

Title: Numerical simulation of the sodium and argon flow in the high temperature SOLTEC facilities using TRACE code

Description:

At the Karlsruhe Institute of Technology (KIT) the 1000K Sodium Loop for Test materials and Corrosion (SOLTEC) facilities have been developed. The facilities will be used for qualification of new materials for high temperature applications, investigations of steel corrosion in flowing hot Na environment and long term investigations of sodium based thermos-electrical devices.

The base loop of these facility consists of two regions, the high temperature side with temperatures up to 1000 K is connected to the test section and the low temperature side (up to ~800 K), where the pump and the main components are located. Argon is used as a cover gas to prevent the sodium-air contact and to balance the pressure level in the loop.

The scope of the study is the numerical modeling and simulation using TRACE code to investigate the sodium flow, temperature and pressure distributions along the loop under different scenarios and operational conditions (steady state and transient). Special interest from safety point of view is the sodium and argon flow in case of fast sodium release to the storage tank. The simulation shall check the selected design and give hints for further optimizations.

In detail::

1. Become acquainted with:: SOLTEC facility, numerical simulation using TRACE
2. Design of a TRACE-Model for the SOLTEC Anlage (adaptation of an model for another facility)
3. Definition of critical components
4. Test calculations, review of results and facility model
5. Improvement of the facility model
6. Analysis and discussion of the results
7. Documentation

Qualifikation:

Mechanical engineering (Maschinenbau), Energy technology, Informatics

Basic knowledge in: numerical simulation, TH, (TRACE)

Documentation: German or English

Dauer: ca. 3 Monate (BA)

Eintrittstermin: ab sofort

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