



## OXYGON® 400. Fast and fuel efficient oxyfuel preheating of vessels up to 50 tons size.



OXYGON® 400 preheating systems installed at SKF in Katrineholm, Sweden; 1 ton ladles are heated in 6 stations.

### Summary

- Compared to airfuel, oxyfuel allows for fuel savings of up to 55%
- 25% shorter heating cycle
- Compact, simple and powerful oxyfuel installation, easy to fit on any vessel preheating
- Flameless oxyfuel promotes a more uniform heating increasing refractory lining life, reducing the number of vessels in circulation and effectively lowering CO<sub>2</sub> and NO<sub>x</sub> emissions

### Vessel preheating

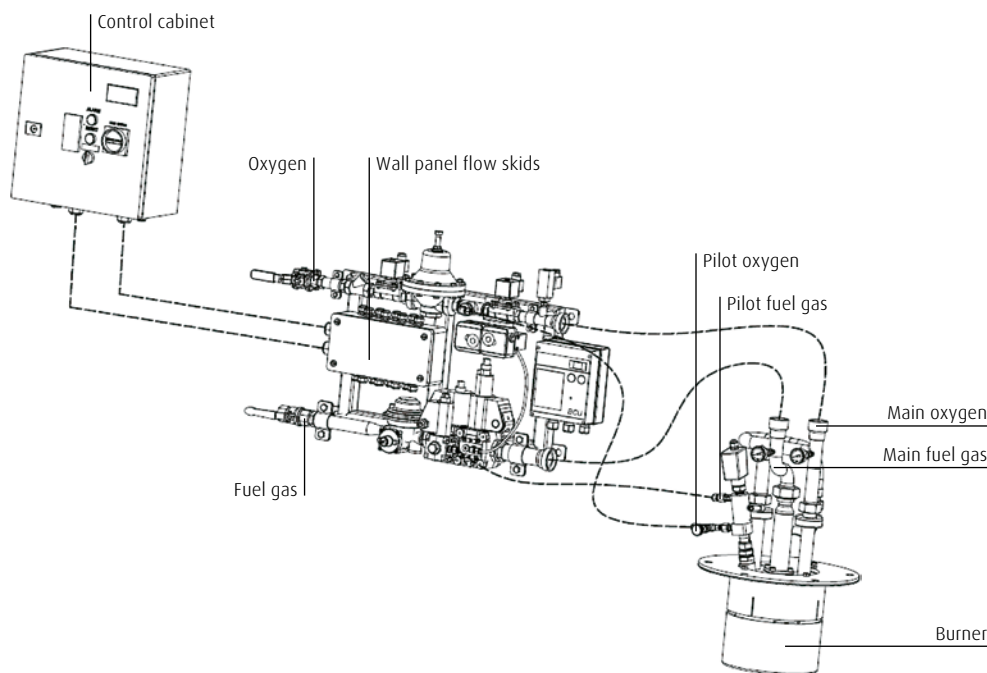
Within the metals production industry various types of vessels and runners are used to transfer hot, liquid metal between melting and casting operations. Typical examples are ladles, converters, tundishes, runners, pouring chutes, etc. These vessels and runners have ceramic lining of different types and quality that needs preheating to minimize refractory wear and to secure the right metal quality. Preheating temperature is chosen from an optimisation of factors like fuel economy, refractory lifetime, refractory quality and liquid metal temperature as well as vessel design and tapping system used. The issue of lowering green house gases emission, such as CO<sub>2</sub> and NO<sub>x</sub>, is not only an environmental concern but also an economic aspect of modern metals production. Flameless oxyfuel combustion in preheating of various vessels (such as ladles, AOD converters, tundishes, etc.) has long been proven to be an efficient method of cutting heating times, improving fuel economy and extend vessel refractory lining life.

The OXYGON® 400 system now makes this energy efficient preheating application available for use in smaller vessels and runners, targeting for example foundries and micro steel mills. To further improve the performance, flameless oxyfuel is applied.

### Flameless oxyfuel

Flameless oxyfuel combustion technology is uniquely designed to boost capacity, reduce fuel consumption, improve temperature uniformity and lower emissions. The combustion occurs under a diluted oxygen concentration as flue gases are mixed into the combustion zone. This slows down the oxyfuel combustion reactions and results in lower flame temperatures, which are below the point at which thermal NO<sub>x</sub> is created. The mixing of flue gases into the flame also disperses the energy throughout the entire vessel for a faster and more uniform heating. The dispersed flame contains the same amount of energy but with a much more effective heat distribution. The overall result is a more homogenous heating, a further decreased fuel consumption, and reduced NO<sub>x</sub> emissions.

The OXYGON® 400 preheating system works in a flameless mode with only the pilot flame continuously visible.



- Features**
- Compact, rugged and modular oxyfuel burner system, self-cooled (ceramic) type, with integrated burner pilot and UV cell
  - Separate flow trains for fuel and oxygen
  - Process control system with on/off control towards a preset temperature or temperature curve
  - Plug-and-play functionality with pre-adjusted components

- Customer benefits**
- Up to 55% reduction of fuel consumption and CO<sub>2</sub> emissions
  - 25% shorter heating cycle for ladles
  - Flameless oxyfuel promotes a more uniform heating to further extend refractory lining life
  - Flameless oxyfuel effectively lowers NO<sub>x</sub> emissions
  - Compact, simple and powerful oxyfuel installation, easy to fit on any vessel
  - A hotter ladle allows for lower metal tapping temperature, saving energy, refractory lining and reducing the number of rejections (returns due to too low metal temperature)
  - Faster heating, which could reduce the number of ladles in circulation
  - Hotter and uniformly heated vessel for improved cast product quality

- Brief specifications**
- Nominal power: 400 kW oxyfuel (maximum power is 500 kW)
  - Built-in leakage check, burner ignition and ladle purging functions
  - On/Off regulation to temperature set-point; programmable heating pattern possible; pilot flame always on (15–40 kW)
  - Oxygen: 80 Nm<sup>3</sup>/h at 5–10 bar(g)
  - Natural gas: 40 Nm<sup>3</sup>/h at 1–3 bar(g)



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