

# Can your furnace give you short recovery time and precise control of furnace temperature?

CASE STORY · RELIABILITY IN SEALED QUENCH FURNACES · KANTHAL® SUPER

**Lucas Varity is a well-known international company, which was formed through a merger between Lucas Diesel and Varity. Diesel systems is a division in this group located in Blois west of Paris, France.**

**This division produces fuel injection pumps for diesel engines. These pumps have a considerable number of parts that need to have a high wear resistance. Heat treatment of these parts are carried out in their in-house shop.**

## THE CHALLENGE

### **Kanthal® Super molybdenum disilicide (MoSi<sub>2</sub>) heating elements in 14 sealed quench furnaces**

Today Diesel Systems have a total of 14 Ipsen T4 and T5 sealed quench furnaces. Each has 12 Kanthal Super 1700 elements 560/900/60 mm operating directly in endothermic atmosphere made up by Methanol and Nitrogen. Due to the properties specified for the heat treated parts different treatment processes are utilized. The most common are carburizing, case hardening and carbonitriding.

Production of injection pumps started in Blois in 1987, when four furnaces were commissioned. Due to increased production another six furnaces were added 1989 and then in 1992 further four furnaces were taken into service.

The company has a very sophisticated material handling system. All transports of parts for heat treatment between the warehouse and the furnaces, are fully automatic and are carried out by an auto carriage system guided along cables in the floors.

### **Fully automatic control systems**

Properties like cycle time, atmosphere, temperature etc., are programmed into the computer for each of the products. From the control room the operators can monitor the quality of each furnace heat treatment cycle momentarily on display panels.

Lucas has a procedure to burn out possible carbon depositions in the furnace chamber. This is done every Saturday. Typical carbon potentials in the atmospheres vary between 0.8–1.2% due to treatment process utilized.

## THE SANDVIK SOLUTION

### **No radiant tubes, fast recovery time**

When the Blois plant was projected the requirement on the furnaces was a recovery time of not more than one hour for a 500 kg (1102 lb) load. The only heating system that could manage this quick recovery back to process temperature was Kanthal Super elements.

These molybdenum disilicide electric heating elements form a dense glass-type surface, that prevents oxygen from penetrating into the elements. It also protects the elements from the carbon atmosphere in the sealed quench furnaces to the extent that no radiant tubes are needed. The dense surface contributes to a very long service life. Should an element fail prematurely because of mechanical damage, for instance, it can easily be exchanged within half an hour without cooling down the furnace and no production is lost.



*Some of the 14 Kanthal Super heated sealed quench furnaces at Lucas Varity.*

## THE RESULT

Short recovery time and long service life of the elements result in a very high productivity with fast cycle time, high production and few unplanned production stops. The precise temperature control and ramping features also contributes to a high yield and quality of the products. Diesel Systems have recorded an average life of six years of the elements, quiet operation, precise control of furnace temperature and high reliability.



*The automatic loading- and unloading auto carriage system.*



*Temperature, atmosphere and other parameters are controlled by a central computer system.*

### **Sandvik Group**

The Sandvik Group is a global high technology enterprise with 47,000 employees in 130 countries. Sandvik's operations are concentrated on three core businesses: Sandvik Tooling, Sandvik Mining and Construction and Sandvik Materials Technology – areas in which the group holds leading global positions in selected niches.

### **Sandvik Materials Technology**

Sandvik Materials Technology is a world-leading manufacturer of high value-added products in advanced stainless steels and special alloys, and of medical implants, steel belt-based systems and industrial heating solutions.

Kanthal is a Sandvik owned brand, under which world class heating technology products and solutions are offered. Sandvik and Kanthal are trademarks owned by Sandvik Intellectual Property AB.

## CHALLENGE YOUR EXPECTATIONS

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