Heat Treatment Facility

Furniss & White (Foundries) Ltd
Northern Combustion Systems supplied a new heat treatment plant for a local customer, Furniss & White (Foundries) Ltd. The package consisted of one gas fired furnace, a transfer charging machine, water quench tank and all appropriate ancillary equipment for the complete heat treatment of castings fully designed, built, installed, commissioned and includes operator training with a service package.

**Normalising (Gas) Furnace**

The furnace to suite the customer was supplied as a lift off cover type furnace, designed for a load capacity of 5.3 tonnes including support tray, maximum load size (W)1500mm x (D)1500mm x (H)1100mm.

The temperature range of the furnace at 600°C to 1250°C was achieved with a temperature uniformity of 600°C to 800°C ±8°C and over 800°C to 1250°C at ±14°C to meet the specification requirements of NORSOK M650 Rev 4 2011.

The furnace is fired using two self-recuperating high velocity gas burners mounted at low level, in diagonally opposite corners of the furnace hood. This firing pattern is well proven and sets up a high velocity flow of combustion products which circulate around the furnace load, resulting in a high degree of temperature uniformity throughout the combustion chamber.

The system designed to meet with current European safety standards EN746-2

The furnace hood is hydraulically raised and lowered in seconds automated in time to ensure a safe fast quench of the load.
Water Quench

Positioned in front of the furnace for a rapid quench is a $3.4 \times 3.8 \times 3.95$ m quench tank holding 51,000 litre of water with high velocity agitation jets.

The volume of water calculated to prevent the water from exceeding 50°C when quenching a 5.3 Tonne load of castings and tray from 1250°C at 20°C.

The water is vigorously agitated from two sides and from below using multi-jet, high velocity agitation to break down the water vapour barrier and increase heat transfer between the casting and the quenchant. The agitated water pumped by two 30kW pumps 108ltr/sec, positioned in an underground service pit and controlled by variable speed drive controlling the quench jet intensity.

The system incorporates a circulation pump and sealed cooler capable of a cooling capacity of 370kW. Water at 50°C is capable to return to the quench at 15°C with an ambient temperature up to 32°C. The water is pumped through the plate exchanger where it is cooled then back to the quench tank.

Charging Machine

Loading and unloading of the furnaces is by a 5.5 Tonne capacity single sided, fully automated, 4-wheel drive charging machine.

The operator transfers the load to a dedicated high temperature alloy tray positioned on a loading table. The operator exiting the fenced off facility, activates new or pre-programed heat treatment cycles.

The time for opening the door to total immersion of the load into the quench is critical and achieved in less than 30 seconds.

Click here to view the Quench Facility in action!