

Improving the Economics of Gen 3 CSP Through Application of Ni-Alloys (08367)

New developments in welded product forms for alloy 740H®

1. Impact

- Reduces the costs (up to 40%) associated with using nickel-based alloys for solar receivers, piping, heat-exchangers, and other high-temperature components. Through a combination of high-temperature alloy selection and use of welded product forms.

2. Project Goal

- Development of alternative (low-cost) manufacturing routes (welded tube and seam-welded piping) for Inconel ® Alloy 740H® through supply chain engagement

3. Method(s)

- Support all pathway projects
- Innovative manufacturing
- Codes & standards engagement

4. Outcome(s)

- First successful demonstration of autogenous laser weld tube production via industrial processes for an age hardenable nickel-based alloy
- World's first seam-welded 740H pipe
- Development and supply of materials (including secondary processes such as re-drawing) to multiple SETO collaborative partners
- Innovative pressurized creep testing of thin-wall solar receiver tubing
- Long-term testing (beyond 10,000hrs) to support use of new product forms
- Engagement with codes and standards

5. Conclusion/Risks

- Demonstrated significant cost reduction potential for using 740H in current and future Gen 3 CSP plants
- Strong engagement from material's supply chain and end-users

6. Team

- EPRI (lead), Special Metals Corp.
- Collaborators: SWEPCO, Shaw, Greenville Tube Co., RathGibson

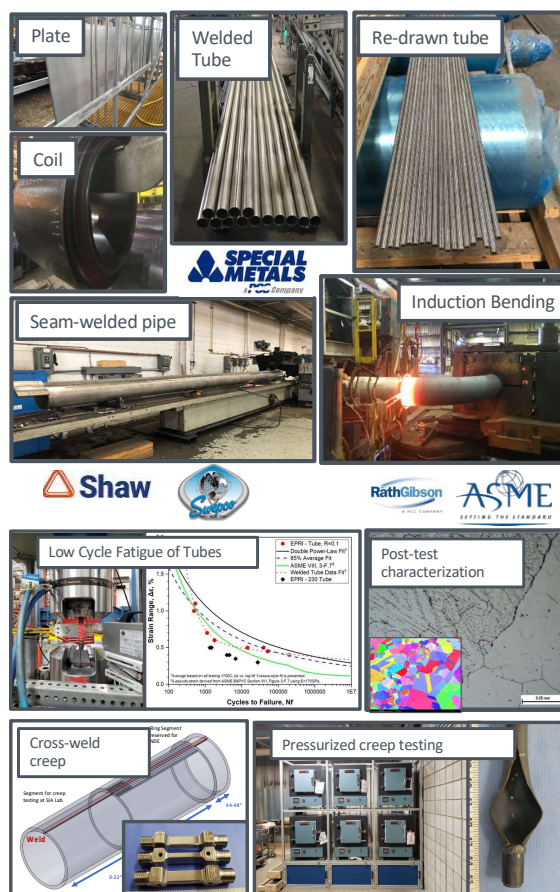


Figure 1. Example product forms and collaborators (top) and high-temperature testing and analysis (bottom) in the development of new Inconel 740H product forms.