ALLOY FABRICATION CAPABILITIES

Melt Processing Capabilities
- Air Induction Melting: up to 300 lbs.
- Vacuum Induction Melting: 10, 50, and 500 lbs.
- Vacuum Arc Remelting, Electro Slag Remelting: 3- to 8-inch diameter ingots, 50-500 lbs.
- Button Melting: 50-500 grams

Heat Treatment & Fabrication Capabilities
- Heat-treatment furnaces: 1650°C, inert atmospheres and controlled cooling
- Press Forge: 500 Tons
- Hot and Cold Roll mills: 2 and 4 high configurations

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**Corrosion & Oxidation Laboratories**

Capabilities include systems for steam exposures, supercritical CO₂ exposures, and high pressure/high temperature immersion tests involving saturated CO₂ or mixed gas involving Air, Ar, N₂, CO₂, O₂, SO₂, H₂S, CH₄, NH₃.

- Ultra-supercritical (USC) Steam Autoclave: Dual rated to 4500 psig at 760°C and to 5000 psig at 746°C
- Supercritical CO₂ Autoclave: Rated – 4000 psig at 800°C
- Autoclaves for immersion testing in saturated CO₂ or mixed gas involving Air, Ar, N₂, CO₂, O₂, SO₂, CH₄, NH₃: Standing Stirred Autoclaves (5000 psig, 250°C), Flow-Through Unit (5000 psig, 500°C)
- Available static and cyclic oxidation testing for 24/7 exposures to: air, O₂, N₂, Ar, He, CO₂, H₂O, and N₂/4% H₂, at ambient and elevated temperatures
- Electronic potentiostats/galvanostats for conducting electrochemical experiments
- Capabilities to perform electrochemical experiments at high-pressures and temperatures (4500 psig, 250°C) in in saturated CO₂ or mixed gas involving Air, Ar, N₂, CO₂, O₂, SO₂, H₂S, CH₄, NH₃

**Fracture Mechanics & Creep Capabilities**

- Mechanical Testing: tension, compression, low and high cycle fatigue, fatigue crack growth rate testing using electro-mechanical and servo-hydraulic Universal Testing Machines (5,500 to 220,000 lbs.) with high temperature capability and with fully instrumented computer control and data acquisition.
- Creep Testing: creep frames for stress-rupture and creep-rupture tests and stress relaxation tests. Testing can be done in Air, Ar, CO₂ or N₂. Maximum load capacity of 10,000 lbs. and a maximum temperature capability of 1200°C.

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**Severe Environment Corrosion/Erosion Research Facility (SECERF)**

Modular facility that allows researchers to examine the performance of materials under a wide variety of corrosion and hot-corrosion conditions, such as “fire-side” power generation conditions.

- Provides the basic infrastructure for conducting experiments at varying temperatures, in pure or mixed-gas environments, and in pure- or mixed- gas/liquid environments
- Available gases: CO, CO₂, CH₄, H₂, H₂S, SO₂, HCl, O₂, N₂, Ar, He, air, H₂O vapor
- Gas flow rates: 5-4000 mL/min
- A programmable gas delivery system with mass flow controllers, monitors, and interlock system allows for safe 24/7 unattended operations
- Temperature Range: Furnaces – Ambient to 1600°C; Hostile Atmosphere Erosion testing apparatus – Ambient to 900°C

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**Laboratory Capabilities to Simulate Real World Environments**

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