E-Jet Ultra Low NO\textsubscript{x} Regenerative Ceramic Burner (EJ)

The E-Jet Ultra Low NO\textsubscript{x} Regenerative Burner is the result of over 25 years of experience in regenerative burner technology combined with the latest CFD modelling and burner controls technologies. The E-Jet Ultra Low NO\textsubscript{x} Regenerative Burner combines the traditional advantages of Hotwork’s well proven RCB Regenerative Ceramic Burner Technology which customers still expect – high fuel savings, rapid and uniform heat transfer, high turndown and excess air capabilities, reliability, etc. – with the added benefit of Ultra low NO\textsubscript{x} emissions.

**Benefits:**
- Outstanding fuel savings
- Associated reductions in CO\textsubscript{2} emissions
- Compliance with all international NO\textsubscript{x} legislation
- Minimised CO emissions
- Maximised process performance
- Rapid heat transfer
- Improved temperature uniformity
- Robust design, easy to maintain
- Stable at all temperatures
- Designed for retrofit

**Features:**
- Internally Induced Fuel Dilution System (Patented Technology)
- Internal flue gas recirculation
- Staged combustion
- Flameless combustion
- Burner sizes from 300 kW to 9000 kW
- Discharge velocities of up to 150 m/s
- Suitable for natural gas, LPG, fuel oils and dual fuel
- 10/1 turndown on stoichiometric ratio
- Over 1000% excess air capability
- Ignition by premix pilot
- Flame detection by UV cell
- Suitable for a wide range of applications up to 1500°C

**Typical Applications:**
- Aluminium melting
- Forging
- Reheating
- Heat treatment
- Ladle heating
- Process heating
- Hot process air generation
A unique combination of NO\textsubscript{x} reducing features

Ultra low NO\textsubscript{x} levels are achieved by combining a range of NO\textsubscript{x} reducing techniques which include, in particular, an innovative feature developed by Hotwork, the Internally Induced Fuel Dilution System (Patented Technology). The Hotwork E-Jet Burner also operates with internal Flue Gas Recirculation (FGR) without the need for hot gas fans and associated refractory lined ducting. The addition of a local FGR duct and the flexibility of installing it in a strategic location around the burner have actually proven to improve temperature uniformity, a major benefit for applications such as heat-treatment and forging.

The mixing of air, fuel and recirculated flue gases, which incorporates staged combustion, is controlled in such a manner that flameless combustion is achieved. This lowers peak flame temperature which in turn contributes to reducing NO\textsubscript{x} formation. Another consequence of lower peak flame temperatures is increased longevity of burner parts.

The modular design allows for optimisation of the required burner characteristics to suit a customer’s particular process requirements. Internal components are designed to be modular to ensure total flexibility for the choice of fuel, level of combustion air preheat and optimised firing rate, since component variables are pre-designed for manufacture.

Excellent flame stability at all temperatures

The mixing of fuel, air and waste gases is carefully controlled in order to optimise NO\textsubscript{x} reduction and flame stability from cold start-up to working temperature for simple, efficient and safe operation.

Discharge velocities of up to 150 m/s

High discharge velocities are maintained with the induced ‘in chamber’ dilution and recirculation. This makes the E-Jet Regenerative Burner ideal for applications where tight temperature uniformities are required such as heat-treatment, or where flame penetration is required such as aluminium melting.

High fuel efficiency

The E-Jet is used in conjunction with a close-coupled compact regenerator for maximum fuel efficiency, with the associated advantages of high fuel savings and reduced CO\textsubscript{2} emissions, as well as ultra low NO\textsubscript{x} emissions.

Ultra Low NO\textsubscript{x} Burner Performance

(Achievable values under ideal conditions)

<table>
<thead>
<tr>
<th>Furnace Temp. °C</th>
<th>Air Temp. °C</th>
<th>NO\textsubscript{x}, mg/m\textsuperscript{3} @ 5% Oxygen</th>
</tr>
</thead>
<tbody>
<tr>
<td>950</td>
<td>760</td>
<td>76</td>
</tr>
<tr>
<td>1000</td>
<td>800</td>
<td>78</td>
</tr>
<tr>
<td>1050</td>
<td>840</td>
<td>95</td>
</tr>
<tr>
<td>1100</td>
<td>890</td>
<td>109</td>
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<td>940</td>
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<tr>
<td>1250</td>
<td>1040</td>
<td>184</td>
</tr>
<tr>
<td>1300</td>
<td>1100</td>
<td>222</td>
</tr>
</tbody>
</table>

Notes on the values stated above:
Air pressures, when connected to a Hotwork Compact Regenerator will be subject to an additional regenerator loss of around 25~30 mb, with clean regenerator media. This data is provided as general guidance for operation at nominal capacity and is subject to variance from fabrication and refractory manufacturing tolerances etc.

Further Information

Further details on this burner such as dimensional drawings, typical schematic diagram, spares drawings, procedures for installation, commissioning and maintenance, etc. are available on request.

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