Keeping the Auto Industry Moving

NUTEC Bickley is currently installing a truck beam heat treat line incorporating two large walking-beam furnaces – one for austenitizing and the other for tempering. The contract for these specialist furnaces was won against strong international competition and was awarded by one of the leading Latin American auto structural component designers and manufacturers, boasting numerous plants and thousands of employees. Confirmation of NUTEC Bickley’s ability to design and manufacture superior systems is that this is the third such order from this important customer.

The austenitizing furnace is a continuous unit, capable of treating 60 beams (roughly equivalent to 17 tons of steel) per hour. It has an operating temperature of 910°C (1670°F), and a maximum temperature of 1100°C (2010°F). There are 10 automatic control zones, designed to promote temperature uniformity.

The truck beams are 33cm (13in) wide, 11.5cm (4.5in) high, 15m (49ft) long, and each weighs around 285kg (625lb). A closely controlled environment is necessary in order to induce the required change to the steel beams’ crystal structure.

There are 29 high-velocity burners, sited above the load. These top brand burners are one of the most used and respected of their type in the combustion industry. Offering low NOx emissions, they feature stable high excess air and excess fuel operation, direct spark ignition, integral air and gas meters, sturdy cast construction and flame rod ionization. The burner configuration creates gas recirculation and allows uniform heating of the load and better heat transfer to the product through radiation mechanisms and convection.

The furnace employs NUTEC Bickley’s IMPS™ combustion system that uses a predetermined pulse sequence to control individual burners or burner groups based on the heat requirements of each control zone. IMPS provides multiple benefits, including energy savings, enhanced process control, optimal kinetic energy utilization from burners, improved temperature uniformity without excess air, a high turndown ratio, flexible rezoning through software, high gas recirculation rates, better energy transfer to the product, and reduced NOx emissions.

This austenitizing furnace is designed with an area close to the entrance where the beams are preheated before moving forward. Heating is then ramped up to 910°C in a maximum time of 27 minutes.

The tempering furnace – which is also capable of heat treating beams at a rate of 60 pieces per hour – has an operating temperature of 490°C (915°F) and a maximum temperature of 600°C (1110°F). There are six automatic control zones and the heating method for tempering is via air circulation with a vertical flow pattern, ceiling to floor. This is achieved with six centrifugal fans, one for each combustion chamber. The combination of multiple chambers and control zones with recirculation fans optimizes convective heating inside the furnace.

Medium-speed burners are employed in this furnace, sited above the load, with one for each control zone.

As with the austenitizing furnace there is a preheat section, with heating being ramped from room temperature up to 490°C in a maximum time of 27 minutes.

Both of these furnaces benefit from advanced insulation based on the patented Jointless® ceramic fiber system that allows faster heating and cooling and reduces heat storage. Using MacroModules, this insulation is 8in (20cm) thick in the combustion zones. Optimal thermal efficiency has also been guaranteed with an improved design of the door frame and canopy for both access and exit doors. Both furnaces are fully NFPA 86 compliant.

For all further information, please contact:

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