Point of use Argon Recycle System
Point of use Argon Recycle System

Recovers and recycles up to 95% of the purge gas from a vacuum furnace

GR2L is a CleanTech company based in the United Kingdom with a unique purge gas recovery and recycle system, the ArgonØ™, for use with silicon vacuum furnaces. The ArgonØ™ operates with both lubricated and dry vacuum pumped furnaces and is based on technology jointly developed with Cambridge University. It recovers up to 95% of the available purge gas at purities of 99.9998% i.e. N5.8 delivering process cost reduction, reduced CO₂ footprint and productivity enhancement.

The system is Point of Use and can connect multiple vacuum furnaces, dependant on total gas flow, allowing straightforward retrofit to current installations of either CZ or DSS process tools with payback of 18-30 months dependant on geographic argon pricing.

In DSS installations using helium to shorten the cool down deadtime and realise a productivity enhancement of 5-10%, the ArgonØ™ can also be configured to recover and recycle the helium resulting in a further improvement in the return on investment.
Operating Principles

The heart of the system is a patented chemical looping combustion (CLC) reactor that utilises a solid state oxygen carrier to combust the impurities in the gas to CO₂ and moisture; these are subsequently removed via molecular sieve traps. The solid state oxygen carrier ensures the reacted gas is oxygen free as no gas phase oxygen is admitted. When exhausted the oxygen carrier is regenerated using atmospheric air in a separate step and then purged with argon to remove residual nitrogen prior to entering a standby mode.

The molecular sieve columns are regenerated via a combination of vacuum and temperature steps, overall the system operates on a 10-12 hour cycle dependant on the levels of contamination in the exhaust gas. All processes are plc controlled with remote interface capability.

Capacity

The Argon® has a flow capacity of up to 200 Nlm allowing connection to multiple vacuum furnaces, typically 4 to 8, dependant on the total gas flow.

Gas is recovered from the vacuum pump exhaust via a recovery module located at the vacuum pump. Flows are automatically balanced with recycled gas to ensure there is no ingress of atmospheric air allowing for up to 95% of the argon used to be recycled.

With a Return on Investment of between 18-30 months the Argon® represents excellent value for money and where helium is also recycled the ROI falls to typically 6-12 months. In addition the Argon® reduces the CO₂ footprint of a typical vacuum furnace by 3-5 tonnes CO₂ per annum along with improvements to the security of supply.
## Point of use Argon Recycle System

<table>
<thead>
<tr>
<th>Process</th>
<th>Utility</th>
<th>Maximum Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argon Flow rate</td>
<td>Power</td>
<td>Width</td>
</tr>
<tr>
<td>Argon®</td>
<td>&lt;200 Nl/min</td>
<td>200 - 230V 3ph 20amps</td>
</tr>
<tr>
<td>Recovery Module</td>
<td>&lt;60 Nl/min</td>
<td>200 - 230V 1ph 5amps</td>
</tr>
</tbody>
</table>

---

**Access**

---

Aztec House
Perrywood Business Park
Salfords, Surrey, RH1 5DZ
United Kingdom

Telephone
+44 (0)1737 652600

Website
www.GR2L.co.uk