

Prof. Dr.-Ing. Jörg Starflinger  
Chair of Nuclear Technology and Reactor Safety

### Objective:

This work has two main goals:

1. Measuring of the contact angle between molten potassium and Inconel® alloy 600.
2. Measuring of the effective pore radius and permeability of various wicks having potassium as wetting fluid and Inconel® alloy 600 as wick's structural material.

Two experimental setups will be built. They will be tested using stainless steel and water, before performing experiments with potassium.

### Background:

In the framework of the project "MISHA - Passive cooling of innovative micro nuclear reactors", this research project is geared towards evaluating the heat transport performance of high-temperature heat pipes. In order to have a proper evaluation of those performances, accurate knowledge of the following quantities is needed: contact angle, effective pore radius and permeability. In fact those quantities are essential to properly evaluate the capillary properties of the heat pipe. Hence, an experimental measurement of the mentioned quantities is needed.

### Procedure:

- Literature review (contact angle, effective radius, capillarity, molten metals).
- Design of the experimental setups and experiments planning.
- Construction and test of the setups.
- Conducting experiments.
- Analyzing and categorizing the results.
- Written report and oral presentation in the IKE-seminar for students.

### Requirements:

- A strong inclination toward hands-on experimental work.
- Basic knowledge in measurement techniques and in LabView software desirable.
- Basic knowledge of MATLAB or Python is a plus.
- English language skills.

**Start:** from 01.02.2024 or later

**Contact:** M.Sc. Ruggero Meucci  
Pfaffenwaldring 31 • Room no. 3.344  
D-70569 Stuttgart  
[ruggero.meucci@ike.uni-stuttgart.de](mailto:ruggero.meucci@ike.uni-stuttgart.de)  
+49 711 685 69662

Student Research  
Project  
or  
Master Thesis

Experimental  
measurement of  
contact angle,  
effective radius  
and permeability  
of potassium in  
steel wicks

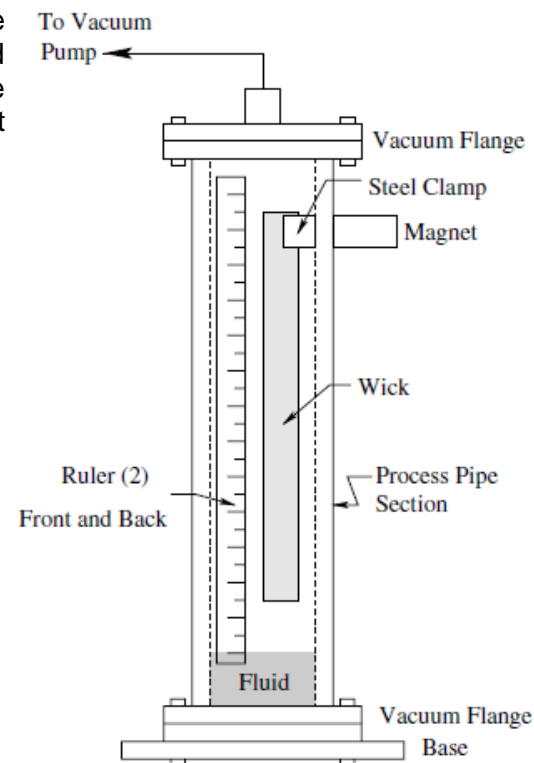


Fig. 1: Example of an experimental setup for rate-of-rise wick property measurement. (Holley, Faghri 2006)