As a competent project and service partner, SAACKE implemented an integrated solution that ensures compliance with the NOX emission values into the foreseeable future.

Innozenz Behrens, Plant Engineering, Stadtwerke Duisburg

Optimized operation and low emissions with electronic compound control

SAACKE equips existing hot water boiler for the Mitte heating station in Duisburg with low NOX burners

The Stadtwerke Duisburg public utility was searching for an optimum combustion concept as part of the gas conversion of the Mitte heating station, with the aim of removing the existing costly flue gas recirculation system. The primary specifications included ensuring that emission levels were well below the statutory requirements and an efficient operation and modernization strategy.

The implementation of four burners for the combustion of natural gas L with individual electronic compound control and comprehensive project management allowed SAACKE GmbH to deliver an impressive overall concept that does not require any secondary measures to reduce NOX.

High service quality – from project planning to commissioning

The Stadtwerke Duisburg received intensive support for a cost-efficient upgrade from the early project planning phase as well as for budgeting. This ensured that it benefitted from SAACKE’s extensive experience in project engineering. Great importance was placed on the reuse of existing components: the existing combustion air supply concept was used when installing the burners. Another challenge was faced in the commissioning phase: as a peak load district heating plant, the Mitte heating station is only operated in the winter months for about 2,000 – 3,000 hours a year. The commissioning depended on the weather conditions and required a flexible commissioning team. The comprehensive SAACKE service network with 24h on-call service ensured that the trial operation was completed in three steps as planned.

“As a competent project and service partner, SAACKE implemented an integrated solution that ensures compliance with the NOX emission values into the foreseeable future.”

Innozenz Behrens, Plant Engineering, Stadtwerke Duisburg

Stadtwerke Duisburg AG

District heating

4 burners with 27.8 MW each
Task
Development and implementation of a fuel conversion in the combustion plant for the Stadtwerke Duisburg AG Mitte heating station in compliance with NO\textsubscript{x} emissions $<$80 mg/Nm\textsuperscript{3} for 3% O\textsubscript{2}.

The SAACKE solution in detail
The plant’s core element is four gas lance burners, type DDGG-LN, that are each equipped with electronic compound control. The burners can be operated simultaneously or independently. The incoming combustion air is adapted by a differential pressure controller. The natural gas pressure is controlled via an inlet pressure control system in order to guarantee optimal fuel curves for the respective modes of operation. A control range of 1:6 is achieved for the combustion of natural gas L. The scope of service included the delivery and installation of four burners with the associated gas valve trains, refractory brickwork, electronic compound control and a central burner control with boiler protection. The service also included commissioning and advance long-term project management with project planning and budgeting. The burners can be retrofitted for operation with light oil.

Conclusion
The plant was upgraded to gas as part of the conversion and falls below the NO\textsubscript{x} requirements without any additional flue gas recirculation. The combustion concept with electronic compound control provides a range of benefits: volume measurements of the media flows (air and fuels) are not required for operation. There is no need to ensure the fuel-air ratio by O\textsubscript{2} monitoring. The electronic compound control ensures that the NO\textsubscript{x} limit values are easily met and guarantees the reliable function of the burners. Together with the concept planning and project engineering by SAACKE, the Stadtwerke Duisburg was able to implement an economical, efficient and sustainable solution.

Solution
Installation of four DDGG-LN, each with 27.8 MW, with electronic compound control. Concept planning and budgeting in consideration of existing components.

Technical data: Mitte heating station

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiler type</td>
<td>1 hot water boiler</td>
</tr>
<tr>
<td>Burner type</td>
<td>DDGG-LN 300.03</td>
</tr>
<tr>
<td>Burner capacity (max.)</td>
<td>4x 27.8 MW</td>
</tr>
<tr>
<td>Heat output range</td>
<td>20-100 MW</td>
</tr>
<tr>
<td>Control range</td>
<td>1:6 (natural gas)</td>
</tr>
<tr>
<td>Emissions (natural gas L)</td>
<td>80 mg NO\textsubscript{x}/m\textsuperscript{3} at 3% O\textsubscript{2}</td>
</tr>
</tbody>
</table>

All benefits at a glance
- Falls well below the national and European emission standards thanks to low NO\textsubscript{x} technology
- Increased efficiency due to the high control range and individual burner control
- Increased economy and optimized efficiency due to electronic compound control
- Low maintenance costs and long service life
- Commissioning, service and 24h on-call service