



Low-temperature Oxyfuel. Uniform heating for higher productivity, no hot spots and less emissions.



Low-temperature Oxyfuel in the melt shop at SAPA Heat Transfer, Sweden.

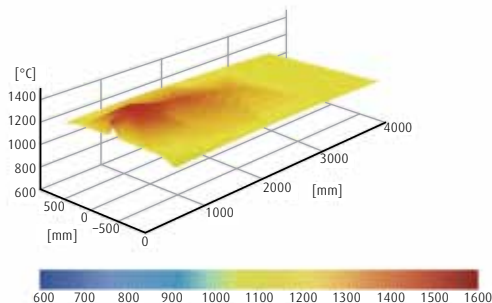
- Summary**
- Up to 100%, typically 30–50%, higher melt rate and up to 50% lower fuel consumption
 - Low flame temperature, comparable to that of airfuel technology, and uniform heat distribution to increase melt rates, cut emissions of NO_x and reduce dross
 - Unique design solution for aluminum melting conditions

Customer SAPA Heat Transfer, Sweden.

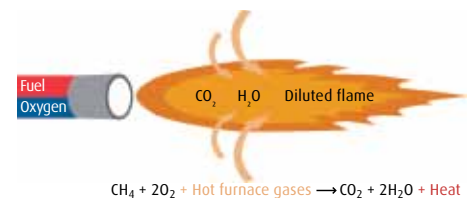
Challenge With the increasing demands for non-ferrous metals, increasing the throughput of existing melting furnaces represents a challenge for the aluminum industry. Producers also need to constantly improve process yields, cut fuel consumptions and reduce emissions of gases, such as CO_2 and NO_x . This market situation is a familiar one for Linde, with its extensive knowledge and experience of combustion and customer processes from over 130 oxyfuel installations in aluminum.

Low-temperature Oxyfuel

Low-temperature Oxyfuel combustion technology is uniquely designed for the challenges that exist within the aluminum industry to boost capacity, with uniform furnace temperatures to avoid hot spots, reduce fuel consumption, improve yields and reduce emissions. The combustion occurs under a diluted oxygen concentration by mixing the furnace gases into the combustion zone. This slows down the oxyfuel combustion reactions and results in lower flame temperatures, comparable to those of airfuel technology, which are below the point at which thermal NO_x is created. The mixing of furnace gases into the flame also disperses the energy throughout the entire furnace for uniform heating and more efficient melting. The dispersed flame contains the same amount of energy but with a much more effective distribution. The overall result is more homogenous heating and melting, enabling not only a higher power input and thus higher melt rates, but also reduced formation of dross and NO_x emissions.



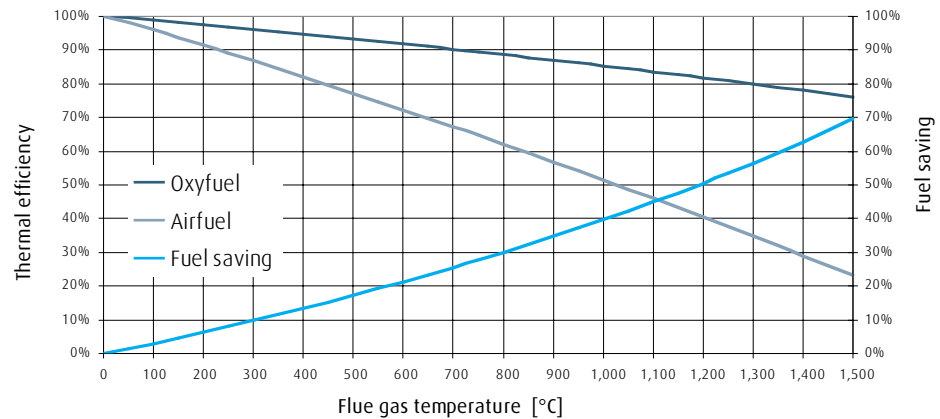
In-furnace temperature measurement shows a uniform and low flame temperature without peaks, which helps to achieve higher melt rates, avoiding hot spots and thermal NO_x .



In so-called Low-temperature Oxyfuel, the flame is diluted with the furnace gases which lowers the flame temperature and promotes an effective heat distribution.

Oxyfuel combustion

With oxyfuel combustion, removing nitrogen from the combustion and heat transfer process has several advantages that enable higher production output in new or existing furnaces, reduced fuel consumption, improved process control and lower emissions. The thermal efficiency of Low-temperature Oxyfuel is equal to that of conventional oxyfuel.



Features

- Comparable flame temperature to that of airfuel technology
- Adjustable degree of flame dilution
- Suitable for all types of reverberatory furnaces
- Power: 0.2–3 MW
- Self-cooling ceramic burner stone, 300 mm burner diameter, weight 80 kg
- Compact, powerful and modular design of burner for easy installation and maintenance
- Integrated flame monitoring by UV cell and pilot flame for automatic ignition

Customer benefits

- Low-temperature Oxyfuel for a homogenous melting, resulting in increased furnace throughput capacity. Up to 100%, typically 30–50%, higher melt rate.
- Up to 50% lower fuel consumption
- Uniform furnace heating to avoid hot spots, so reducing dross formation
- Low maintenance, no need for recuperator, electrical air blower or regenerative solution
- Substantially reduced flue gas volumes, up to 80%, for a compact exhaust solution
- Major reductions in CO₂ and SO₂ emissions – up to 50%
- Ultra-low levels of NO_x emissions, reduced by up to 90%



More capacity at SAPA

SAPA Heat Transfer, Finspång, Sweden is a producer of aluminum heat-exchanger strip for the automotive market. The company melts rolling mill scrap, wire mill scrap and primary ingots of various shapes and sizes. SAPA installed oxyfuel back in 1995 to increase production and to reduce NO_x emissions. The 28-tonne melting furnace was optimized in collaboration with Linde in 2002. To further improve the furnace performance the new Low-temperature Oxyfuel was brought into use in mid-2005. Since the switch from conventional oxyfuel, SAPA has seen a 10% increase in melt rate, a 10% reduction in energy consumption and a 90% reduction in NO_x emissions, while dross formation has been reduced by 9%.

Linde AG

Linde Gases Division, Seitnerstrasse 70, 82049 Pullach, Germany
 Phone +49.89.74461661, Fax +49.89.74461230, www.linde-gas.com