



FOR ALL YOUR THERMAL PROCESS REQUIREMENTS

## CASE STUDY

# Large Rotary Hearth Reheating Furnace

Magma Combustion Engineering completed a project for a leading metal component manufacturer in the UK which included the turnkey supply of a large rotary hearth reheating furnace.

## AIM

Prior to forging, steel stock of various qualities and sizes requires heating to the temperature at which it can be shaped by the available presses. The production of large pipes by extrusion forging particularly requires that large work pieces, in this case up to 9 tonnes in weight, be heated uniformly to the high temperatures necessary to achieve the required material plasticity for this operation. To meet the onerous duty required for this application, the temperature distribution within any furnace used for this process has to be extremely uniform.

Using the concept of a working envelope within the furnace, the required temperature uniformity for this unit was required to be  $\pm 14^{\circ}\text{C}$  at operating temperatures between  $600^{\circ}\text{C}$  and  $1280^{\circ}\text{C}$ .

Given that the life of the furnace is expected to be long, fuel efficiency was also considered important, in order to minimise operation costs. Consequently, heat regeneration technology and low thermal mass principles were incorporated into the design of the unit. Additionally, the furnace structure, both mechanical and refractory was specifically designed to provide extended service under the tough operating conditions which apply in any forge.

## SCOPE OF THE WORK

A full turnkey rotary hearth furnace supply package was provided, namely:

- CFD design studies
- Mechanical, electrical and control design
- Manufacture and procurement of system elements
- Project management
- Site installation
- Commissioning and temperature uniformity trials

## BENEFITS

A reliable, extremely energy efficient and temperature uniformity compliant stock reheating facility for extruded pipes for the power generation industry was provided, helping the company to maintain cost effective and competitive operations in this market sector. Additionally, forged components for other market sectors temperature can also be produced using this rotary hearth furnace.

The energy consumption of this furnace in production was some 50% lower than those previously used for this duty, which far exceeded expectations, and gave a rapid payback for the capital investment.

## CONTACT US

Want to know more about how Magma can help you?

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## PHOTOS

A selection of photos from this case study.

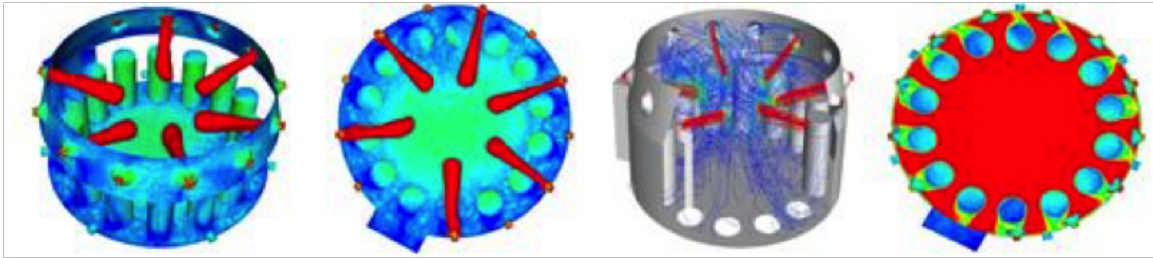


Fig. 1 Detailed CFD analysis was completed to ensure temperature uniformity.



Fig. 2 Rotary hearth furnace with the door closed.



Fig. 3 Rotary hearth furnace being charged.

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