



# HEATING WIRES AND CABLES FOR TOUGH ENVIRONMENTS





## AXON' CABLE'S EXPERTISE IN CABLING ENGINEERING

### HEATING WIRES AND CABLES FOR TOUGH ENVIRONMENTS

Axon's wires and cables are designed to be tough! And this is equally true for resistive heating wires and cables tailored by Axon' for challenging markets. Generating heat is the easy part but being able to withstand tough conditions including high temperature, high pressure, high voltage, chemicals, and mechanical constraints requires a comprehensive knowledge of conductors and insulating materials.

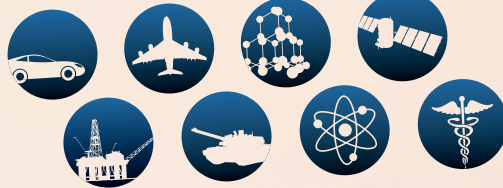
Axon' Cable is a world leader in interconnect systems. The company excels in the **design and manufacture** of **wires, cables, harnesses, connectors** and **integrated systems** for demanding applications in high-technology markets such as oil & gas, aeronautics, defense, space, medical electronics, research centers, automotive and consumer electronics.

Axon' engineers are equipped with the latest simulation and co-design tools to assist customers at every stage of the development of a product.

With an annual investment of 10% of its turnover in Research & Development, innovation is clearly what drives the Axon' group.



#### APPLICATIONS







## VERTICAL INTEGRATION: CONDUCTORS, CABLES AND MORE!

### STUDY >

- Concept
- Co-design
- Simulation

### CONDUCTORS >

- Plating
- Drawing
- Stranding

### FLAT OR ROUND CABLES >

- Insulating (thermoplastic, PTFE or taping)
- Assembling
- Shielding
- Potting
- Jacketing

Vertically integrated, the group has **in-house expertise** in materials including conductor, plating, cable insulation, molding and overmolding enabling the company to offer **custom-designed cables** for diverse and challenging applications.

As far as heating cables are concerned, stainless steel or nickel plated conductors are recommended but Axon' offers a wide range of single-stranded or multi-stranded precision conductors made with bare copper, silver plated copper, tin plated copper, nickel plated copper, stainless steel, silver plated aluminium and special copper alloys which meet the most stringent requirements.

## INSULATION MATERIALS: RESISTANCE TO HIGH TEMPERATURES BUT NOT ONLY!

The Axon' group benefits from over 55 years of expertise in insulating materials and their application.

- Fluorinated materials (FEP, ETFE, PFA), PEEK, polyimide
- Fluoropolymers including PTFE
- Halogen free insulating materials
- Radatox® insulating materials, highly resistant to atomic oxygen (ATOX) and radiation
- Special materials and compounds developed by our plastics experts.



# WHY USE HEATING CABLES?

To regulate the temperature in your systems

To defrost areas

To maintain your parts at a given temperature

To keep liquids fluid

To trigger mechanisms using heat

To bring heat to large spaces

To avoid condensation

## BESPOKE HEATING WIRES AND CABLES

Axon' heating wires and cables are designed to meet your most demanding requirements including:

- **Weight saving** with heating wire diameters as little as 0.10mm
- **Custom design heating** cables up to 20 mm diameter and more
- **Space saving** and flexibility with flat constructions
- Very long lengths for heating sub-sea oil pipelines, for example
- Resistance to **chemicals**, fuels or abrasive gases
- Resistance to **radiation** for space or nuclear applications.
- **High voltage** designs
- Static and dynamic applications
- REACH compliance.

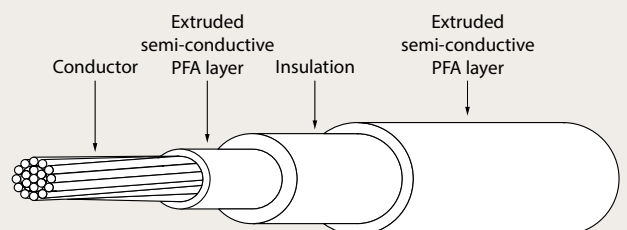
## HERITAGE:



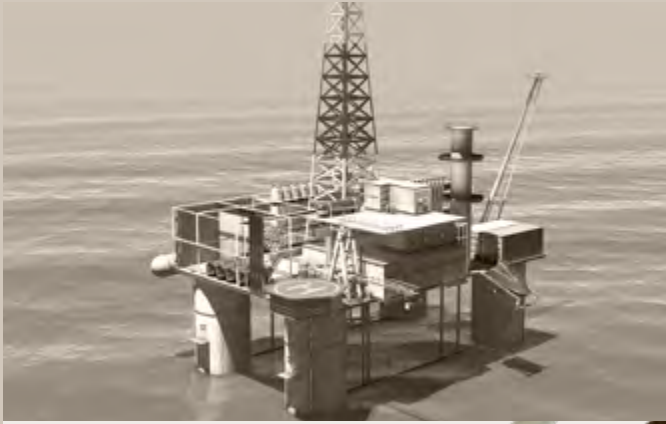
## SELECTIVE CATALYTIC REDUCTION IN AUTOMOTIVE

Selective Catalytic Reduction with AdBlue® Diesel exhaust fluid converts Nitrogen Oxides (NOx) into harmless nitrogen and water. However, AdBlue® starts to freeze if the temperature drops below -11°C, so the components are protected against the cold by **Axon' FEP insulated heating wire**. Axon' FEP insulated wire which is in direct contact with AdBlue® reduces the power consumption and improves the heating distribution.

- Nickel alloy conductors with high electrical resistance
- Chemical resistance to AdBlue® fluid
- Temperature resistance from -40°C to +200°C
- Small dimensions: space saving.



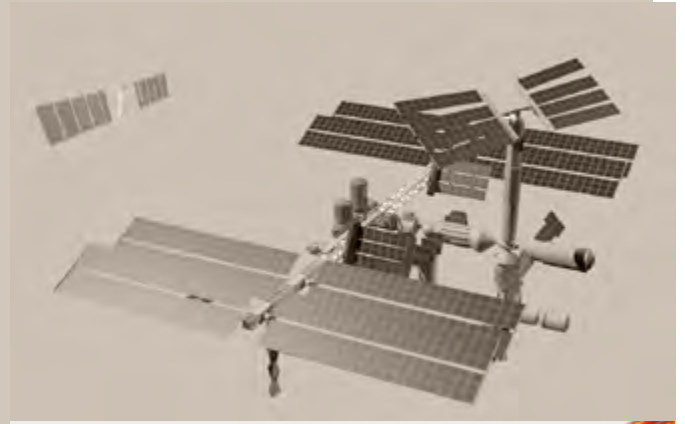
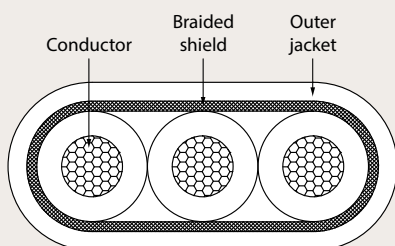
# CASE STUDIES



## PROTECTING LONG PIPELINES

Axon' has developed high performance heating cables which prevent the formation of wax and hydrates inside long oil and gas pipelines. This is an ideal solution to avoid blockages in the flowlines with resulting system shut-downs. They can have a flat configuration for weight saving. These high voltage heat tracing cables are designed to resist:

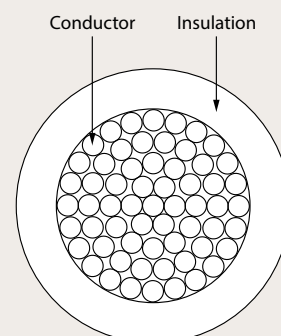
- Deep water conditions including high pressure
- High voltages
- High temperatures (over 200°C).



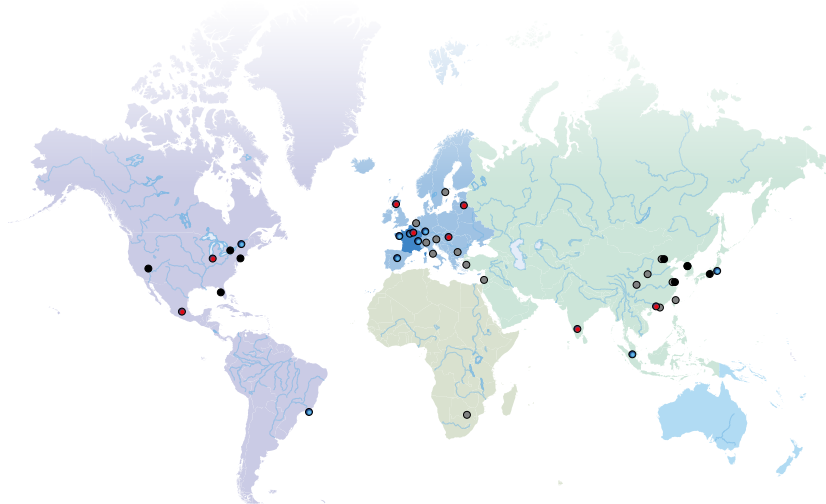
## HEAT AND ACTION

As an example of a space application, the heating cables are connected to actuators which, under the effect of heat, deploy an antenna or a solar panel. They can also be used to heat batteries and to protect on-board electronic devices against the cold. Examples of cable construction:

- Solid stainless steel conductor insulated with Polyimide
- Stranded stainless steel conductor insulated with PFA
- In aircraft, heating wires and cables can be used for de-icing and demisting.



## A GLOBAL PRESENCE



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