




# Development of High Temp Molten Salt Pump Technology for Gen 3 Solar Power Tower Systems

# Project Overview

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One key finding of the DOE-EERE CSP Gen3 Demonstration Roadmap is that there are no commercially available pumps (and bearings) that can operate at the desired temperature and environmental conditions.

 <p>HAYWARD TYLER</p>	Hayward Tyler, Inc. Principal Investigator	Material Selection, Pump & Bearing Development
 <p>OAK RIDGE National Laboratory</p>	Oak Ridge National Laboratory	Material Selection, Material & Bearing Testing
 <p>HTSD</p>	High Temperature System Designs	Material Selection, Design Input & System Awareness

# Technical Challenges

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Identifying the combination and interaction of materials to operate successfully in a high temperature chloride salt environment is the technical challenge.

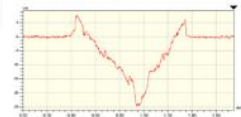
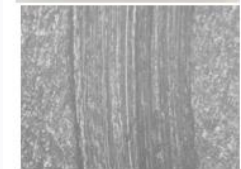
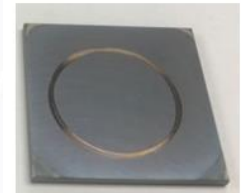
Bearing Surface -> Corrosion Rate & Type of Corrosion

Bearing Design -> Reliability & Maintenance

Economics -> Scalability and Cost of Pump

# Approach & Method

Evaluate Commercial Materials	Ceramics, Alloys, Composites: +5
Static Corrosion Test	500hr test @ 750°C -> Down select
Tribological Test	Wet & dry @ 750°C -> Down select
Bearing Development	Sleeve, Bushing, & Carrier
Bearing Test	Wet & dry @ 750°C -> Final select
Pump Development	Design & Analysis



# Corrosion Test Results - Batch 1

CORROSION RATE
mm/y (calculated)
0.013
0.041
0.041
0.067
0.074
0.113

SURFACE FINISH	
$\Delta Ra$	$\Delta Rz$
-0.017	-0.22
0.050	0.82
0.103	0.9
0.173	1.12
0.775	4.4
1.520	6.99

**Microscopic  
Examination**

# Impact

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Corrosion Data for Industry

Fluid Film Bearing Qualification

Fully Analyzed Ready to Build Hot & Cold Pumps for Pilot Project w/Focus on:

- Qualified Bearings
- Low Cost Materials & Construction
- Reliability
- Scalability

# Q & A

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