

Eddy Current Flow Meter flow rate measurements in liquid Sodium at the SUPERFENNEC loop

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The Eddy Current Flow Meter (ECFM) is a robust and reliable inductive sensor for measuring the flow rate of liquid metals. Since there is no direct contact between sensor and liquid metal, it can be used in chemically aggressive environments and at very high temperatures of up to 600 °C. This allows the ECFM to be deployed, for example, as part of the safety instrumentation in liquid metal-cooled fast reactors directly above the sub-assemblies, in order to continuously monitor the flow rate of the coolant and to detect coolant blockages. In this paper we present the measurement results that were obtained with a high temperature prototype of the ECFM at the SUPERFENNEC Sodium loop at CEA Cadarache in France. There, we were able to evaluate the performance of the ECFM between temperatures of 200 °C to 400 °C. In addition to the measurement results, we will discuss results of related numerical simulations and give a detailed description on the construction and choice of materials of the high temperature prototype.

Country/Int. organization

Germany

Authors: Dr KRAUTER, Nico (Helmholtz-Zentrum Dresden-Rossendorf); PAUMEL, Kevin (Commissariat à L'Energie Atomique et aux Energies Alternatives); GIRARD, Marianne (Commissariat à L'Energie Atomique et aux Energies Alternatives); Dr ECKERT, Sven (Helmholtz-Zentrum Dresden-Rossendorf); Dr GERBETH, Gunter (Helmholtz-Zentrum Dresden - Rossendorf)

Presenter: Dr GERBETH, Gunter (Helmholtz-Zentrum Dresden - Rossendorf)

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