



Case Study:

Boosting Umbilical Cable Performance with Semiconductive Fillers

A customer turned to Premix for a semiconductive filler to improve subsea umbilical cables in harsh marine environments – here's how it worked.

Challenge

Umbilical cables are critical components in subsea operations, acting as a crucial link between surface facilities and underwater equipment. Designed to withstand harsh marine environments, these cables enable the transmission of power, communication, and various fluids necessary for the operation of subsea systems.

The remote operation of subsea equipment, facilitated by umbilical cables, is vital for the efficient and safe extraction of underwater resources. By ensuring a stable and secure connection, these cables provide uninterrupted data and power transmission, which is critical for monitoring and controlling subsea operations.

A key element of umbilical cables is the filler, which maintains the cable's shape and stability, provides rigidity, and enhances protection for embedded components.

Premix was approached by the customer to offer a semiconductive filler capable of withstanding harsh marine environments while maintaining high electrical and thermal conductivity and mechanical strength.

Solution

Premix proceeded with semiconductive compound based on high-density polyethylene and performed additional tests to verify the suitability of the compound for customer application. The compound offered high thermal and electrical conductivity while being easily processable. This compound was used to manufacture semiconductive fillers to be used in umbilical cables.

Impact

The high thermal conductivity of the fillers compared to traditional solution helps dissipate heat efficiently to the environment, maintaining acceptable temperatures for the internal components of the umbilical cables. Additionally, semiconductive filler reduces signal interference and mitigates static electricity buildup.

Reference

Rosianita Balena and Edvaldo Mendes. "Thermal Analysis of Umbilical Cables". Proceedings of COBEM 2007

Thor Henriksen, Jens. K. Lervik and Truls Normann. "Thermal and Electromagnetic Modelling of Power Umbilicals". Proceedings of Jicable 2007

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