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CASE STUDY

Clam Type Pre-Forging Heat Treatment Furnaces

Magma Combustion Engineering completed a project for a leading alloy and metal components manufacturer in Sheffield, UK which included the supply of two Clam type heat treatment furnaces.

AIM

Our customer required two high efficiency furnaces capable of close tolerance heat treatment of ESR ingots prior to forging in a forging machine. The load in each furnace was up to 45 tonnes of aerospace materials requiring tight tolerance to temperature control ramp and final soaking to $\pm 5^{\circ}\text{C}$ between 450 to 750 $^{\circ}\text{C}$ and $\pm 10^{\circ}\text{C}$ up to 1190 $^{\circ}\text{C}$. This project was to provide improvements in production flow in addition to improved consistency of heat treatment and energy savings.

SCOPE OF THE WORK

The contract called for the design, supply, installation and commissioning of two Clam type furnaces. These were to be fitted with latest technology pulse fired ultra-low NOx Natural Gas burners with waste heat recovery to minimise energy consumption. A low level individual recuperator supplied each burner, positioned at high level, with pre-heated air and each burner was fitted with an exhaust gas recirculation supply. The burners were mounted in staggered opposed orientation.

The controls were operated from a remote operator pulpit and included a PLC to manage combustion and burner pulsing in response to command from operators and process controls, HMI operator interface and chart recorders.

The furnace lid, Clam, was required to open through a full 90 degrees to facilitate crane access for loading and unloading and was lined with non-carcinogenic ceramic fibres. The hearth was a composite of insulation and hard wearing working layer refractory concrete.

BENEFITS

The plant was commissioned to the schedule imposed by our customer and met all objectives for close tolerance control with temperature uniformity surveys made that fulfilled the requirements of RPS 953 and AMS 2750.

CONTACT US

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PHOTOS

A selection of photos from this case study.

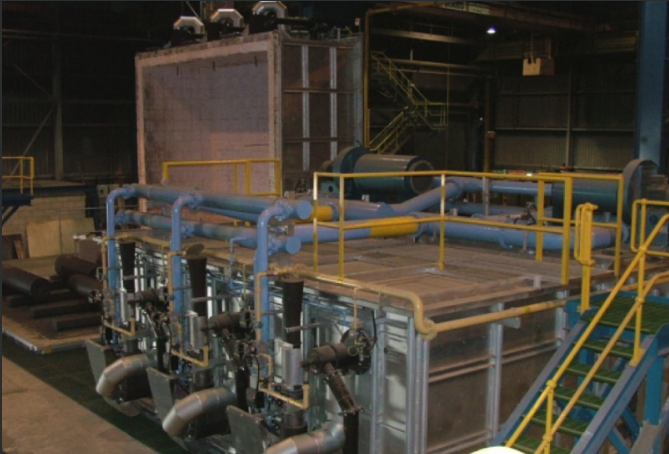


Fig. 1 Two clam type furnaces, one open while being charged and the other in operation.

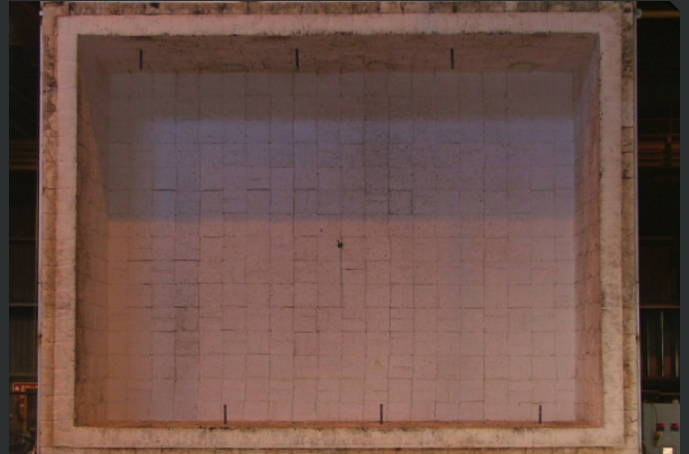


Fig. 2 Clam furnace with lid open showing refractories.



Fig. 3 Furnace burners & recuperators.

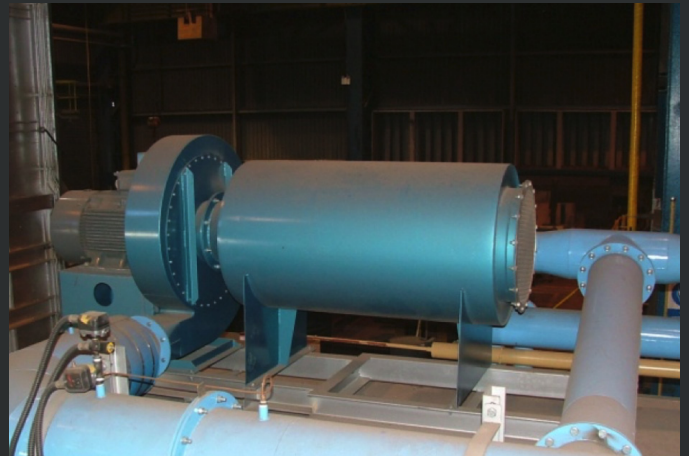


Fig. 4 Combustion air fan.



Fig. 5 Control panel.



Fig. 6 Control panel.

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