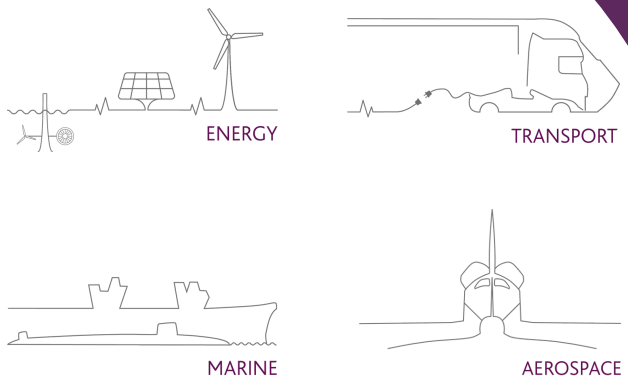
COMBINING THE PROPERTIES OF THERMOPLASTICS TO MANUFACTURE CABLE SYSTEMS SUPPLIED WITH A 10-YEAR WARRANTY

SMi FIT & FORGET



UNASSAILABLE 'FIT AND FORGET' PRESSURE MOULDED CABLE SYSTEMS FOR HOSTILE ENVIRONMENTS

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Keith Wells CEng FIMechE, CEO of SMI

Manufacturers that use plastic in their products have a vast range from which to select. Each type has specific properties and selections are based on their ability to support desired outcomes in finished products.

SMI makes extensive use of plastic in the cable systems we manufacture. Among the properties we seek, longevity, insulation and robustness are the most important, as they are installed on high capital investment platforms that operate in hostile environments for lifetimes extending into decades.

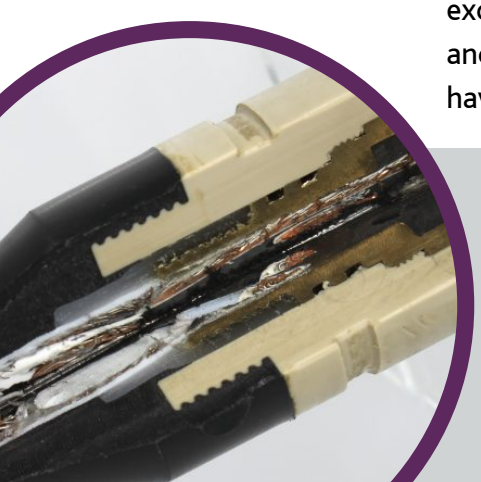
In this article, we're going to have a look at the properties of the two plastics that we principally use and how we combine and support their strengths to create a product range so well adapted to their end-user application that we can confidently offer a market leading 10-year warranty.

Thermoplastic properties

Thermoplastics are polymers that melt to a viscous liquid when heated and set into a new solid shape on cooling. This property, alongside their long lasting insulative qualities, makes them ideal for use in moulding protective structures for cable systems.

SMI's technology is focussed on creating an encapsulating thermoplastic moulding and amalgamating it at an atomic level with existing cable and connector materials to form an indivisible and highly robust seal. Resulting cable, connector and penetrators are able to operate effectively in the most hostile environments for the life of the platform on which they are installed.

Thermoplastic polyurethane (PU) is commonly used for cable jackets. It has significant elasticity and wear resistance. However, it absorbs water, a tendency that increases as temperature rises, which degrades its electrical insulation properties over time. Thermoplastic polyethylene (PE) is another plastic that has a unique combination of excellent dielectric characteristics, high electrical resistivity, low moisture permeation and low water absorption. PE is effectively inert in the ocean, with PE jacketed cables having now survived for more than 40 years immersed in sea water.



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Despite the benefits of PE, it is notoriously difficult to process. However, SMI has successfully mastered the techniques required to mould PE and atomically amalgamate it with other materials, including PU of various densities. An SMI moulding will remain sealed for at least the life of the cable and potentially longer, as the environmental resistance of the amalgamated material is greater than that of the jacket alone.

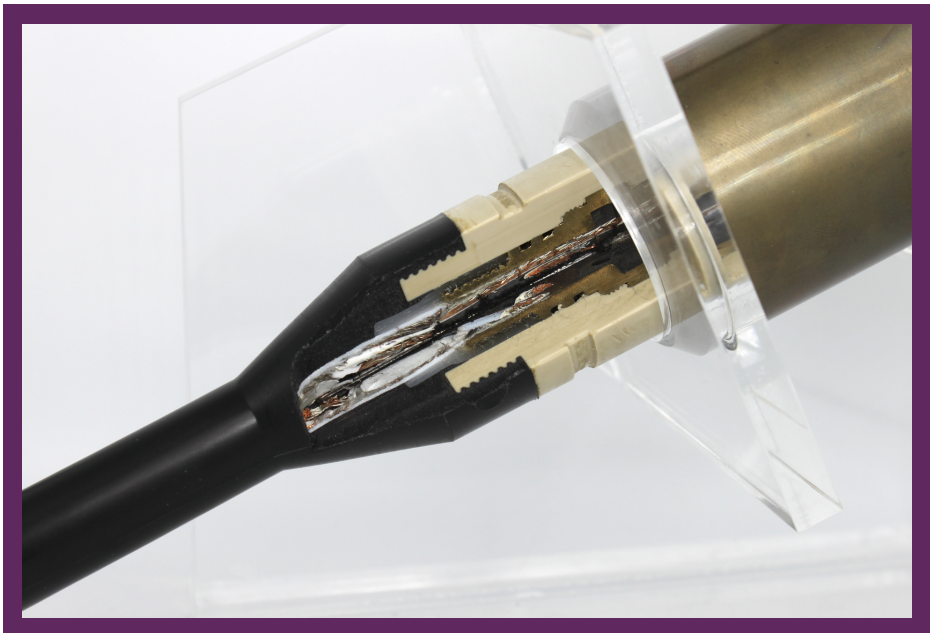
Dual jacketed cables

Increasingly, dual jacketed cables are being specified for use in the hostile environment applications in which SMI specialises. These cables typically feature a PE jacket covering the conductor at the cable's core, with a PU jacket on top of the PE jacket creating the externally facing surface. This arrangement benefits from the robustness of PU, helping to prevent damage caused by mechanical abrasion and impacts on the cable's surface, while the long term insulative properties of PE provide long term performance of the conductors at the core, even when the cable is immersed for long time periods in sea water.

A risk that remains with dual jacketed cables is the possibility of poor sealing at terminations allowing moisture and other environmental contaminants to enter the cable structure, resulting in the reduction or total loss of cable performance. SMI's PlastEthUrm™ product range is designed to provide long term prevention of this issue occurring on cables dual-jacketed with PU and PE.

PlastEthUrm dual sealing technology

Our PlastEthUrm product are based on proprietary technology that enables both jackets to be permanently and indivisibly terminated using thermoplastic pressure moulding processes. PE and PU is in turn injected into a mould where it is amalgamated with the jacket of the same material and atomically bonded to the connector or penetrator back shell.



PLASTETHURM 10 YEAR WARRANTY FIT & FORGET

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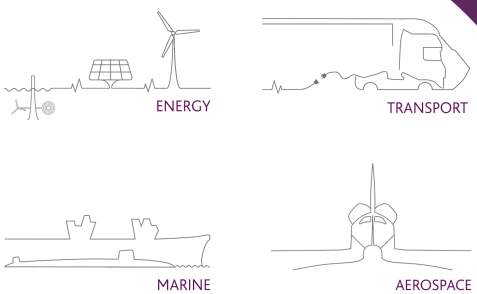
Once both processes are complete, a single PlastEthUrm moulding will have been formed that separately seals and water blocks both jackets. The moulding is inspected visually and radiographically, as well as put through pressure and electrical testing to ensure its integrity. PlastEthUrm mouldings have been integrated into our Telemetrix portfolio of data and power infrastructure which has been adopted by navies around the world and are the preferred solution for system designers wanting to extend platform life.

10-year product warranty for reduced through life costs

SMI's PlastEThUrm cable harnesses are offered with an industry leading warranty against leaks of ten years from immersion, reflecting the confidence that comes from more than 10,000 installations with zero leaks. This offer contrasts with the 'suggested design life' that other manufacturers offer. These implicitly demonstrate lower confidence in the product. As such, they create the need for contractors to shorten cable replacement cycles. Given the complexity and inaccessibility of cable systems once integrated onboard active platforms, these additional cycles significantly increase through life costs.

About SMI

SMI creates the central nervous systems of platforms operating in hostile environments, including naval ships, submarines, aircraft, marine renewable power generation and transport. Our bespoke pressure moulded cable harness systems, through-hull penetrators and pressure moulded connectors reliably connect a platform's systems throughout their life, ensuring operators have the performance and control they require to optimise platform effectiveness. With our right first time, 'fit and forget' approach, system refit and maintenance requirements are greatly reduced, maximising platform availability and minimising through life costs.



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