ELECTROGLASS

England

The Electric Melting Specialists
Conference Theme

Glass Technology and Innovation: Driving Growth in Traditional and New Markets
Minimising energy usage

Minimising energy cost

- key priorities in an energy intensive process
Electricity in Glass Making

... often the Low-Cost Option

Richard Stormont
Managing Director
Electroglass Ltd
Typical Gas and Electricity Costs per Kilowatt-Hour

- Gas cost US Cents per kWh
- Electricity cost US Cents per kWh

Countries: Philippines, Indonesia, Malaysia, Thailand, Taiwan, S Korea, India, Chile
Gas?
Oil?
Electricity?

Process energy efficiency is the key
Electrical energy in glass melting and conditioning

All-Electric Melting

Electric Boosting in fuel-fired furnaces

Electric Distributors and Forehearths
Electrical energy in glass melting and conditioning

All-Electric Melting

Electric Boosting in fuel-fired furnaces

Electric Distributors and Forehearths
All-Electric Melting
The Batch Blanket of an All-Electric Furnace
Furnace Size and Energy Efficiency

Electric Furnace Energy Efficiency %

Fuel-Fired Furnace Energy Efficiency %

Capacity Tonnes/Day
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Ratio of Gas Furnace to Electric Furnace Energy Consumption

Furnace Size Tonnes/Day
Where the cost of electricity per unit of energy is about 3 times the cost of the same amount of gas energy, or less, electric melting is likely to be the economic choice for furnaces up to about 40 tonnes/day.
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ELECTROGLASS CCC BOOST SYSTEMS

Typical Performance Data: Boost KW per extra Tonne/Day

Furnace Reference and Glass Colour

kW per Extra Tonne/Day
20 kW of continuous boost power input per extra tonne/day. Equivalent to 480 kW-hours of energy per tonne of glass, or 413 kCals per kg of glass.

If electricity is 3 times the cost of gas per unit of energy, and your unboosted furnace is using more than 1240 kCals per kg of glass, the glass from the boost system is cheaper than the glass from gas.
**Electric Boost in Float Glass Furnaces**

- **700 Tonnes/Day Furnace**
  - Optimum thermal efficiency only at maximum pull rate.
  - Reduced efficiency at lower pull.
  - Reduced pull on tinted glass

- **600 Tonnes/Day Furnace with 100 Tonnes/Day Electric Boost**
  - Optimum thermal efficiency from 600 to 700 tonnes/day, with boost adjusted according to pull.
  - Tinted glass output increased to match downstream line capacity
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Electric Distributors and Forehearth
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All-Electric Forehearth
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All-Electric Forehearthns

Low Heat Losses

Centreline Radiation Cooling

Radiant Profile Heating

High Efficiency Insulation for Minimum Losses
Conversion of 2 Forehearths from Gas Heating to Electric

- 1050 m³ per day at 0.464 US$ per m³
- 1535 kWh per day at 0.051 US$ per kWh
<table>
<thead>
<tr>
<th></th>
<th>FOREHEARTH 1:2 36&quot; WIDE</th>
<th>FOREHEARTH 1:1 48&quot; WIDE</th>
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<tbody>
<tr>
<td>Date</td>
<td>12/21 12/22</td>
<td>12/21 12/22</td>
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<tr>
<td>PULL (T/D)</td>
<td>57.2 56.8</td>
<td>73.2 71.8</td>
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<tr>
<td>GLASS COLOUR</td>
<td>E.G  E.G</td>
<td>E.G  E.G</td>
</tr>
<tr>
<td>Power (KVA)</td>
<td></td>
<td>KVA</td>
</tr>
<tr>
<td>Rear</td>
<td>4.3 4.5</td>
<td>10.4 8.7</td>
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<tr>
<td>Middle</td>
<td>9.4 10.3</td>
<td>6.4 3.6</td>
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<tr>
<td>Conditioning</td>
<td>2.2 2.4</td>
<td>10.7 10.4</td>
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<tr>
<td>Electrodes Left</td>
<td>3.8 3.8</td>
<td>11.3 11.6</td>
</tr>
<tr>
<td>Electrodes Right</td>
<td>3.9 3.9</td>
<td>Conditioning 1.9 2.3</td>
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<tr>
<td>TOTAL POWER</td>
<td>23.6 24.9</td>
<td>Electrodes Left 3.6 3.1</td>
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<tr>
<td></td>
<td></td>
<td>Electrodes Right 3.7 3.2</td>
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<tr>
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<td>TOTAL POWER 48 42.9</td>
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</table>
2nd Setpoint change 1100 degC to 1105 deg C.
Time 10 mins, 0.50 deg/min.
Power limited to 20 kW.
Max power used approx 15 kW.

1st Setpoint change 1090 degC to 1100 deg C.
Time 19 mins, 0.53 deg/min.
Power limited to 20 kW.

Zone Temperature

Zone Power
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Electrical energy in glass melting and conditioning

All-Electric Melting
- Highly Energy Efficient
- Lower Melting Energy Costs in smaller furnaces
- Technology of Choice for Volatile Glasses
- Environmentally Friendly

Electric Boosting in fuel-fired furnaces
- Highly Energy Efficient
- Maintains Maximum Energy Efficiency at Reduced Pull
- Reduces Total Energy Consumption per kg. of Glass
- Can Reduce Total Energy Cost per kg. of Glass

Electric Distributors and Forehearth
- Highly Energy Efficient
- Can Reduce Gas Energy Costs by 60% to 90% in many cases
- Excellent Temperature Control and Fast Response
- Minimal Maintenance
Energy is Expensive -
- Save It!
Thank You!

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