Salt Pot Instrumentation and Components Evaluation Experiment (SPICEE)

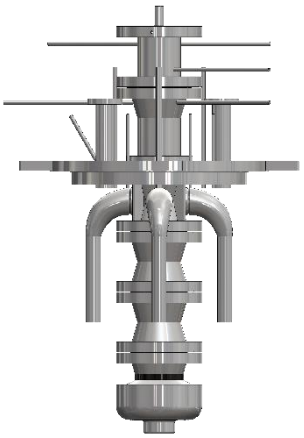
Overview

The Salt Pot Instrumentation and Components Evaluation Experiment (SPICEE) is a high-temperature, two-tank system enabling a variety of molten salt testing. The two large tanks are connected by a cross pipe allowing for a controlled pneumatic transfer of salt from one tank to the other. The transfer rate is monitored by load cells located under one tank. With this capability, instrumentation such as flowmeters and level sensors can be calibrated. The large tanks also provide a venue for testing components in a high-temperature salt environment. Examples include valves, pumps, and related subcomponents such as shaft seals, bearings, impellers, and flanges. Designed to be flexible, the system can swap between fluoride- or chloride-based salts. The facility also includes several supporting systems in areas such as data acquisition, trace heating, and gas control systems, as well as a suite of temperature and pressure instrumentation.

Example Testing

- Flow meter calibration up to approximately 4.5 m/s (14.7 ft/s) in DN25 (1 in.) pipe
- Novel sensor testing of factors such as level, pressure, and salt composition
- Life testing of pump bearings submerged in a prototypic environment
- Flow-induced corrosion and erosion
- Pump shaft seal reliability and hermeticity
- Valve life and leak tightness

SPICEE Configuration for Salt Transfers



Bearing Test Rig Rendering

SPICEE with Bearing Test Rig Installed

Key Specifications:

710°C @ 300 kPa
Temperature and pressure rating

≤5.8 kg/s
(~4.5 m/s in DN25 pipe)
Transfer flow rate

~120 L
Salt volume, F- or Cl-based salt

27 kW
Trace heating

Stainless steel and high-nickel alloys
Materials of construction

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