



Heat Exchanger Developments for sCO₂ Power Cycles at Brayton Energy

Jim Nash

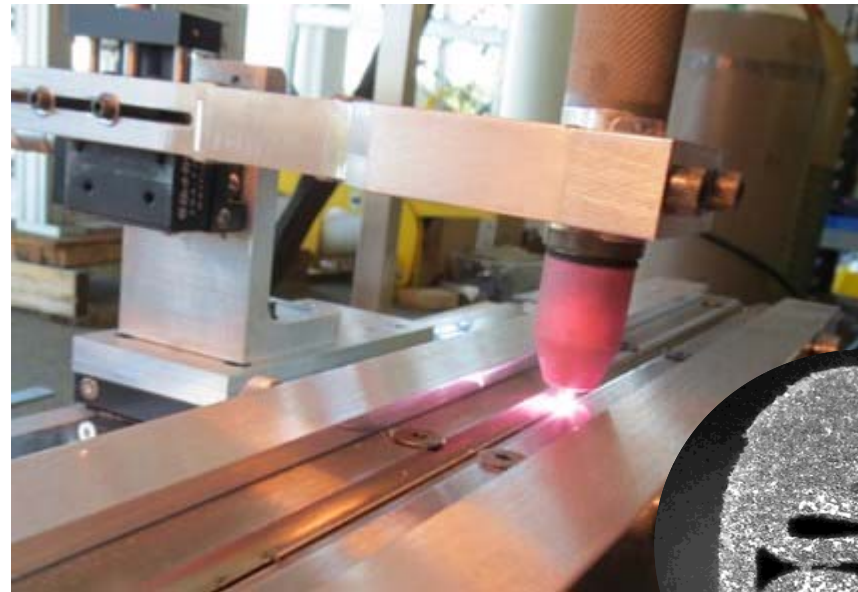
San Diego

15 October 2015



Roll Forming Fin

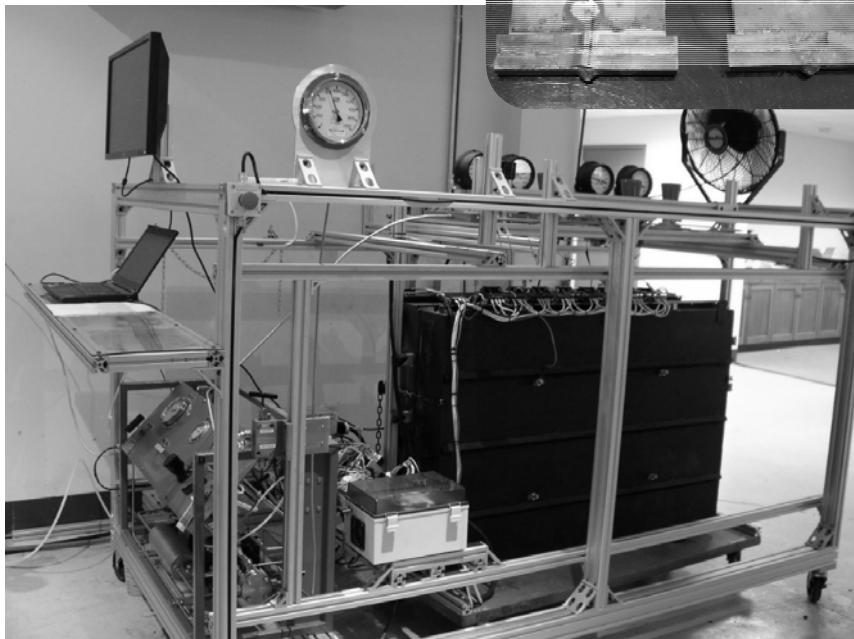
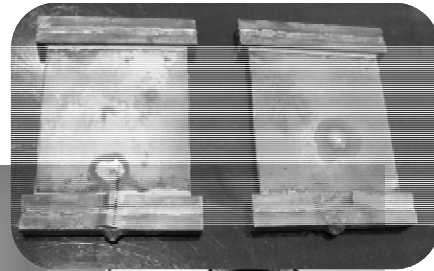
Brazed cell with welded pressure boundary



Manufacturing Process Development for Lower-Cost Heat Exchangers in High-Temperature/Pressure Applications – Sponsored by DOE/NETL

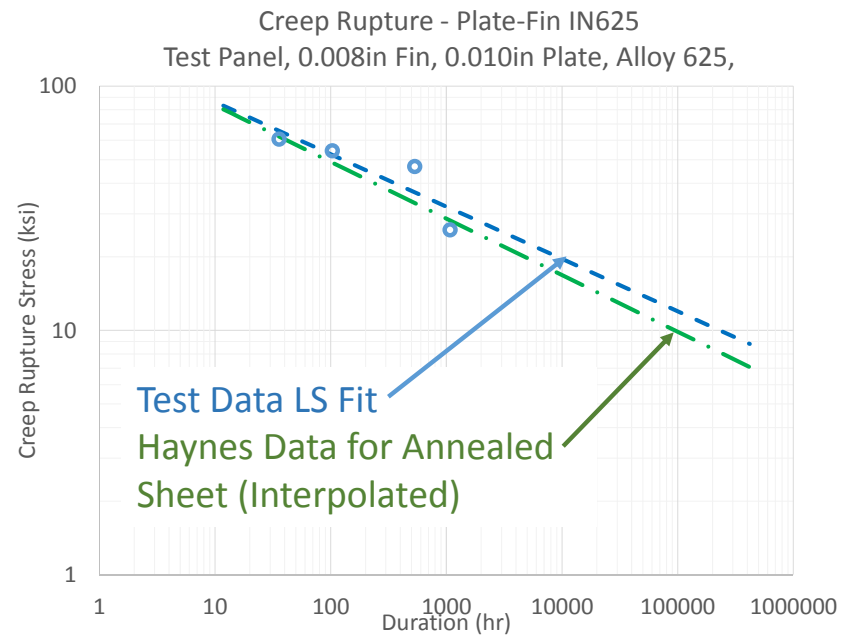
- Design for lower cost manufacturing
- Process development to execute design – brazing, TLP bonding, welding
- Characterization/validation testing – creep, fatigue of processed heat exchanger

Creep Validation



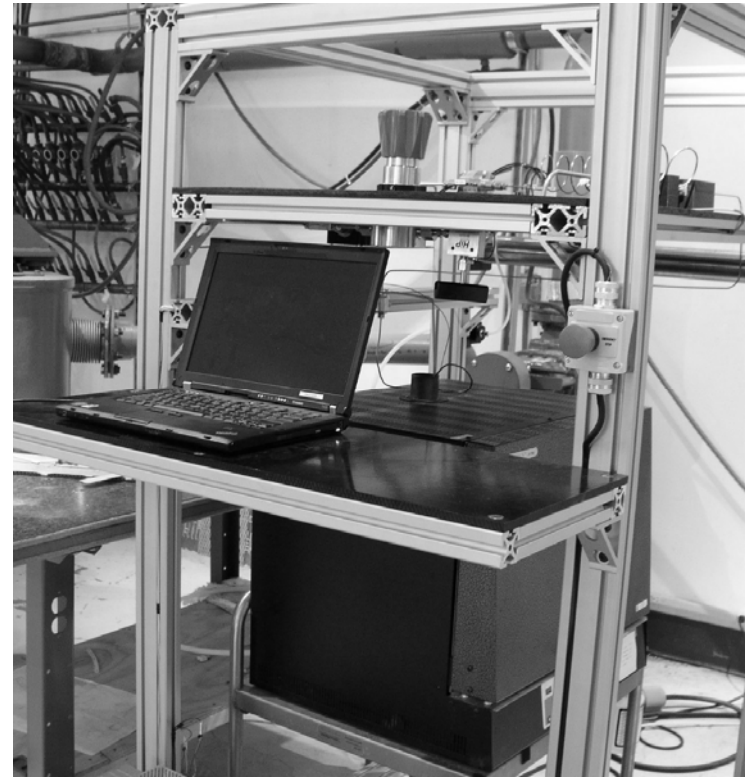
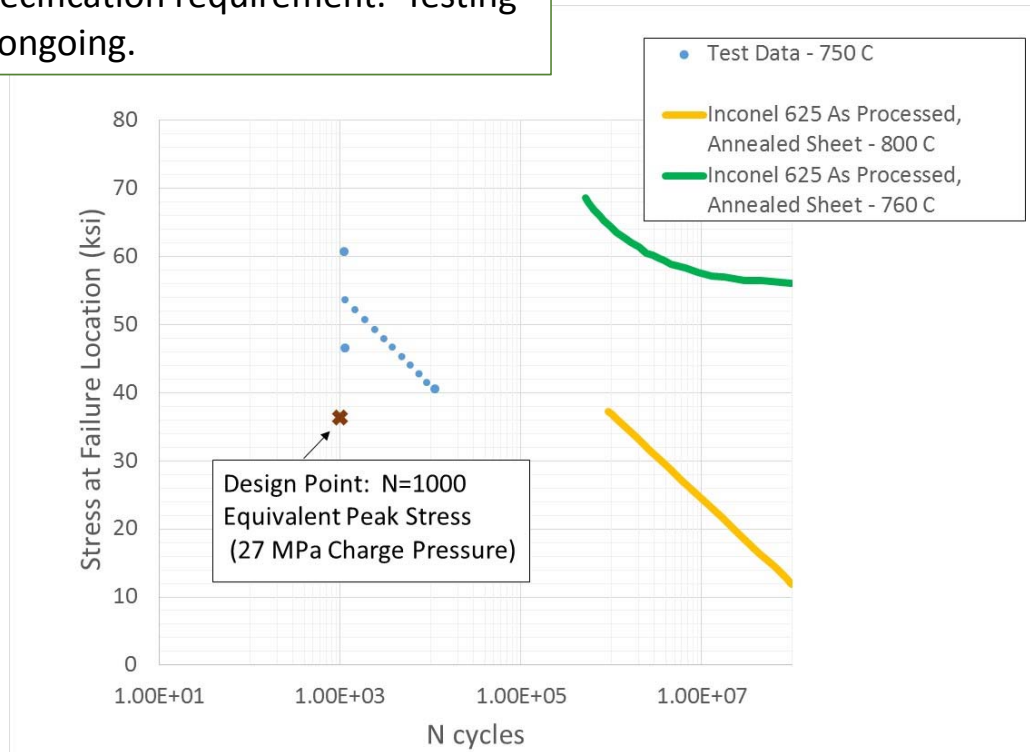
Configured and processed samples in 800°C, 1000bar, capable CO₂ test rig

Creep rupture data for plate-fin tracking with published annealed sheet properties. Testing is ongoing.



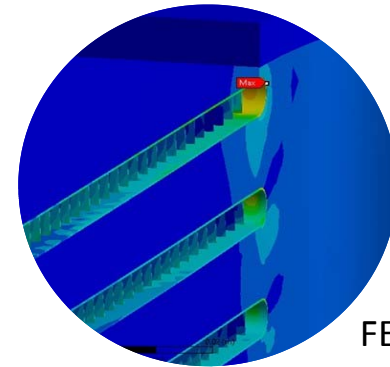
Pressure Fatigue Validation

Fatigue capacity exceeds specification requirement. Testing is ongoing.



Configured and processed samples in 1,100°C, 1000bar, capable CO₂ test rig, @ ≈ 120cycles/min.

Thermomechanical Fatigue Validation



**Temperature and strain measurements to validate thermo-structural FEA model.
Accelerated testing with excess ΔT .**

