



“Higher process temperature and faster cycle time”

INCREASED PROCESSING SPEED IN HEAT TREATMENT INDUSTRY

Lark Heat Treating is a commercial heat treater located in Northwest Houston, TX, USA. Founded in 1978 by brothers Frank and Gene Clark, the company has grown to a 50 employee operation that specializes in a wide range of heat treatment services mainly to the oil, gas and petrochemical industries.

THE CHALLENGE

At the plant, each stage of operation is monitored by an approved QA system to assure and maintain consistent and uniform product quality.

The shop is equipped with two gas fired pit furnaces, each rated at approximately 322 kW/h (1.1 million BTU), used for heat treating tool components, mainly carburizing and carbonitriding in an endothermic protective atmosphere, at temperatures between 430°C and 1040°C (800 – 1900°F).

Firing cycle times vary between 1 and 10 hours. Each low thermal mass insulated furnace is heated by seven single ended recuperator (SER) radiant tube burners.

The burners were originally fitted with nickel chromium alloy inner and outer tubes, which lasted on average, for about six years.



THE SOLUTION

A decision was made to equip one of these furnaces with Kanthal APM™ alloy radiant tubes in order to increase the processing speed and to enable higher temperature firing cycles to be carried out.

To achieve the productivity improvement target, the burner power was increased by 30%. The burner settings are continually monitored and adjusted to maintain optimum combustion stability and system performance.

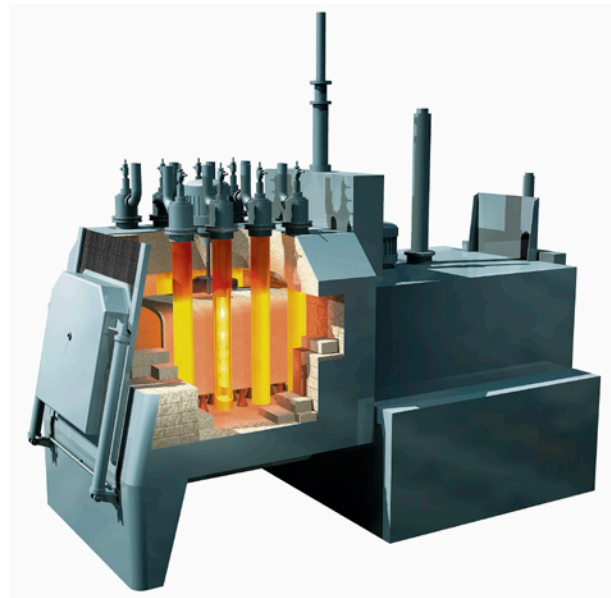
The Kanthal APM™ tubes selected are the same size as the old nickel-chromium tubes that they replaced, with an outer diameter of 154 mm (6.06 in) an inner diameter of 142 mm (5.59 in) and length of 1257 mm (49.5 in).

The inner tubes are also the same size as before, which made the transition very simple and straightforward. The loading on the Kanthal APM™ tubes is up to 5.45 W/cm² (120 BTU/in²) which gives an outer tube temperature of 1170°C (2140°F) at a furnace temperature of 1040°C (1900°F), which exceeds the capabilities of nickel chromium tubes.

Kanthal APM™ is a dispersion strengthened ferritic superalloy, manufactured using a powder metallurgical process. The tubes are seamless, extruded, have no seam joints, and are supplied preoxidized ready to install in carburizing atmospheres. The alumina oxide formed on the surface of Kanthal APM™ renders the tubes immune to carburization.

THE RESULT

These features combined with the higher operating temperature capability of Kanthal APM™ (1250°C (2280°F)), results in a tube life that is 3 – 5 times longer than nickel chromium alloy tubes.



Based upon the success with this first furnace, Lark Heat Treating has decided to convert their second pit furnace to Kanthal APM™ tubes.

Additionally, Lark's heat treatment shop is also equipped with five Ipsen IQ furnaces, four of which are gas fired, fitted with between 6 – 12 SER radiant tube burners, depending on the furnace, and one electric unit heated by bayonet style metallic elements installed inside radiant protection tubes.

To achieve longer tube life and increased production capability, Lark is also in the process of changing the 330 stainless alloy radiant tubes currently used in these furnaces to Kanthal APM™.

Visit kanthal.com to read more about our offering.