"Bombproof" and classified for marine measurements

"Bombproof" was the customer's name for the sensor, owing to its extreme tolerance of vibrations. It all started many years ago. Crucial temperature sensors for engine monitoring stopped working on board a cruise ship in the Caribbean Sea. The cause was vibrations. Pentronic manufactured new ones that were flown across the Atlantic and delivered to the ship by helicopter. A new design was produced, the "bombproof" sensors, that has proven its ability to withstand vibrations.

"It's difficult to simulate the reality out at sea in a laboratory. Experience in this field is just as important," says Boije Fridell of Pentronic. He has been working on maritime applications since 1981.

TAKING PART IN DEVELOPMENT

Ships cannot simply drop in at the nearest workshop for repairs. Faults that occur at sea cost a lot of money and jeopardise the safety of passengers or cargo. Everything has to work, even though the surrounding environment is not always ideal for measuring equipment.

As in other areas, requirements regarding measurement uncertainty, close mechanical tolerances and simple installation are becoming stricter. As a result, Pentronic is involved ever earlier in development projects. It is increasingly rarely a matter of supplying a temperature sensor to the customer's specifications.

"We have to know where the temperature is to be measured and what requirements the sensor has to meet. Then it's up to us to design the optimum sensor," says Boije.

Large diesel engines are also used for electrical power production on land in order to support existing power production locally or to act as the sole power source to supply an inaccessible mine, for example. Diesel engines have very high efficiency, which is further increased if the waste heat is utilised. Another type of machine with similar areas of use is the gas turbine.

Boije Fridell shows a temperature sensor with several built-in thermocouples to be used in gasflow of gasturbines.

"Conditions can be just as demanding on land," says Boije. "For example, a gas turbine that produces electrical power on an oil field or somewhere along a pipeline may be just as inaccessible as a ship at sea. In both cases reliable operation has to be ensured in a harsh environment."

CLASSIFICATION OF SENSORS

Marine temperature sensors pose other challenges. Classification societies and insurance companies have their own particular views on what requirements such an important component as a temperature sensor has to meet. Pentronic has obtained type approval for a number of temperature sensors for engine monitoring of the thermocouple and Pt100/RTD types from the following classification societies:

American Bureau of Shipping (ABS), Bureau Veritas (BV), Registro Italiano Navale (RINA), Lloyd's Register (LR), Germanisher Lloyd (GL), Det Norske Veritas (DNV) and Russian Maritime Register of Shipping (MRS). Pentronic has also obtained type approval for temperature sensors for fruit transportation, for example.

"We also have tried-and-tested routines and contacts for the type approval of new designs," Boije adds.