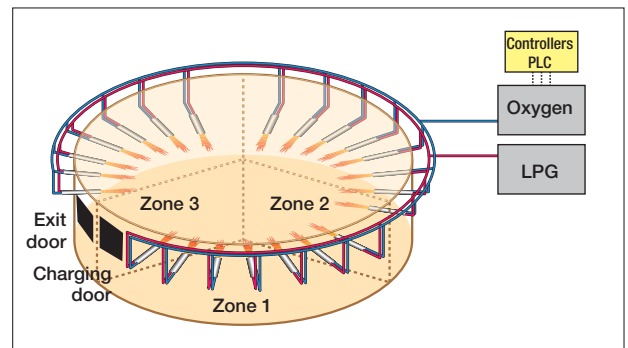
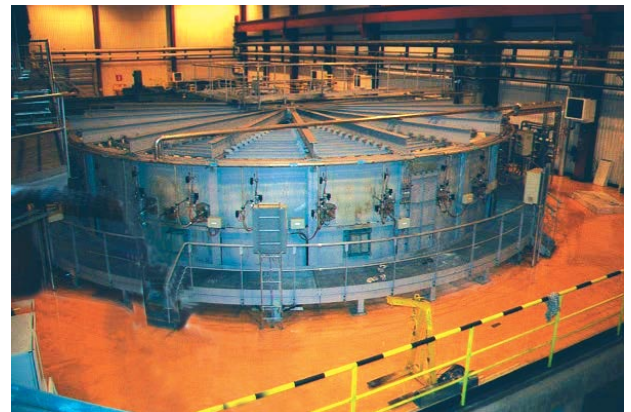


## Reference Installation Summary

<b>Customer</b>	Ovako Steel AB, Hofors, Sweden
<b>Equipment</b>	Ceramic oxy-fuel burners, AGA control system
<b>Fuel</b>	LPG

**Background** Ovako Steel AB are one of the world's leading producers of high quality bearing steels. They have steel production facilities in both Hofors and Hällefors in Sweden, along with several other secondary processing facilities at sites around the world. As part of a large tube mill investment plan called Tube 2000, Ovako decided to commission a new rotary hearth furnace. In addition to gaining maximum productivity, the main considerations were to maximise production efficiency in this furnace by minimising the specific energy costs and to reduce the environmental impact of the process. Additionally, there is a constant requirement for improved, reproducible quality.



**The burner positioning in the furnace**

### Customer Objectives

- ▶ To maximise productivity.
- ▶ To optimise energy efficiency.
- ▶ Reduce the environmental impact of the process, particularly regarding NO<sub>x</sub>.
- ▶ To improve quality.

### Oxy-fuel – the Efficient Solution

Their choice to build an oxy-fuel fired furnace was based on the experience they had gained after having converted one of their other furnaces to oxy-fuel combustion 3 years ago. Increased production, improved quality, reduced emissions and improved temperature control were just some of the benefits that they had gained by using oxy-fuel. In addition to these, the capital costs of building an oxy-fuel fired furnace compared with an air-fuel fired furnace with a heat recovery system are considerably lower.

Using oxy-fuel combustion substantially increases the thermal efficiency of a furnace. The main reasons for this are that the radiant heat transfer properties of the furnace gases produced by oxy-fuel combustion are significantly better than those of air-fuel. Also, due to the absence of nitrogen in the combustion mixture, the volume of exhaust gases is re-

### The Equipment Installation

duced substantially, and thus the total heat losses via the exhaust gases are also substantially reduced. As a result of the improved thermal efficiency, the heating rate and therefore productivity are increased, and less fuel is required to heat the product to a given temperature, i.e. specific fuel consumption is reduced. This helps to make a valuable contribution to reducing the overall environmental impact of the company's operations on the local environment.

- ▶ 22 ceramic low NO<sub>x</sub> burners.
- ▶ Separate flow trains for both oxygen and fuel to each burner in each zone.
- ▶ A complete control system allowing individual control of each of the 3 zones. The total installed power is 7,5 MW.
- ▶ Flow measurement is made using a differential pressure v-cone orifice to ensure accurate measurement and therefore good control.

### Results

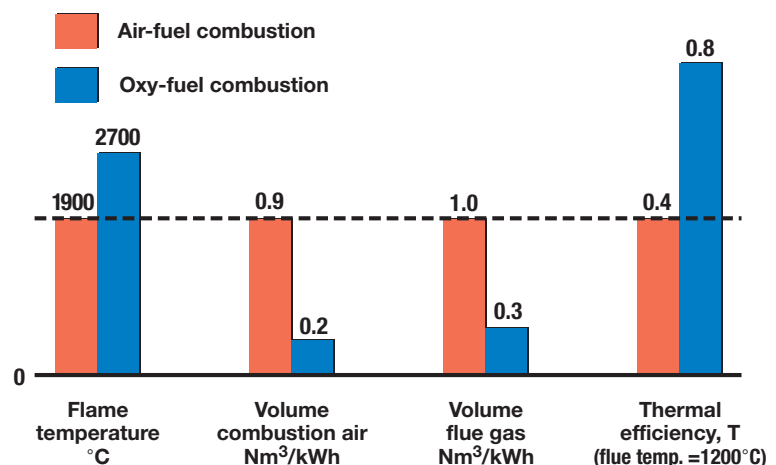
The following performance results have been achieved in this furnace:

- ▶ Productivity max. 22 tons/h
- ▶ Fuel consumption 235 kWh/ton
- ▶ Discharge temperature 1120 – 1240°C

### Customer Benefits

Several key benefits have been achieved as a result of the use of oxy-fuel technology:

- ▶ Optimum thermal efficiency which increases the production capacity of the furnace when compared with an air-fuel fired alternative.
- ▶ Low specific fuel consumption.
- ▶ A substantial reduction in flue gas volumes of the order of 80% when compared with an alternative air-fuel fired furnace.
- ▶ Substantial reductions in fuel borne emissions such as CO, CO<sub>2</sub> and NO<sub>x</sub>.
- ▶ Reduced maintenance requirement due to the simple, reliable, self-cooling ceramic burners.
- ▶ Excellent temperature control and temperature uniformity.



**Comparison between air-fuel and oxy-fuel combustion**

Other leaflets about our complete range of applications and products are available in all sales offices.

Our experts are available for consultation.