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The rotary hearth furnace, 650 kW, with 56 Tubothal® heating elements installed at Snecma.

# TEMPERATURE PRECISION IN AN AERONAUTIC CASTING PLANT

**The French company Snecma Moteurs is part of the Snecma aerospace propulsion and equipment group, which specializes, among other things, in the manufacture of engines for civil and military aircraft, rocket engines, turbines, and aeronautical equipment such as landing gear, braking systems, reverse thrusters, engine components, and much more besides.**

## **THE CHALLENGE**

At Gennevilliers, north of Paris, the company maintains a casting plant with a 650 kW electric furnace with a rotary hearth code-named 195E.

The internal diameter of the charge chamber is 5.30 m (17.4 ft) and the height 1.20 m (3.9 ft), with fiber insulation.

To meet the requirements for temperature precision in an aeronautic casting plant (Class 7), where 90 to 95% of the components are rigorously checked, as well as to cope with extended operating cycles with rapid temperature changes during series production runs which can be of widely varying length.

## **THE SOLUTION**

This system involves 56 vertical Tubothal® elements of 6 kW and 12 kW units, consisting principally of Kanthal® rod in an iron/chrome/aluminum alloy known as Kanthal APM™, which is manufactured on the basis of powder metallurgy. These elements are operated under air at between 850°C (1560°F) and 1200°C (2190°F), depending on the particular furnace runs. The respective load rates for these elements are 2.64 W/cm<sup>2</sup> (0.4 W/in<sup>2</sup>) and 3.37 W/cm<sup>2</sup> (0.5 W/in<sup>2</sup>).



Tubothal® is a high-powered heating element, using Kanthal APM™ wire with large cross-section, for maximum performance and longest service life.

Tubothal® electric heating elements installation was the natural choice right from the start as far as Serthel are concerned, who designed and built the furnace. The increased total power and the higher temperature have resulted in a 30% higher production capacity.

#### **THE RESULT**

After close to seven years of continuous operation, a large number of the original elements are still in use. The small dimensions of the elements, located in the center and at the periphery of the charge chamber, make for easy maintenance and simple, rapid replacement even when the furnace is hot.

Snecma are well pleased, not only with the advantages of Tubothal® elements, associated in particular with the reliability of control and regulation in relation to gas as an energy supply, but also most especially due to the

fact that these elements have made it possible to operate virtually without any unscheduled stoppages at all – even at times when production is suddenly and sharply increased.

This successful creation, combining the very latest in mechanical and thermal technologies in a particularly reliable electrical heating system, has enabled Snecma Moteurs to opt for the advantages of a Tubothal® solution for future installations as well.

This excellent reference has also allowed Kanthal to consolidate their position as favoured suppliers to Snecma Moteurs, where more than a hundred other furnaces of all types are operating on the same site.

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