Regenerative Firing for a Rotary Forge Furnace

B 1006-071, B 206-072, B03376, B17476, B17687

Application: Rotary Hearth Forge Furnace

Bloom performed a **complex modeling analysis** to determine the correct **burner number, size, and placement** in order to achieve proper **temperature uniformity** for a unique forge furnace arrangement.

Purpose/Drivers

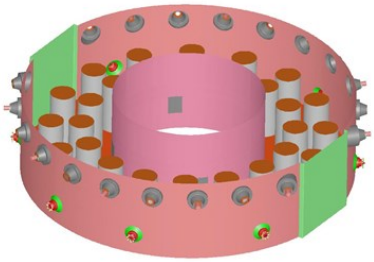
- **Unique Furnace Design**
- **Temperature Uniformity**
- **Thermal Efficiency**

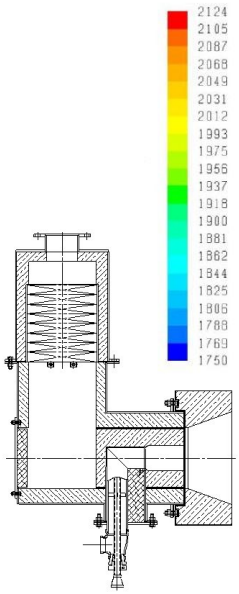
Key Points:

1) The unique furnace arrangement required a **thorough modeling analysis** to **optimize temperature uniformity**.
2) Bloom **engineered a new burner design** specifically for this furnace arrangement with special mounting of the cases, and a new fuel connection.

Scope

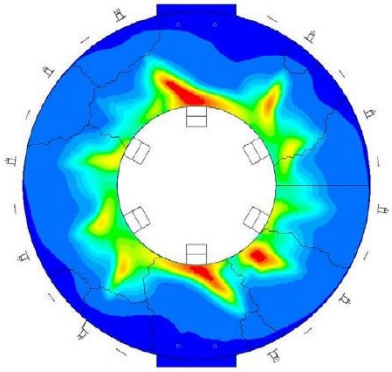
- **Computational Fluid Dynamics (CFD) analysis for the furnace**
- **Re-designed 1150 Series Regenerative Burner heads and cases**
- **Cycle Valves for:**
  - **Air**
  - **Fuel**
  - **Exhaust**
- **Burner Pilot equipment**





Achievements

- **Flame envelope tailored to furnace design**
- **Temperature uniformity (± 50°F)**
- **70% [LHV] Thermal Efficiency**



A domestic forge company built a new forge furnace. Because of the unique design of the furnace (rotary hearth) conventional burner placement schemes were not applicable, so the correct burner configuration and placement were not obvious. Bloom worked with a furnace OEM to decide the correct burner location. In order to do so, Bloom completed a detailed numerical modeling. After several iterations, Bloom and the OEM determined the correct burner placement to optimize the furnace and product uniformity. Bloom then engineered and supplied the burner equipment, accounting for the unusual furnace configuration. The special design ensured the proper temperature distribution in the furnace, and ultimately the proper heating of the product.

Keywords: Forge Furnace, Regenerative, CFD, modeling

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