

High-performance TPI-insulated cables for radiation and cryogenic environments

To ensure reliable quench detection in ITER's superconducting magnets, cabling had to withstand ultra-high vacuum, intense radiation, and cryogenic temperatures down to 2 K, very extreme conditions. Axon'Cable successfully met this challenge by developing a new generation of cables insulated with thermoplastic polyimide (TPI), combining outstanding electrical performance, radiation hardness, and mechanical robustness.

The development

Axon'Cable engineered a process that enables the use of TPI insulation for wires and cables, achieving extremely low outgassing, resistance to gamma and neutron radiation, and operation from 2 K to 240°C. Originally designed for the quench detection system of ITER magnets, this breakthrough led to the development of the Flexorad® product line, a family of flexible, high-performance cables suitable for the most demanding environments.

The technology is applicable to aerospace and satellite systems, medical imaging and radiotherapy equipment, particle accelerators, cryogenic detectors, quantum computing, and nuclear instrumentation, wherever reliability under radiation or cryogenic conditions is critical.

Advantages

- **Proven performance in ITER's** quench detection system
- **Wide temperature range** (2 K to 240°C)
- Excellent **radiation and neutron resistance**
- Extremely **low outgassing** suitable for **UHV environments**
- Robust **mechanical properties and long-term stability**
- Adaptable to **custom designs and complex harnesses**.

Collaboration opportunities

Axon Cable is seeking customers interested in advanced TPI-insulated cabling solutions for extreme environments.

Fusion for Energy Technology Transfer
Programme

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