



“The furnaces are very efficient and provide a substantial increase in productivity and economy”

## MINIMIZED MAINTENANCE IN MELTING AND HOLDING FURNACES

**STG, Svensk Tryckgjutning AB, located in southern Sweden, specializes in die-casting products in aluminum and zinc for customers in the automotive, electronics, engineering, transport and construction industries.**

### THE CHALLENGE

Melting was previously done in crucible and induction furnaces, but before moving to a new factory, it was decided to invest in modern melting furnaces. The objective was to improve product quality, yield and economy.

New gas/electric multi-chamber furnaces SMUAB, a furnace builder specializing in installations for aluminum, recommended a combined gas-electric, tiltable melting furnace type and two such furnaces were ordered.

The melting process takes place in a separate chamber with an open gas burner using propane with a power of 190 kW.

### THE SOLUTION

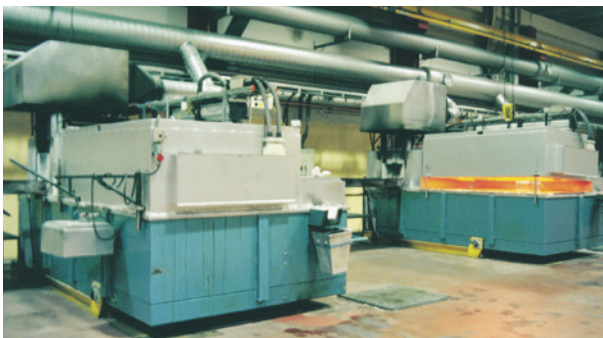
The holding chamber uses overhead heating provided by a Tubothal® – Kanthal APM™ radiant tube system. The molten aluminum, with a temperature of 720°C (1330°F), is circulated in the furnace by a pump, thereby speeding up the melting process and improving quality.

The maximum capacity is 600 kg (1323 lb) of molten aluminum per hour. The electric heating system comprises three high power, multi-shank, heavy gauge Tubothal® wire elements combined with Kanthal APM™ metallic radiant tubes. This system allows a higher power rating than any other metallic system available.



Tubothal® elements are rated at 48.2 kW each at 220 V, totally 145 kW, designed to connect directly to a mains voltage supply of 380 V. The maximum element temperature is 1100°C (2010°F). The temperature is controlled by thermocouples in the furnace chamber, and also in one of the radiant tubes. The Kanthal APM™ tubes have a total length of 2400 mm (94 in) and are supported by hangers and half-shells made from Kanthal APM™ material to avoid sagging. The outer tube temperature is 965°C (1770°F) and the loading is 4.1 W/cm<sup>2</sup> (26 W/in<sup>2</sup>).

Today, Tubothal system is used in a vast number of melting and holding furnaces. A primary advantage of these tubes is the formation of a thin cohesive oxide film on both the inner and outer surface. This oxide does not spall off and, consequently, the molten aluminum is not contaminated. The oxide also functions as a barrier against atmospheric attack and prolongs the life of the tubes.



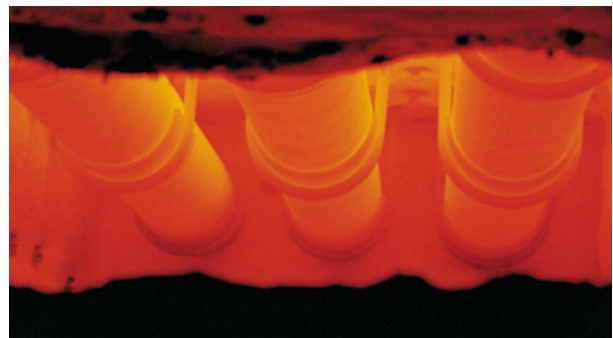
The two SMUAB melting furnaces at STG have each a capacity of 600 kg/h (1323 lb/h) aluminum. The size is 2520 × 4320 × 1800 (height) mm (99 × 170 × 71 in). Total power is 190 kW (gas) + 145 kW (electric).

### THE RESULT

Production runs in three-shifts with production stoppage at weekends. The results so far have exceed expectations – the furnaces are very efficient and provide a substantial increase in productivity and economy. Maintenance has been minimized to the regular cleaning of slag. Tubothal® system shows no sign of ageing and could have a lifetime of several years.

STG are now planning to upgrade their old Westomat furnaces with Tubothal® system to achieve a higher power output, better insulation and less maintenance.

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The three Kanthal APM™ tubes in the fiber-insulated lid. The tubes are 198 mm (diam.) × 2400 mm (length) (7.8 × 94 in). The hangers and half-shells are made of Kanthal APM™ material. Each tube is fitted with a Tubothal® electric heating element.