D-GASIFIER
The ultimate solution for the replacement of gaseous and liquid fuels
The D-GASIFIER is an innovative equipment patented by Dynamis that allows the use of 100% solid fuels in low temperature processes that normally run on gaseous or liquid fuels. It offers considerable cost reduction opportunities, when fuel price becomes a critical factor.

The chamber works as a gasifier and only part of the total air required for complete combustion is injected into the chamber. As result, it is a very compact equipment, perfect for the replacement of conventional burners (gas or fuel oil fired).

**Cost Reduction and TOP PERFORMANCE**

The D-GASIFIER can be used to burn a large number of solid fuels (including biomass). An auxiliary burner (for liquid or gaseous fuel) can also be installed, allowing multi-fuel operation (0% to 100%).

**OPERATION AND ATTRIBUTES**

To start up the operation, the D-GASIFIER must be pre heated with an auxiliary fuel, which can be gaseous (natural gas, propane, LPG - Liquefied Petroleum Gas) or liquid (diesel oil, heavy fuel oil).

After the preheating period (45 to 60 minutes), the injection of solid fuel can be initiated. At a given starting temperature the process becomes self-sustaining, thus requiring no auxiliary fuel to ensure the stability of combustion.

**MAIN ATTRIBUTES**

- Friendly and Easy Operation
- High Turndown 3:1
- High Efficiency (over 95%)
- Full remote and automate operation
- Low Footprint
The D-GASIFIER is part of a system that involves a series of equipment and instruments. The following flowchart presents the overview of a standard combustion system indicating all equipment and instruments necessary for the operation, and how the D-GASIFIER chamber fits into the entire process.
APPLICATIONS

The D-GASIFIER finds application in:
› Rotary, Grate and Vertical Kilns
› Calciners and Furnaces
› Rotary, Rapid, Flash and Fluidized Bed Dryers
› Hot Gas Generators

The same type of D-GASIFIER finds application in other kilns for lime, lightweight aggregates, diatomaceous earth, activated clay, perlite and expanded shale, to mention but a few.

ROTARY KILNS

The characteristics of a D-GASIFIER installed in a Rotary kiln are shown in the chart below:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>capacity</td>
<td>16.0 Gcal/h (63.5 MMBtu/h)</td>
</tr>
<tr>
<td>fuel</td>
<td>petcoke, bituminous coal and charcoal</td>
</tr>
<tr>
<td>fuel sulfur content</td>
<td>6.5% (max)</td>
</tr>
<tr>
<td>primary air ratio</td>
<td>30% (related to stoichiometric air)</td>
</tr>
<tr>
<td>primary air temperature</td>
<td>ambient (25°C or 77°F)</td>
</tr>
<tr>
<td>secondary air ratio</td>
<td>145% (total excess air of 175% related to stoichiometric air)</td>
</tr>
<tr>
<td>secondary air temperature</td>
<td>400°C or 750°F</td>
</tr>
</tbody>
</table>
HOT GAS GENERATORS

The chart below presents the main characteristics of a D-GASIFIER designed to supply hot gases to a cement mill:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>capacity</td>
<td>6.0 Gcal/h (24.0 MMBtu/h)</td>
</tr>
<tr>
<td>fuel</td>
<td>petcoke</td>
</tr>
<tr>
<td>fuel sulfur content</td>
<td>6.5%</td>
</tr>
<tr>
<td>primary air ratio</td>
<td>30% (related to stoichiometric air)</td>
</tr>
<tr>
<td>primary air temperature</td>
<td>ambient (25ºC or 77ºF)</td>
</tr>
<tr>
<td>secondary air ratio</td>
<td>150% (total excess air of 180% related to stoichiometric air)</td>
</tr>
<tr>
<td>secondary air temperature</td>
<td>ambient (25ºC or 77ºF)</td>
</tr>
</tbody>
</table>
**D-GASIFIER**

**Main Components**

- **Pre-Combustion Chamber**
  - Responsible for the solid fuel ignition before it is injected into the process. The chamber generates a hot stream of gaseous fuel originated from the injected solid.
  - The Pre-Combustion Chamber main characteristics are the following:
    - **High TEMPERATURE**
      - Up to 1500°C (2800°F)
    - **High TURBULENCE**
      - High swirl
    - **High Residence TIME**
      - Fuel particles spin

- **Primary Air System**
  - The variable speed of the primary air fan controls the combustion airflow to the chamber, usually maintained below 40% of stoichiometric air.

- **Pre-Heating System**
  - The preheating burner has a single primary air inlet. This burner has a shaping air divided in two flows - axial and tangential components.
  - A lance is inserted into the burner central pipe for liquid or gaseous fuels. Compressed air is responsible for fuel nebulization, if liquid.