The innovative SAACKE solution not only proved itself in active operation – the plant also received the LEW Innovation Prize 2013.

Georg Müller, CEO, Interquell GmbH

Effective power, heat or steam from a single source

SAACKE delivers highly efficient combined heat and power (CHP) systems including turbine exhaust gas burner and control technology

The company Interquell GmbH, located in the south of Germany, requires process steam to produce food, such as baby food and cereals. To increase efficiency and save costs, the food producer decided to install a SAACKE Micro-CHP-System mounted by the plant engineering company Lausser. The combination of micro gas turbine, turbine exhaust gas burner and steam boiler was selected, because CHP systems with a gas engine cannot guarantee the requirements.

Higher efficiency by using waste heat from power generation

A micro gas turbine is installed upstream from the SAACKE DDZG-GTM turbine exhaust gas burner, which produces 1,460 MWh of electrical energy at the location per year. The use of the hot exhaust gas of the turbine as combustion air in the turbine exhaust gas burner increases overall efficiency up to 97%. The additional use of a flue gas calorific value exchanger significantly increases the overall energy efficiency. The challenges of this highly efficient solution included effective time management and comprehensive service. Downtimes had to be kept to a minimum to ensure that continuous operation was not interrupted.

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**The SAACKE solution in detail**

The delivered DDZG-GTM can be supplied as a dual fuel burner for natural gas and light fuel oil (LFO). No additional atomizing medium is required for LFO. Fresh air operation, a turbine exhaust gas (TEG) operation and waste heat operation (holding operation) is available on the burner side – always in combination with the lowest emission values. The burner can be safely and reliably operated with a high or a low amount of excess air (lambda 2.1 to 1.1). The micro gas turbine can either be provided by the customer or delivered by SAACKE. The comprehensive scope of supply included the delivery of the burner, the fuel supply for natural gas and LFO, the fan for fresh and secondary air, the installation of measuring and monitoring equipment and the electric control unit. The SAACKE service included installation, commissioning and trial operation as well as a 24-hour on-call service.

**Conclusion**

The combination of the micro gas turbine and the SAACKE DDZG-GTM turbine exhaust gas burner is the key to success of the SAACKE Micro-CHP-System. A high overall efficiency, the generation of electrical energy and the efficient and low-emission combustion of turbine exhaust gases help save costs and efficiently generate process steam. This has also been tested and certified by external experts.

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**Technical data: process steam plant Interquell Großaitingen**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat generator</td>
<td>Shell boiler</td>
</tr>
<tr>
<td>Burner capacity (max.)</td>
<td>7 MW</td>
</tr>
<tr>
<td>Combustion air temperature</td>
<td>5-300 °C</td>
</tr>
<tr>
<td>NO\textsubscript{x} emissions NG TEG:</td>
<td>approx. 80 mg/m³</td>
</tr>
<tr>
<td>LFO, fresh air:</td>
<td>approx. 150 mg/m³</td>
</tr>
<tr>
<td>Micro gas turbine</td>
<td>Capstone C200</td>
</tr>
<tr>
<td>Electrical power</td>
<td>Micro gas turbine 200 kW</td>
</tr>
<tr>
<td>Thermal output</td>
<td>Micro gas turbine 395 kW</td>
</tr>
<tr>
<td>Overall efficiency</td>
<td>Up to 97%</td>
</tr>
<tr>
<td>Primary energy saving</td>
<td>approx. 2,800 MWh/a</td>
</tr>
<tr>
<td>Steam generation</td>
<td>10 t/h at 12 bar (a)</td>
</tr>
</tbody>
</table>

**Emissions in the turbine exhaust gas operation**

1. Based on 3% O\textsubscript{2} content in the NO\textsubscript{x} limit value in mg/m³ to be complied with in the flue gas.
2. NO\textsubscript{x} emissions in mg/m³.
3. Based on 3% O\textsubscript{2} content in the CO limit value in mg/m³ to be complied with in the flue gas.
4. Oxygen content in % in the flue gas after the heat generator.
5. Heat generator output in MWh.
6. CO in mg/m³.

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**All benefits at a glance**

- Long maintenance intervals for turbine and burner
- Low emission values well below the legal emission regulations
- Able to be used in existing and new plants
- High energy efficiency by combining micro gas turbines and turbine exhaust gas burners
- Efficient turbine utilization by variable excess air on the DDZG-GTM
- High availability due to uninterrupted mode change

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