip, methods, mode stirred chamber (measurements up to 18 GHz).
- Different shielding solutions : lower transfer impedance for a more efficient shielding.
- Overbraiding of branches with a continuous shielding.

Different configurations of cables made with twisted pairs, shielded versions, flexible wires, power cables, coaxial cables, microwave cables, tubes, ... suited for applications requiring flexibility, space saving, ...

- Optimisation of twisting, constitution of different layers dependent on the application.
- Assembly of electrical hybrid or optic-electrical cables.
- Flat hybrid cables made with round or flat wires, PTFE tubes and jacketed with insulating materials including ETFE, FEP, PU, silicone, ... for applications requiring space saving, good resistance to flexing or good heat dissipation.
- Spiral cables characterised by memory and extension coefficient suited for the application : medical devices, measurement devices, robots, ...
- Shaped cables (profiles), heating cables, ...



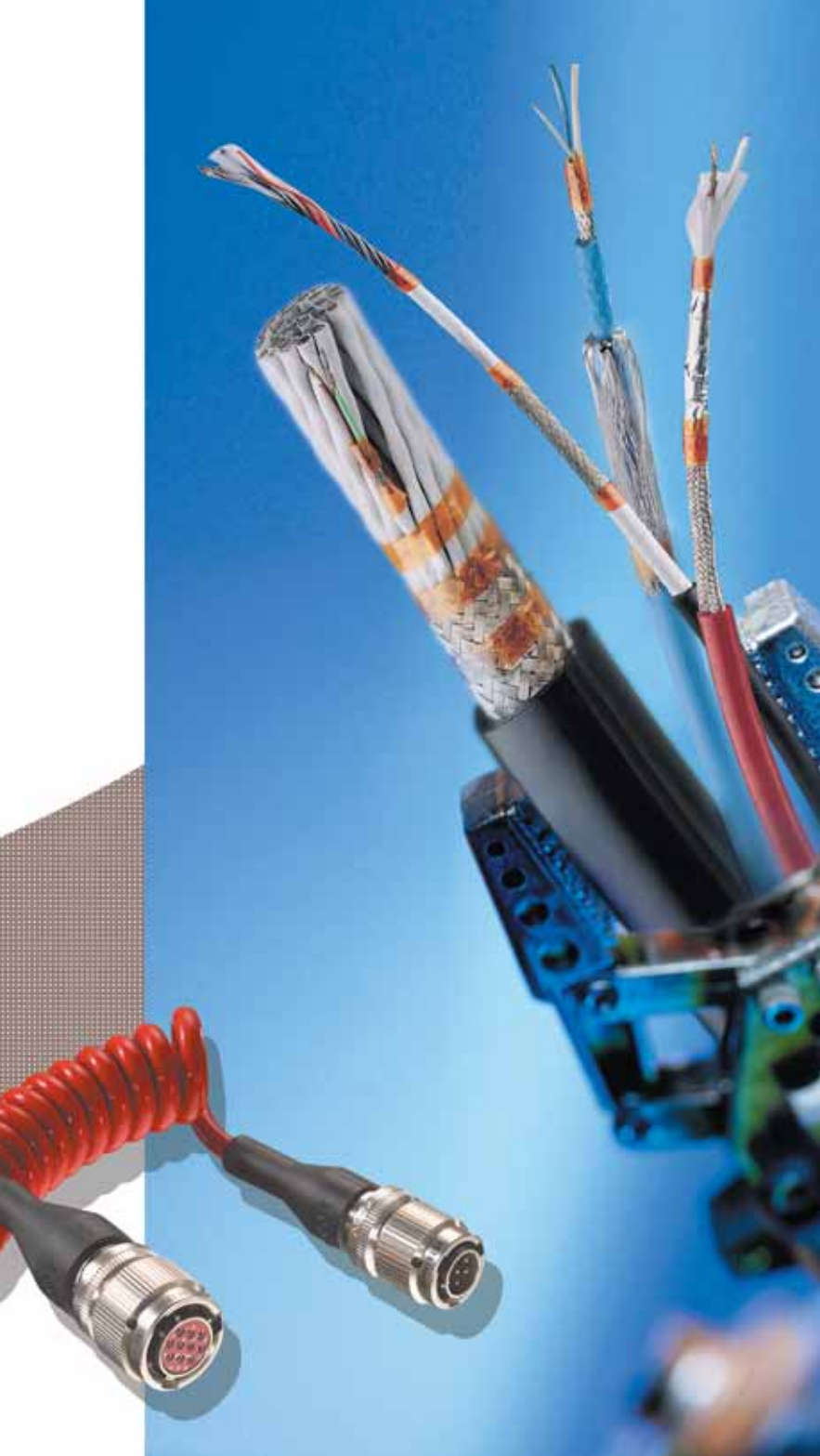




## TESTING CAPABILITIES

AXON' USES A WIDE VARIETY OF EQUIPMENT TO ENSURE THAT CABLES MEET OUR CUSTOMER REQUIREMENTS :

- Climatic chambers for different tests : heat shock, ageing, humid heat, cold, salt spray (validation of cables for automotive applications, marine material).
- Oven for accelerated ageing at very high temperature (1000°C)
- Mechanical tests : combined flex/torsion, folding, winding, unwinding.
- Vibration :
  - vibration equipment (using frequency of the system : 10 Hz to 3 000 Hz) : acceleration up to 100 G.
  - combined vibration/climatic tests.
- Differential Calorimeter Analysis (DSC) : measurement of heat flux under temperature variations (fusion point, crystallisation).
- Electronic scanning microscope : to control, for example, the uniformity of the silver layer of ESA wires and cables. It can also be very useful in the design of new products.
- Benches to test shielding efficiency.
- Meniscograph (IEC 68-2-69) to check solderability of cables and components.





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