SolarPACES
Solar Power & Chemical Energy Systems

MOSAICO PROJECT

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TOWARDS THE STANDARDIZATION OF MOLTEN SALT LOOPS' INSTRUMENTATION AND COMPONENTS

Valves

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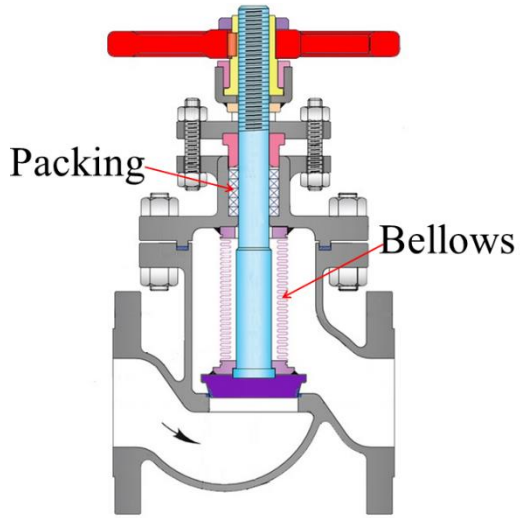
Motivation and objectives

Motivation:

Valves are one of the most problematic components in a molten salt loop

- No leakage
- Materials compatible with working fluid
- Bellows can break easily when moving when the salt is not totally melted



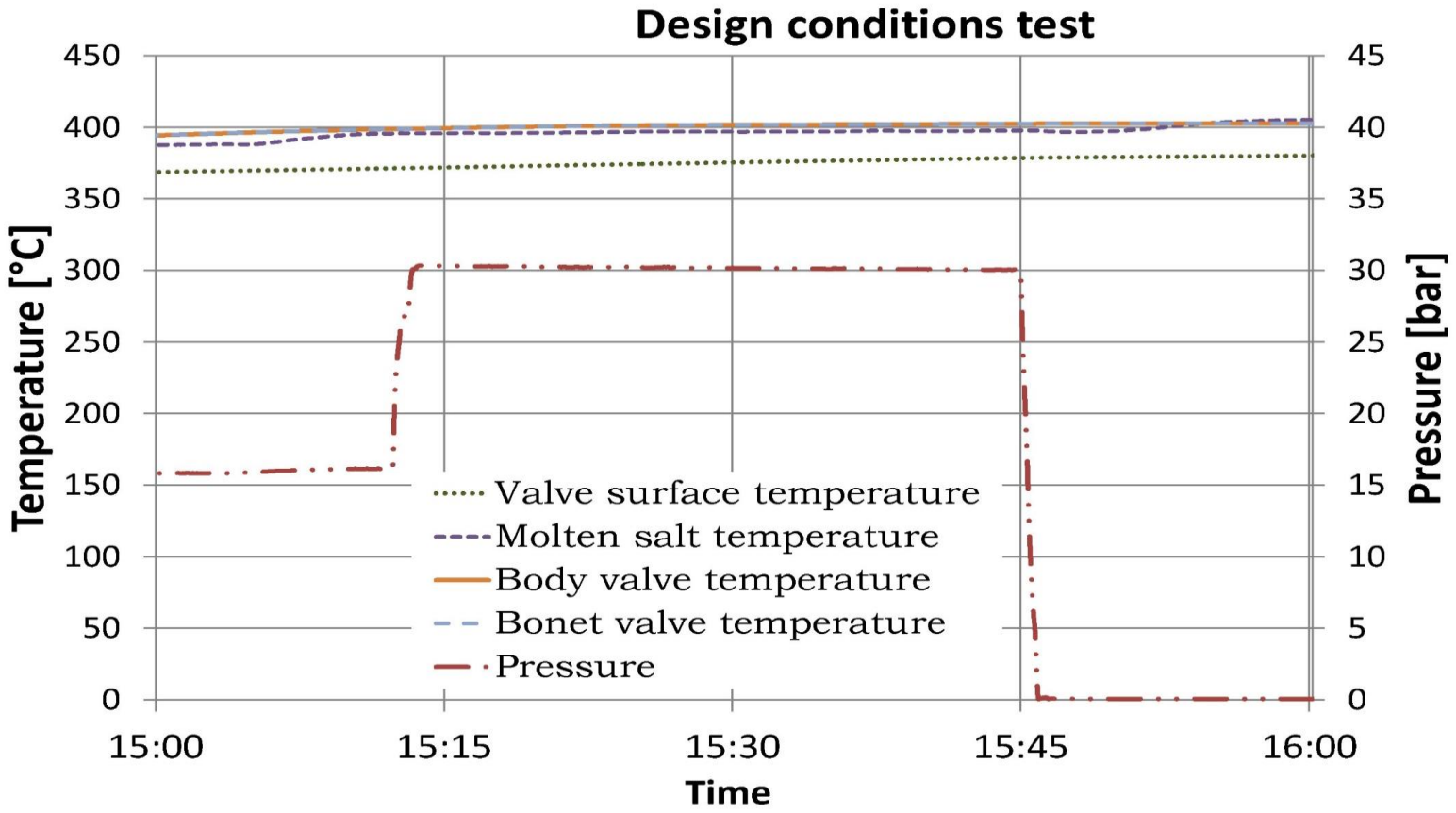
TESTING THE VALIDITY OF VALVES WITH MOLTEN SALT

A set of valves tests has been proposed to satisfactorily predict the components' behavior under real operating conditions:

- Design conditions test
- Leak test
- Packing life test
- Cold zone test

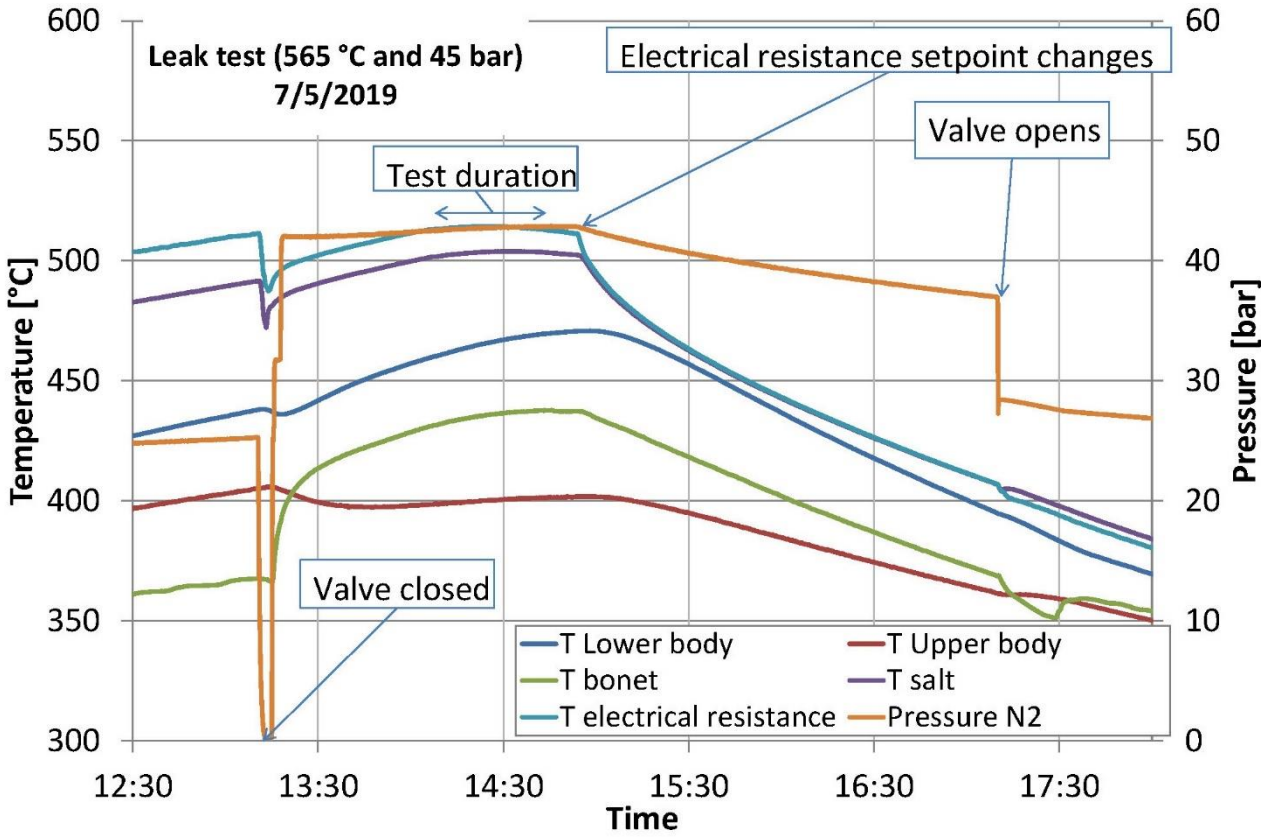
Design conditions test

Design conditions test: 1.5 times nominal pressure



Leak test

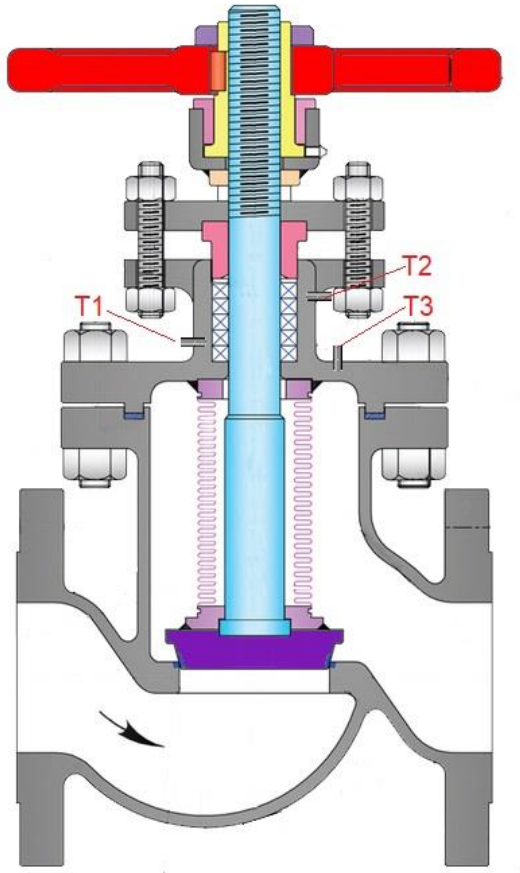
The **leakage test** is carried out with a pressure approaching 1.5 MPa on one side of the valve. this occurs once the valve has been closed and the molten salt has been drained on the other side. Subsequently, any leakage has to be verified.



Cold zones test

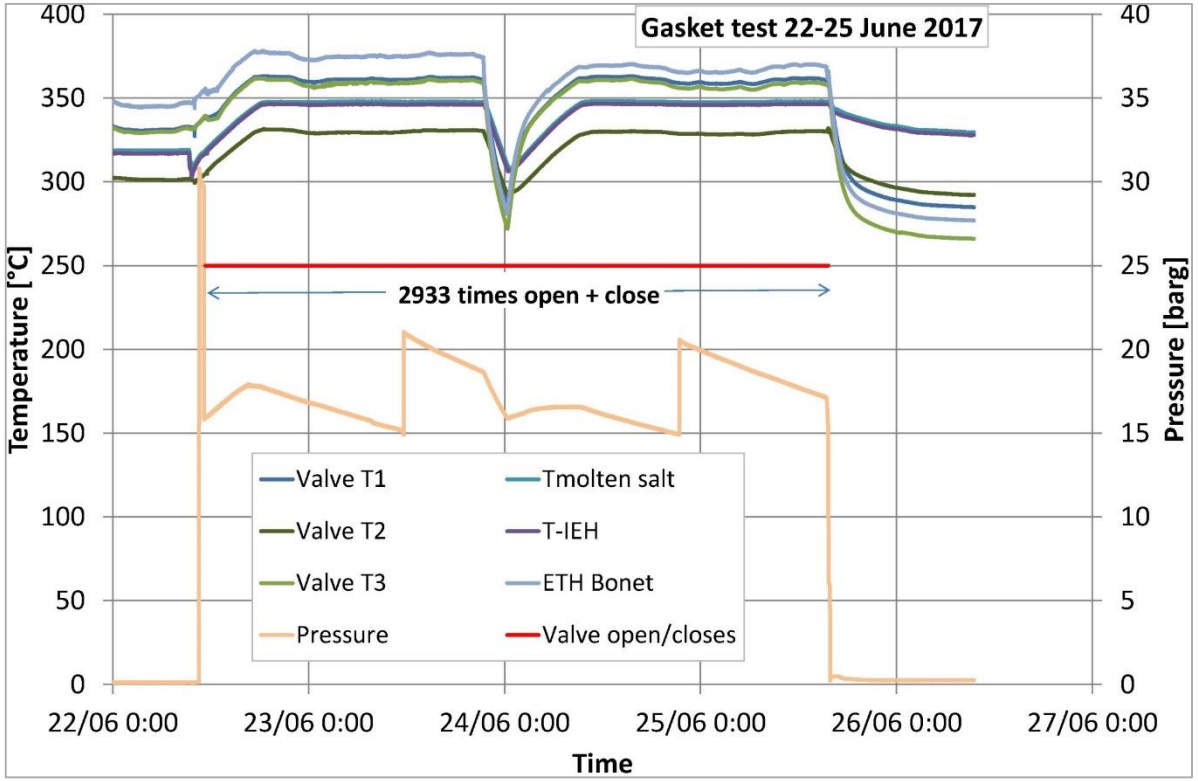
Detecting the zones where the temperature is lower:

- Allow the valve to cool down to 250 ºC
- It is necessary to have thermocouples installed at critical points of the valve without drilling completely through the valve wall.



Packing life test

- There are no standard minimum valve travel rates or number of operating cycles before a valve fails. This value entirely depends on the specific valve application and the materials it is composed of.
- Example: Control valves: 10^4 cycles (corresponding to 14 cycles/day in 2 years)
- With a pressure of 1.5 MPa and a temperature of 350 °C, the valve should be continuously opened and closed up to 10^4 cycles. Gasket leaks are checked for over the entire test sequence.




Thank you for
your attention!