

Salt Flow Calibration Stand

The salt flow calibration stand (SFCS) is designed to develop calibration techniques and to calibrate flow meters for use with high-temperature salts. To develop high temperature salt technology, information including heat transfer data, pressure drop data, and corrosion testing under flowing conditions relies on accurate knowledge of the salt flow rate. Initial calibration will be performed for an ultrasonic flow meter for use in the nearby liquid salt test loop (LSTL).

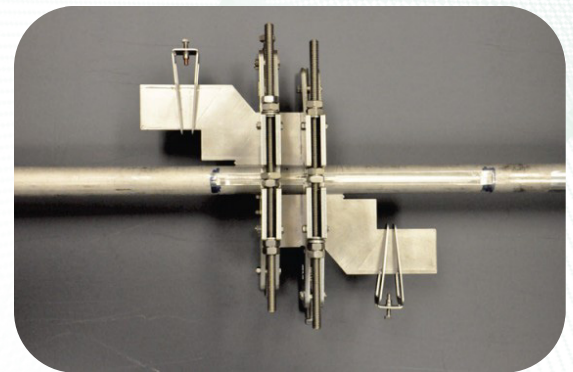
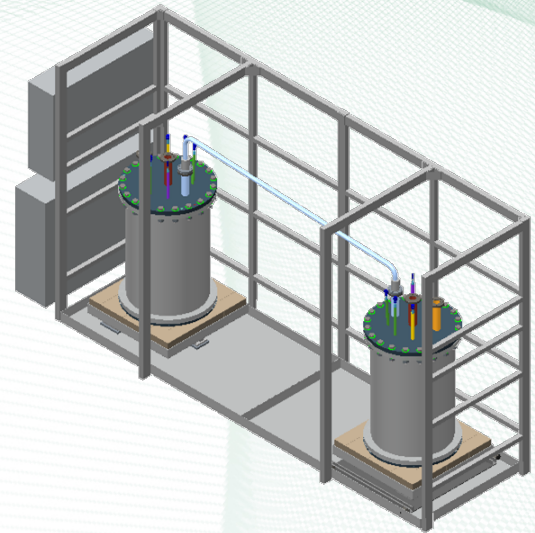
The SFCS consists of two tanks connected by a cross pipe. Salt in one tank is pneumatically pushed to the other tank. During this process, the mass of the salt in both tanks is accurately measured using load cells. The salt's flow rate is determined based on the change in salt mass in the two tanks over time. The flow meter attached to the cross pipe is calibrated based on this salt flow rate. The SFCS also includes a number of supporting features such as data acquisition, trace heating, and gas control systems, as well as temperature and pressure instrumentation.

Beyond the calibration of flow meters, the SFCS could be used for heat transfer, salt freezing, instrumentation and control development, code validation, and/or other future testing needs.

Near Term Goals

- Evaluate calibration techniques for high-temperature salt flow meters.
- Calibrate an ultrasonic flow meter for use on the LSTL.

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Wave guides for ultrasonic flow meter



SFCS experimental setup

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Salt	FLiNaK (initial)
Operating temperature	≤ 710 °C
Operating pressure	≤ 2 bar (≤ 30 psig)
Operating run time life	2+ years
Flow rate	≤ 5.8 kg/s ~4.5 m/s (1 in. pipe)
Cross pipe ID	2.67 cm (1.05 in.)
Salt volume	120 L (240 kg)
Trace heating	~27 kw
Temperature measurement	~52 thermocouples 2 RTDs
Pressure gauges	2 in gas spaces
Salt mass measurement	2 × 3 load cells