KANTHAL®
Part of Sandvik Group

KANTHAL® SUPER CASE STORY

CONTINUOUS HARDENING IN FURNACE ATMOSPHERE

Badia S.A. (Tratamientos Badia, S.a.) was established in 1964 as an independent heat treatment company in a suburb of Barcelona, Spain. The company operates today a number of different furnaces like rotary hearth, continuous rotary, continuous shaker, sealed quench, pit furnaces and induction furnaces, all electric. The furnaces are equipped with Kanthal® metallic heating elements, Tubothal® elements in Kanthal APM™ radiant tubes and Kanthal® Super molybdenum disilicide ($MoSi_2$) heating elements.

THE CHALLENGE

The production volume is about 35 tons/day and the plant is operated on a continuous base 24 hours per day, at present for fi ve days per week. Most of the customers are found in the automotive industry all over Spain. The process control of the furnaces is completely computerised and monitored from a central unit. This contributes to a very high efficiency and quality and less need of manpower. The total number of employees is about 30.

One of the first furnaces installed was a salt bath furnace for nitrating and carbonitriding, with limited production capacity and an old process control system. The furnace did not meet the demands of Badia any longer and a decision was made to replace this furnace with a completely new integrated hardening line. Badia have used Kanthal® Super electric heating elements in their sealed quench furnaces directly in the furnace atmosphere for many years with very good experiences, and would prefer to have the new line heated in the same way. The lifetime of the elements was in average 4–6 years, and the high power resulted in a very short recovery time after charging and consequently a high and reliable production. A similar performance was expected for the new line as the atmosphere and temperature would be the same.

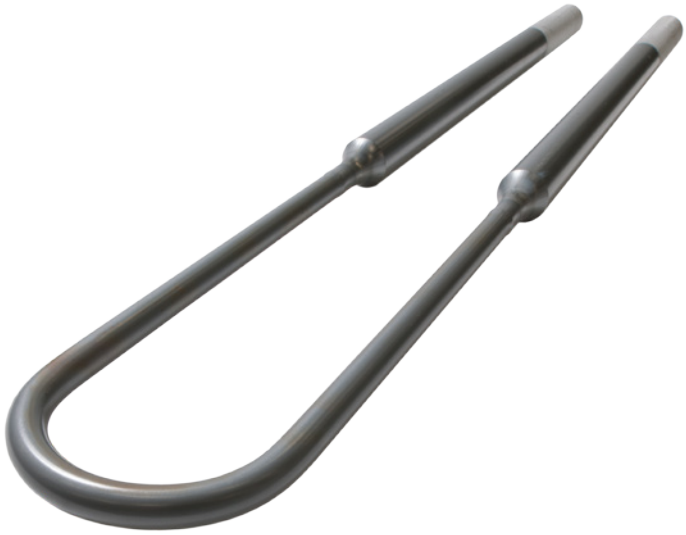
THE SOLUTION

The new line was designed and built by the Italian furnace builder Cieffe. It consists of a high temperature furnace for carbonizing and carbonitriding, a quenching unit, cleaning and tempering.

The total power is 240 kW with 48 Kanthal® Super $MoSi_2$ heating elements. The elements are powered by a transformer and connect four elements in series in three groups per phase. The maximum temperature is 940°C (1720°F), although the process run by Badia normally requires 900–920°C (1650–1690°F). Each element is of the 1700 type, with a heating zone length of 670 mm (26.4 in), rated between 4177–5842 W. Zone 1 and 4 are using 12/24 and zone 2 and 3 6/12 elements. (Dimension in mm of the heating zone diameter/terminal diameter.) The furnace is equipped with a muffl e and the elements are installed vertically from the roof between the lining and the muffle.

The atmosphere is an endothermic mixture of natural gas, N_2, methanol, cracked ammonia, CO and air. The carbon potential is 1.0–1.1%.

Kanthal® Super are the only electric elements that can be operated directly in the furnace atmosphere without using any protection tubes.



THE RESULT

The new line is easily controlled through the whole production process. This is due to four separately controlled zones in the new line.

Visit kanthal.com to read more about our offering.

The 240 kW continuous hardening line at Badia S.A. in Barcelona heated by 48 Kanthal® Super electric heating elements.

Kanthal® Super elements are installed directly in the furnace atmosphere.

S-KA027-SS-ENG, 03.2018, Printed in Sweden

KANTHAL®

Part of Sandvik Group