Endothermic atmosphere
Generators

www.secowarwick.com
Technological application of endothermic atmosphere

- Carburizing
- Carbonitriding
- Bright hardening of carbon and alloy steels
- Normalizing
- Steel brazing

Version available

Gas used for the process
- propane supplied
- natural gas supplied

Heating system
- electrically heated type G-ET
- gas fired (natural gas or propane) type G-GT

Generated atmosphere composition (%)

**Natural Gas**  \((90\%, \text{CH}_4, 5\%, \text{C}_2\text{H}_6, 5\%, \text{N}_2)\)

![Graph showing gas-air ratio and concentration of gases for natural gas.]

**Propane**  \((\text{C}_3\text{H}_8)\)

![Graph showing gas-air ratio and concentration of gases for propane.]

Key construction features of endothermic generators

- Working temperature: 1050°C
- Optimal regulation range of dew-point of produced atmosphere: -5 to +5°C
- Atmosphere water cooling system
- Automatic control of a dew-point
- Possibility of work with a gas analyzer
- Spiral heating elements of a high durability and easy disassembly
- Automatic regeneration cycle of the catalyst
- Sectional casing with easy access to heating elements
Endothermic atmosphere generators

Technical data of standard endothermic generators

<table>
<thead>
<tr>
<th>Technical factor</th>
<th>Unit of measure</th>
<th>G-10E</th>
<th>G-21E</th>
<th>G-42E</th>
<th>G-60E</th>
<th>G-85E</th>
<th>G-120E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. capacity</td>
<td>Nm³/h</td>
<td>10</td>
<td>21</td>
<td>42</td>
<td>60</td>
<td>85</td>
<td>120 (60x2)</td>
</tr>
<tr>
<td>Installed power</td>
<td>kW</td>
<td>12</td>
<td>15</td>
<td>24</td>
<td>33</td>
<td>58</td>
<td>65</td>
</tr>
<tr>
<td>Heating elements power</td>
<td>kW</td>
<td>9</td>
<td>12</td>
<td>21</td>
<td>30</td>
<td>53</td>
<td>60</td>
</tr>
<tr>
<td>Technological gas demand:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural gas</td>
<td>Nm³/h</td>
<td>2,8</td>
<td>5,8</td>
<td>11,5</td>
<td>16,5</td>
<td>23</td>
<td>33</td>
</tr>
<tr>
<td>Propane</td>
<td>Nm³/h</td>
<td>1,1</td>
<td>2,2</td>
<td>4,3</td>
<td>6,1</td>
<td>9</td>
<td>12,2</td>
</tr>
<tr>
<td>Water demand for atmosphere cooling</td>
<td>m³/h</td>
<td>0,4</td>
<td>0,5</td>
<td>0,6</td>
<td>0,8</td>
<td>1,6</td>
<td>1,6 (0,8x2)</td>
</tr>
<tr>
<td>Input gas pressure</td>
<td>mbar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>150 - 400</td>
</tr>
<tr>
<td>Output atmosphere pressure</td>
<td>mbar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 - 70</td>
</tr>
<tr>
<td>Cooling water pressure *</td>
<td>mbar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0,2 - 0,5</td>
</tr>
</tbody>
</table>

* air cooling system available

Automatic control of atmosphere parameters

The atmosphere control system produces consistent parameters utilizing these three main elements:

- digital dew-point controller,
- Lambda probe with supply system,
- air control valve for the retort.

During the operation of an endothermic atmosphere generator, the dew-point controller, which receives a signal from the Lambda probe, increases or reduces the amount of supplied air and controls the gas-air ratio at the retort entrance. This system provides precise regulation of the atmosphere parameters and continuous operation of the generator. Automatic control and protection systems ensure that an achieve temperature inside the retort is kept at a constant level and the generator is operating safely.

As a standard feature, the generator control system includes the catalyst regeneration program.

Main advantages of SECO/WARWICK endothermic generators

- Stability of finished atmosphere parameters
- Fully automatic - as an option
- Minimal number of technological mediums required for generator operation
- Easy service and maintenance
- Safe operation

www.secowarwick.com