→ Success story

Scana STEEL

THE LINDE GROUP

Linde

OXYGON® XL.

For maximising efficiency in ladle preheating.

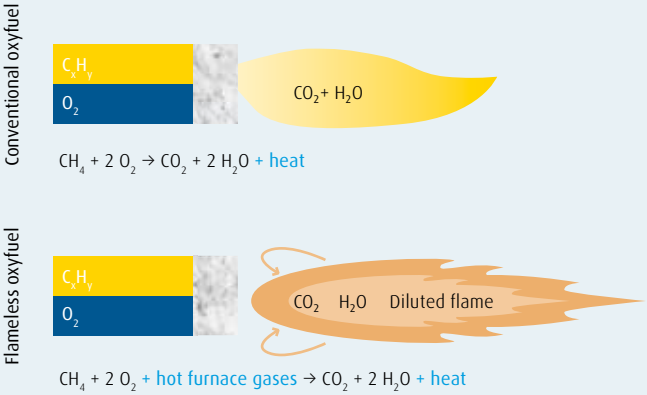
Customer.

Scana Steel AB (www.scanasteel.com) is based in Björneborg, Sweden. The company is a steel producer and solution provider, serving global industries such as power, oil and gas, shipping and manufacturing. Scana is one of the few players in the field with integrated production facilities that include steel melting, heat treatment, forging and steel component machining. It specialises in shafts, rotors, risers and joints, as well as forged steel for tool manufacturers.

Jan Mäkinen, Process Engineer Steelmaking at the control cabinet of the OXYGON XL.

Challenges and solutions.

A schematic comparison between flameless and conventional oxyfuel



Challenge.

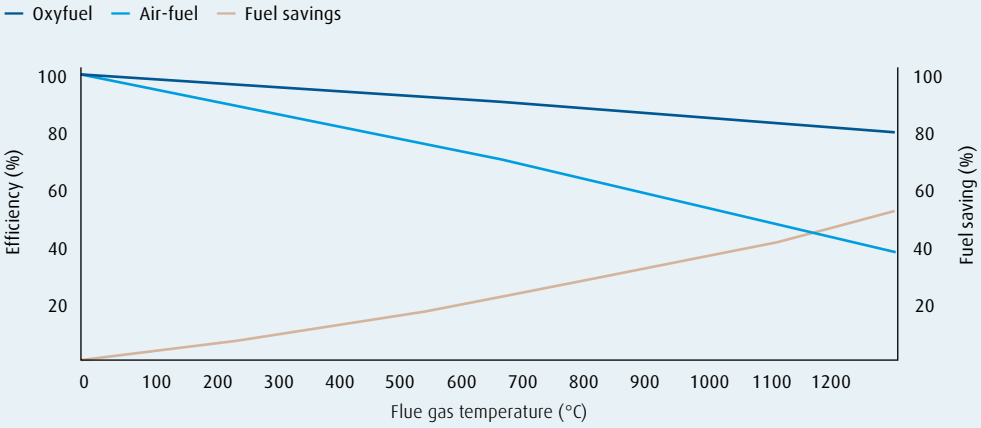
At its facilities, Scana Steel uses an electric arc furnace (EAF) to melt scrap. To follow the melt cycle, one ladle must be operational at all times. For the ladle to be functional, it needs to be dried and preheated to avoid refractory wear and temperature losses. Scana used air-fuel burners to do this. However, these burners were inefficient, requiring around 50 hours to reach the target temperature of 1000°C. In addition to poor thermal efficiency, the air-fuel burners were highly unreliable and often resulted in unplanned downtime. These old burners required continuous maintenance and gave rise to multiple safety issues. Scana was keen to overcome these drawbacks.

Solution.

In 2014, Scana Steel contacted its long-standing collaboration partner AGA, member of The Linde Group, to help solve the efficiency, reliability and safety challenges that its two ladle preheating stations presented. Linde recommended its OXYGON® XL flameless oxyfuel technology. This entailed switching the fuel from oil to natural gas and replacing the combustion air with oxygen. Linde also supplied the flowtrain system for the natural gas and oxygen. The control cabinet for natural gas, oxygen and burner management features a remote operator interface at the ladle preheating stations. In addition, Linde supported Scana Steel with installation and commissioning services to ensure a smooth start without interfering with production operations at Scana.

Technology and benefits.

Fuel savings and efficiency



The principle of flameless oxyfuel.

OXYGON flameless oxyfuel combustion works by diluting the flame with the flue gases – which are free of the nitrogen ballast in ambient air. The flame dilution also disperses the combustion gases throughout the ladle for more effective and uniform heating of the ladle. This helps to avoid hot spots and extends the refractory lifetime. The flame contains the same amount of energy as conventional oxyfuel flames but has a lower flame temperature. This substantially reduces the creation of nitrogen oxides (NOx).

Benefits.

Now, Scana Steel can dry and/or heat the ladles according to the recommended temperature profiles. This not only accelerates heating, but also decreases fuel consumption. In addition, operators have gained much better control over the ladle preheating process through advanced digital programming capabilities. They can now easily program both the temperature, heating curves and start times from the control cabinet, ensuring predictable and consistent ladle temperatures. The remote interface also improves occupational safety and creates a better working environment for operators.

At a glance.

- → Ladle preheating cut from 50 to 20 hours or less (12–15 possible in theory)
- → 80% reduction in fuel consumption
- → 10% extension of refractory lifetime
- → NOx emissions reduced to less than 100 mg/MJ
- → Greater reliability
- → Reduced maintenance effort
- → Ability to lower EAF tapping temperature by 20°C

"The OXYGON® XL flameless oxyfuel solution from Linde makes our work much easier and safer. But it also gives us much greater process control, allowing us to speed up heating times by more than 50%, while cutting costs and improving our environmental performance."

Peter Harnesk, Production Manager of Scana Steel AB

Getting ahead through innovation.

With its innovative concepts, Linde is playing a pioneering role in the global market. As a technology leader, it is our task to constantly raise the bar. Traditionally driven by entrepreneurship, we are working steadily on new high-quality products and innovative processes.

Linde offers more. We create added value, clearly discernible competitive advantages, and greater profitability. Each concept is tailored specifically to meet our customers' requirements – offering standardised as well as customised solutions. This applies to all industries and all companies regardless of their size.

If you want to keep pace with tomorrow's competition, you need a partner by your side for whom top quality, process optimisation, and enhanced productivity are part of daily business. However, we define partnership not merely as being there for you but being with you. After all, joint activities form the core of commercial success.

Linde – ideas become solutions.

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