

Cleanfire[®]HR_i[™]

the 'magic ingredient' to
reduce CO₂ emissions and
improve glass quality

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Introducing Air Products

- Multinational corporation supplying industrial gases, chemicals and related technology and equipment
- \$10 billion per year in sales
- > \$150 million per year invested in R&D
- 18 900 employees
- Operates in >40 countries with sales to more than 100 countries



Introducing Air Products



Air Products & Glass Industry

➤ More than 200 oxy-fuel boosting and full conversion installations worldwide, including:

- Float
- Fibreglass
- TV glass
- Frit
- Container
- Tableware
- Lightning
- Mineral wool
- Pot

Cleanfire® HRi™

Glassman Turkey, Istanbul , November 2011

Combustion lab and R&D Centre



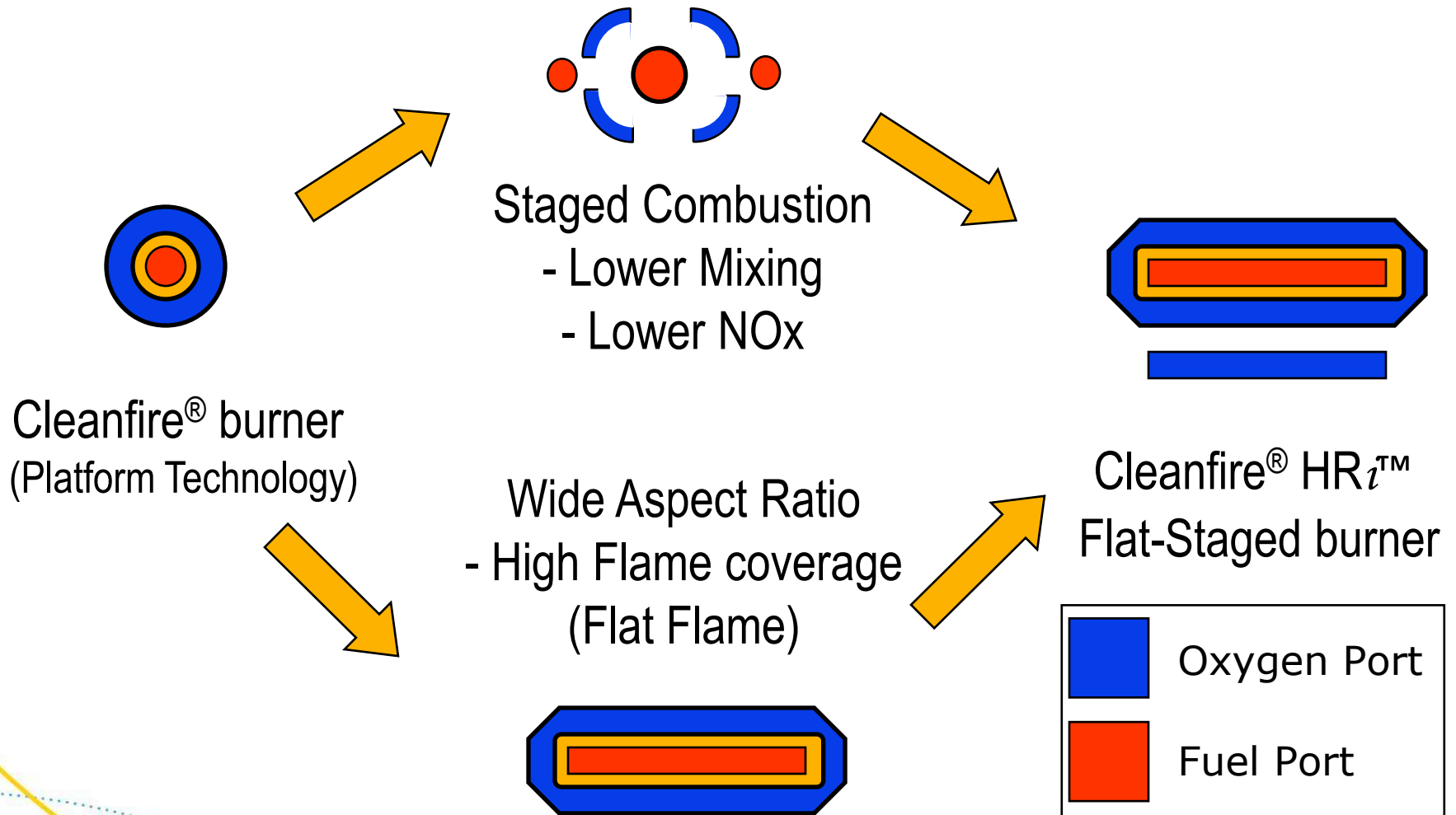
Combustion lab and R&D Centre

- New combustion lab

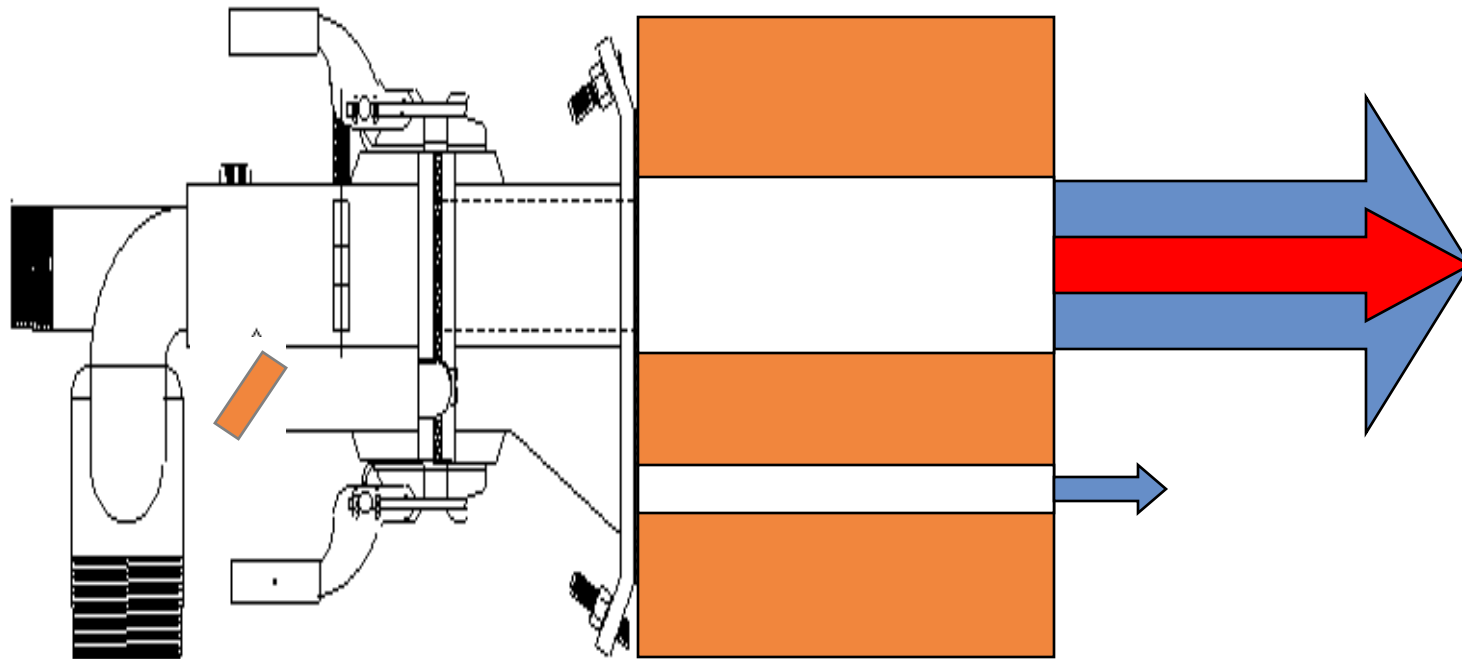


- ThruPort burner

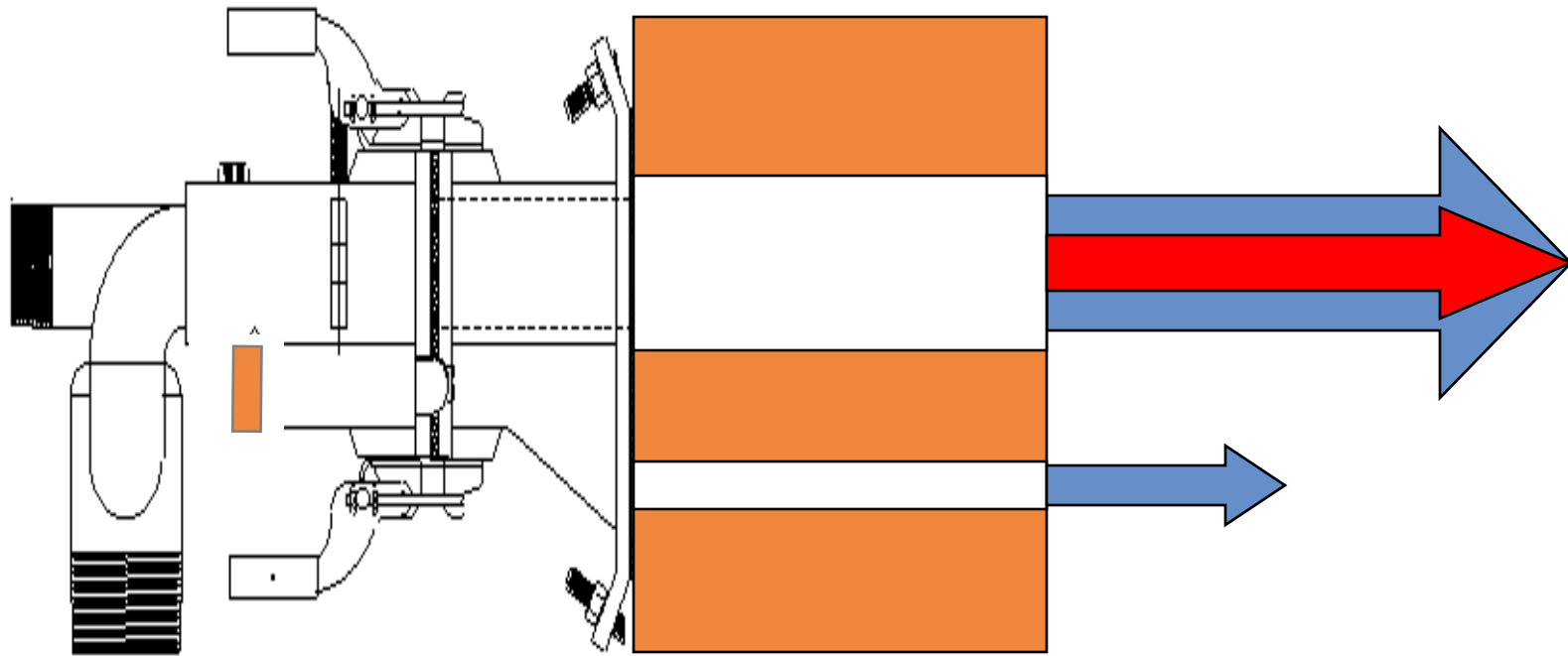
Cleanfire[®]HR_i[™] burner development



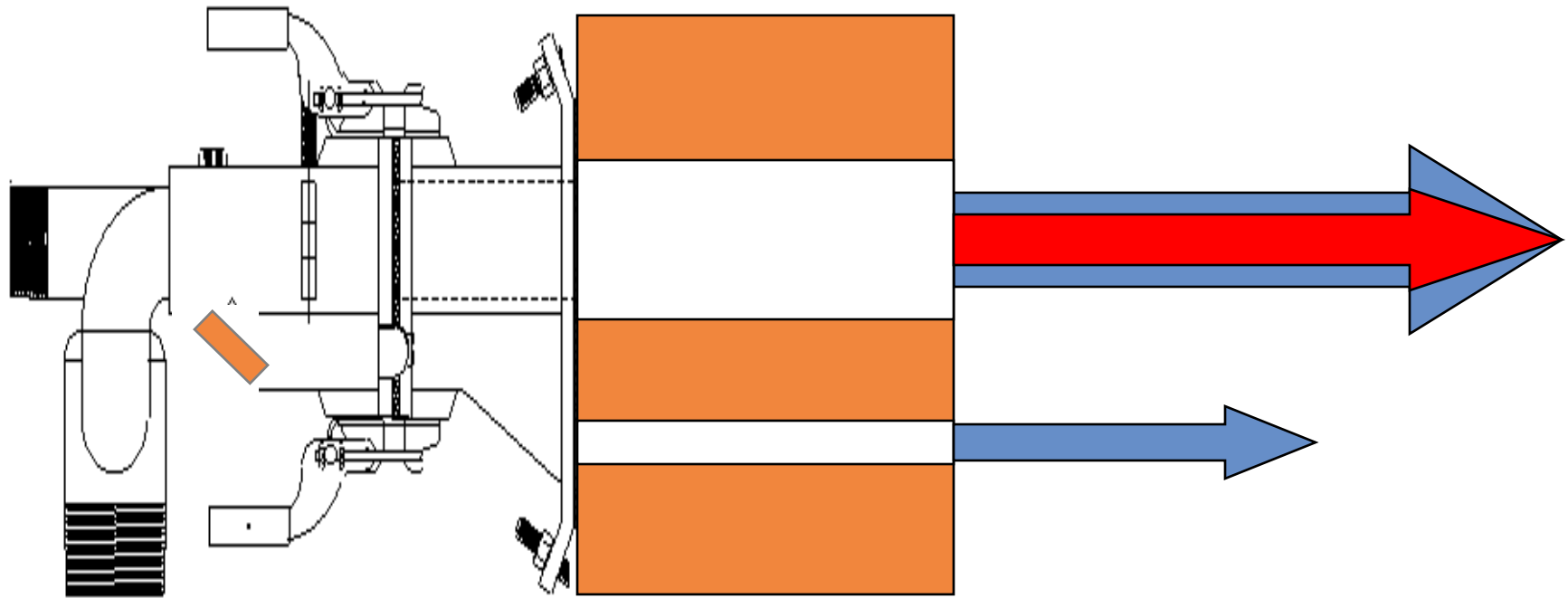
Cleanfire® HR_iTM - staging with oxygen



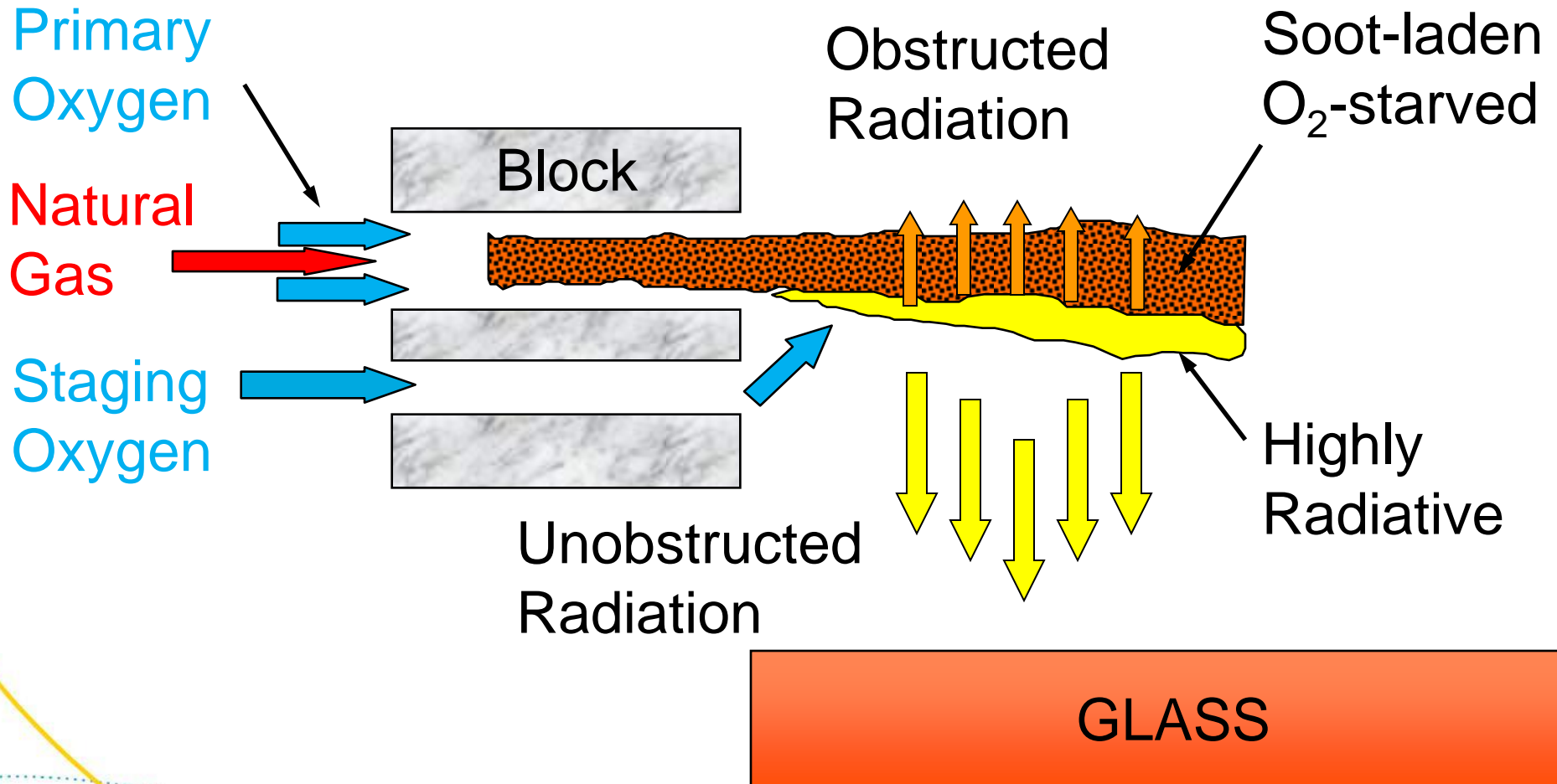
Cleanfire® HR_iTM - staging with oxygen



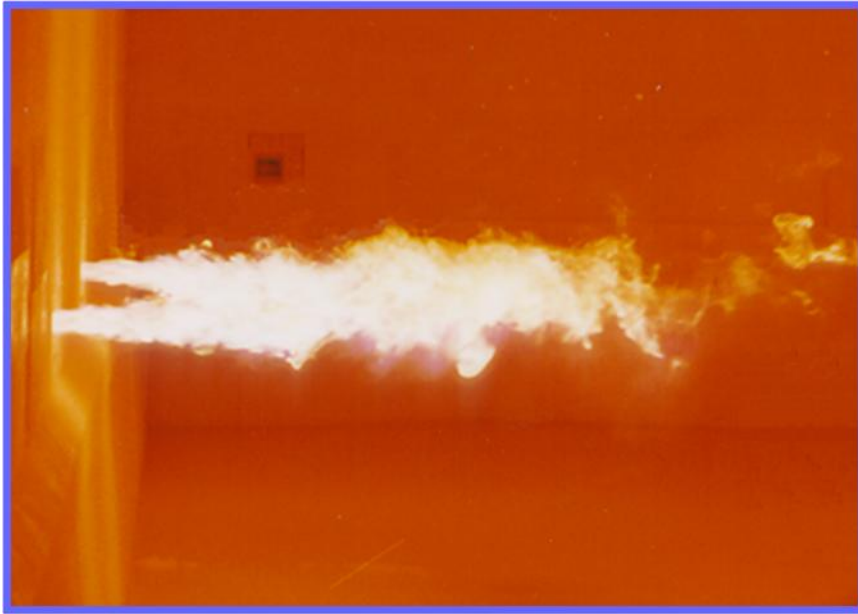
Cleanfire® HR_iTM - staging with oxygen



Cleanfire[®] HR_i[™] - burner staging effect



Cleanfire[®] HR_i[™] - burner staging effect



1.17 MW – no staging



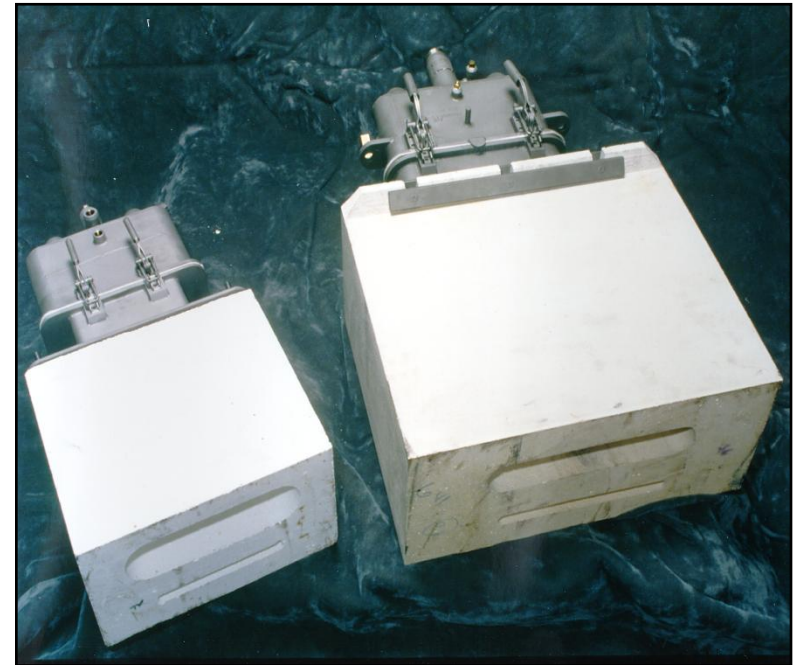
1.17 MW – full staging

Cleanfire[®]HR_i[™] vs tube in tube

TUBE IN TUBE



FLAT FLAME HR_i



5 – 15% fuel and oxygen saving

Cleanfire®HR_iTM burners range

- Mini 70 kW – 1.2 MW
- Small 300 kW – 2.5 MW
- Large 1 MW – 6 MW
- Advanced Boost 300 kW – 3.5 MW



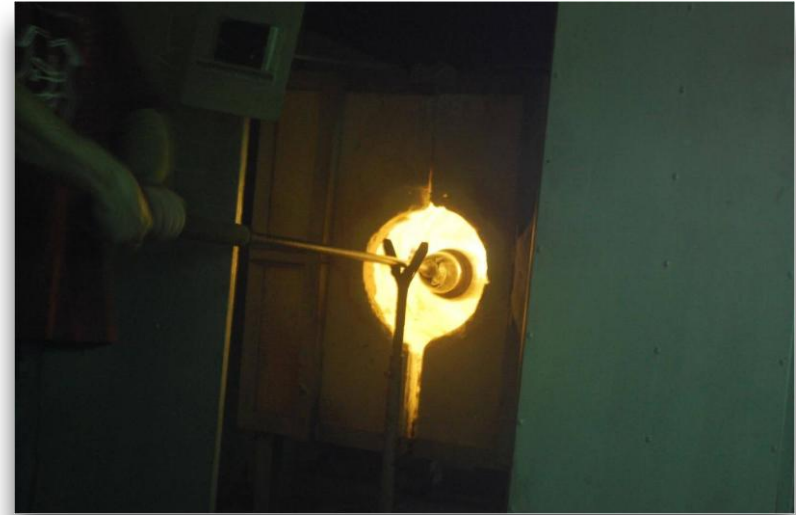
From oxy-fuel float lines to pot furnaces

POT FURNACE



- Fuel saving – 42-45% in total, 60% for melting

REHEAT FURNACE



- Fuel saving – 70%

PRISM® N2 and H2 generators for tin bath atmospheres

➤ NITROGEN

PRISM® HPN generators

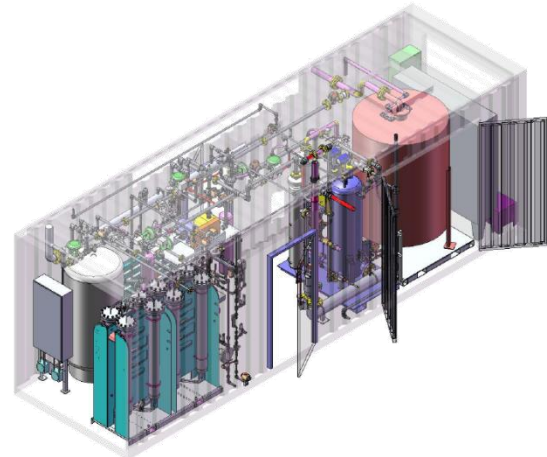
- Flexible and reliable system supplying high purity nitrogen
- Typical flow: 1,100 to 2,000 Nm³/hr



➤ HYDROGEN

PRISM® PHG generators

- Typical up to 250 Nm³/hr
- In excess of 99.999% purity
- Best natural gas efficiency on the market
- 100% packaged
- Simplified one day installation



More info on: www.airproducts.com/gasgeneration

PRISM[®] O₂ generators for oxy-fuel boosting and conversion



➤ ON/OA PLANTS

Flow: Up to 500 MTD of O₂
1:1 GOX:GAN
5-15 MTD LAR, 10% liquid make

Purity: 99.5% O₂

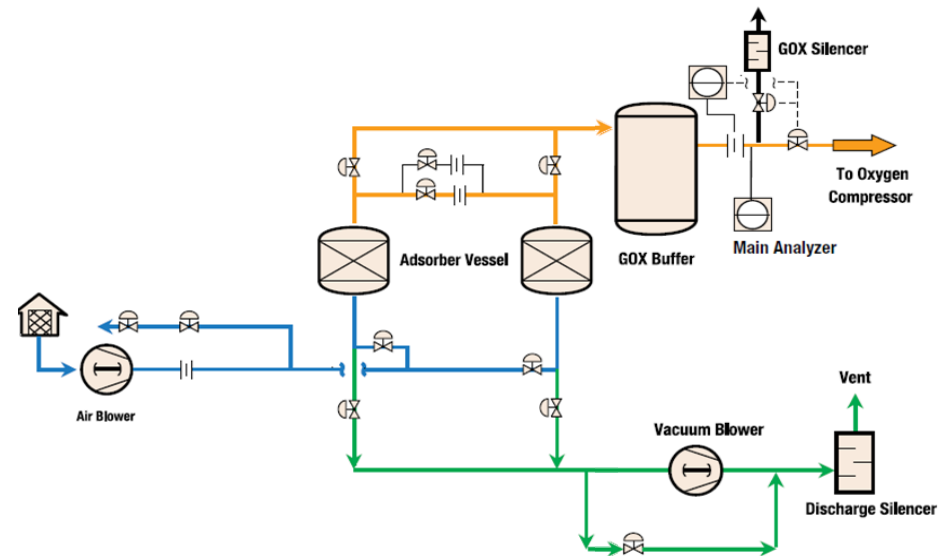
Pressure: Between 1.5 barg and 35 barg

➤ VSA

Flow: Typically 25 to 150 MTD

Purity: From 90% to 93% O₂

- Low capital and power costs
- Easy to install



More info on: www.airproducts.com/gasgeneration

PRISM[®] ONG generators for float furnaces



➤ NITROGEN:

- **Flow:** 55 – 65 MTD

➤ OXYGEN:

- **Flow:** up to 35 MTD

➤ PRESSURE: 2 barg

More info on: www.airproducts.com/gasgeneration

CO₂ emissions calculator

- Developed in response to upcoming changes in 2013 to EU Emissions Trading Scheme legislation
- Two simple screens to complete
- Glass producers can calculate whether they will be below or above the new benchmark CO₂ emission limits
- The calculation shows how much Cleanfire® technologies can reduce CO₂ emissions
- Email summaries are sent for reference

AIR PRODUCTS

Home >>> Step 1 Your details >>> Step 2 Production details >>> Step 3 Calculation

We see legislation affecting you in 2013

We may not be able to predict the future, but at Air Products we are striving to find ways to ensure that your glass production is prepared for the future CO₂ EU Emissions Trading System legislation and remains competitive in a changing market.

Our Cleanfire® technologies can improve productivity, reduce emissions and save you money.

[Calculate your savings in 3 easy steps](#)

If you would like to discuss your specific requirements we are always happy to talk. Just call us on 0800 389 0202 (+44 (0)1270 614314) or email us at EUglass@airproducts.com

For further information visit the following websites:

- www.airproducts.com/glass
- EU Emissions Trading System
- Article: "Environmental benefits and lower cost too!"
- Tanker Delivery
- On-site gas generation

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www.airproducts.com

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Step 3: Calculation

Your current CO₂ emissions are over the EU benchmark limit.

Air Products can help you reduce your emissions by 164 tonnes per year.

Your new CO ₂ output would be 0.22 tonnes per tonne of glass produced	Current EU benchmark 0.38 tonnes per tonne of glass produced
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This reduction would mean a cost saving of €3,772.00 per year.

Speak with one of our experts today to find out how our Cleanfire® technologies can save you money.

[Previous step](#) [Start again](#)

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Please note: The calculations in this site are made using various assumptions about your operations and processes, and should be treated as indicative only. We reserve the right to amend our calculations should we progress to conducting a full process audit and comprehensive calculation for any customer.

www.airproducts.co.uk/CO2calculator

How to contact us

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Thank You !