ALGLASS™

The oxygen burner range for glass melting
**ALGLASS™**, flexible high-performance burners.

Performance is your ongoing objective: increased productivity, improved product quality, reduced costs, energy savings, etc., and you need to be able to comply with continuous reductions in pollutant emissions: NOx, CO2, SOx, dust.

### ALGLASS™
**The robust and flexible burner**

- Excellent heat transfer through pipe-in-pipe technology (cylindrical flame)
- Low NOx: emission below current regulations
- Oxygen staging capability
- Oxygen cooling: no risk of corrosion, condensation or clogging
- Low momentum: prevents carry-over, reduces volatilization and refractory corrosion
- Fuel oil version available: air, steam or natural gas atomization possible.

### ALGLASS™ FC
**Advanced oxy-combustion**

To complement Alglass burners, Alglass FC burners improve the performance of oxygen glass melting furnaces significantly.

- **Wide, long and homogeneous flame for good bath coverage, with no local overheating**
- Very low NOx: 3 to 5 times less than a pipe-in-pipe burner thanks to separated injectors and lower peak temperature (-300 °C)
- **Low volatilization rate (dust)** thanks to low combustion gas velocities
- Further reduction in refractory corrosion

### ALGLASS FC burner range

<table>
<thead>
<tr>
<th>Standard model</th>
<th>Usual operating range</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 kW</td>
<td>200 to 750 kW</td>
</tr>
<tr>
<td>1 000 kW</td>
<td>500 to 1 500 kW</td>
</tr>
<tr>
<td>2 000 kW</td>
<td>1 000 to 3 000 kW</td>
</tr>
</tbody>
</table>

### ALGLASS burner range

<table>
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<tr>
<th>Standard model</th>
<th>Usual operating range</th>
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</thead>
<tbody>
<tr>
<td>200 kW</td>
<td>70 to 350 kW</td>
</tr>
<tr>
<td>500 kW</td>
<td>150 to 850 kW</td>
</tr>
<tr>
<td>1 000 kW</td>
<td>300 to 1 750 kW</td>
</tr>
<tr>
<td>2 000 kW</td>
<td>500 to 2 600 kW</td>
</tr>
</tbody>
</table>
**ALGLASS™ VM**

**Controlled impulse**

The ALGLASS VM burner technology makes it possible to adjust the flame length manually or automatically at constant power. It can also be used to modify the position of the hot spot of the flame and the heat flow distribution transmitted to the load.

- Flame impulse control
- Flame length and flame transfer adjustment
- Variable flame length: Adjustable impulse and luminosity

> **Manual version**
  ALGLASS VM iv with manual setting valve
> **Automatic version**
  ALGLASS VM with dynamic flame length setting

- Automatic flame length variation for homogeneous heating.

**ALGLASS™ FH**

**Controlled energy**

The Alglass FH burner was specially designed for feeders and forehearths. Possibly equipped with a variable oxidant combustion system, the burner can be used, according to the power output, to regulate the oxygen content of the oxidant at a constant flow.

The burner enables a uniform distribution of the heat by means of a constant flame length at variable power output: typically 250 mm

- **External mixing flame**
- **Résistant to atmospheres of up to 1 550 °C**
- **3 power output ranges with an extensive operating range:**
  1-4, 3-10 et 6-15 kW.

**Variable oxidant combustion system**

*Patented technology*

This system consists, according to the power output, of regulating the oxygen content of the oxidant at a constant flow. It makes it possible to:

- Obtain a good heating profile at low power rate
- Improve glass temperature control, without affecting feeder pressure
- Increase the heat transfer flexibility and reactivity
- Protect equipments (burner bodies and refractories) under the most extreme conditions.

**ALGLASS VM burner range**

<table>
<thead>
<tr>
<th>Maximum power</th>
<th>Nominal power</th>
<th>Minimum power</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 kW</td>
<td>20 kW</td>
<td>15 kW</td>
</tr>
<tr>
<td>120 kW</td>
<td>50 kW</td>
<td>30 kW</td>
</tr>
</tbody>
</table>
**ALGLASS™ SUN**, the latest R&D department creation.

Through its 8 research centers, Air Liquide plays an active role in research and development on new solutions, meeting the dual objective of productivity and environmental protection.

The latest innovation, Alglass SUN is a highly staged oxy-combustion process for increased flexibility and significant NOx emission reduction.

A new burner concept...

- **Significant separation of fuel and oxidant injections**

- **Flame length and transfer profile adjustment** via oxygen injection control between three flows:
  - primary and secondary oxygen (low speed)
  - tertiary oxygen (higher speed)

**Easy to implement...**

- **4 x 150 mm high ceramic blocks for fuel and oxygen injections**
- **Easy implementation in existing furnaces**
  - Underport geometries
- **Bifuel operation**
- **Easy adjustment of oxygen distribution between**
  - 3 possible staging levels:
    - Low: 50% tertiary O2
    - Medium: 65% tertiary O2
    - High: 75% tertiary O2

**For greater flexibility...**

- **Variable flame length**
  - Short flame for low staging (4 m for 4 MW)
  - Long flame for high staging (6 m for 4 MW)
- **Increase in burner power output at constant flame length possible**
- **Improved load coverage and high transfer efficiency**
- **Possible use of air as oxidant at low power rate**
  - Stable flame
  - Furnace temperature maintenance
  - Size reduction of the backup liquid oxygen tank (in the event of on-site oxygen production)

**At ultra-low NOx levels**

- **NOx emissions reduced by a factor of 20 compared to standard Alglass burners and by a factor of 4 compared to Alglass FC staged oxy burners.**

*Figure: NOx emissions comparison between Alglass, Alglass FC, and Alglass SUN.*
ALGLASS™, the oxygen burner range offering multiple advantages.

To optimize your oxy-combustion processes, Air Liquide offers you a comprehensive range of burners for oxy-combustion applications in your furnaces. ALGLASS burners are designed to adapt to all types of glass and all types of furnaces in each of their compartments.

ALGLASS™, the oxygen burner range combining ...

...Performance

• Optimization of furnace atmosphere
  > Increased heat transfer
  > Improved temperature control
  > Increase glass quality due to improved homogeneity
  > Optimized heat flow profile

• Flexibility
  > Broad operating ranges
  > Adapted to all types of furnaces and glass

• Robustness and ease of installation
  > Reduced maintenance: less than one inspection per month
  > Compatible with combustible gas and low-pressure oxygen networks
  > Bifuel capabilities: changeover from a gaseous fuel to a liquid fuel by simply changing the injector

• Noiseless
  > Equipped with low fluid speed technology which reduces noise

...Safety

• Elimination of pre-mixing stations

• Airtight: removal of parasitic entries of air

...Environmental protection

• Significant reduction of NOx (up to 95%) and CO2 (up to 50%) emissions

• Energy saving
  > Lower fuel consumption (up to 50%)

• Reduction of batch carry-over and of volatilization from the molten glass bath
Contacts

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