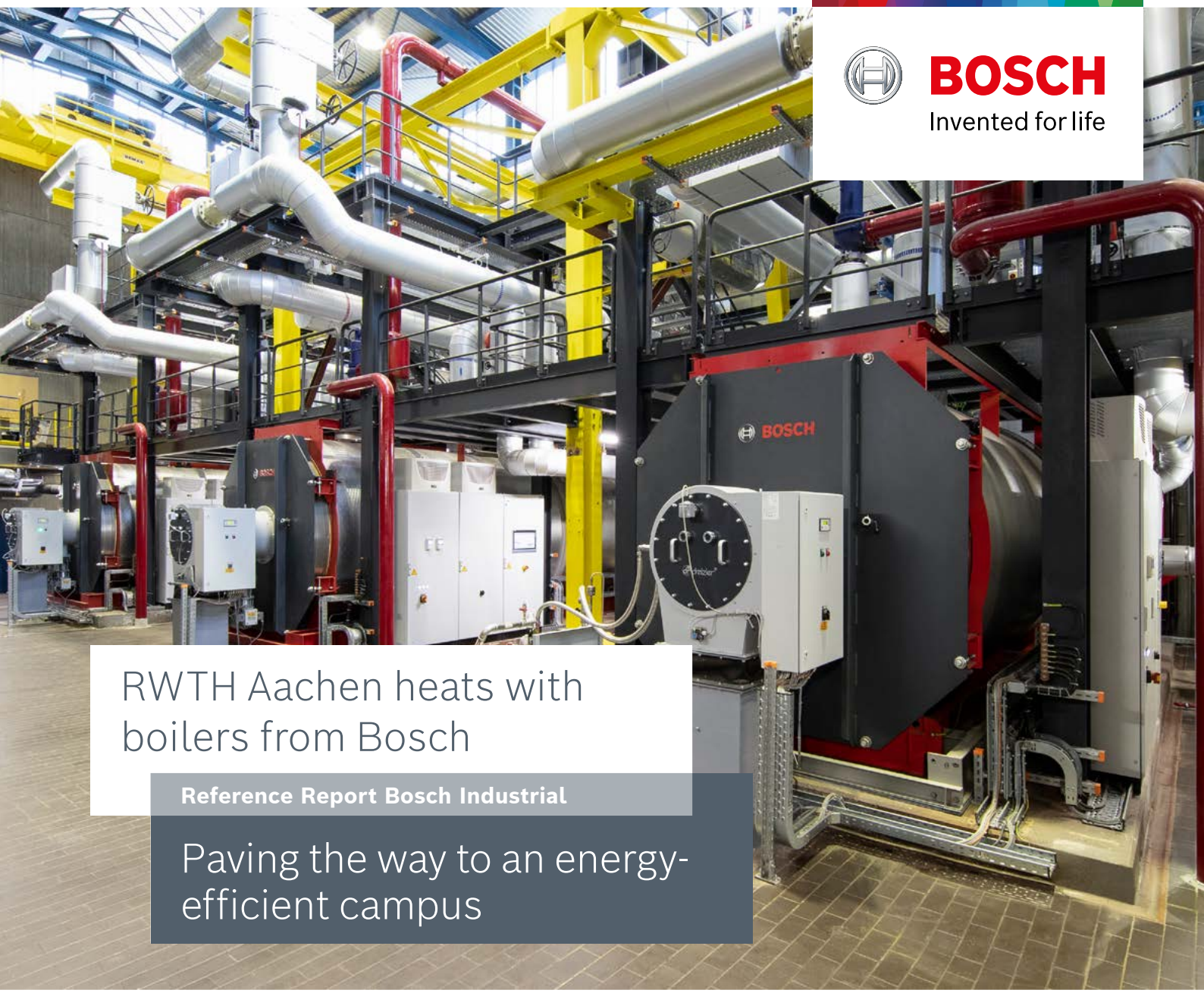


BOSCH
Invented for life

RWTH Aachen heats with boilers from Bosch

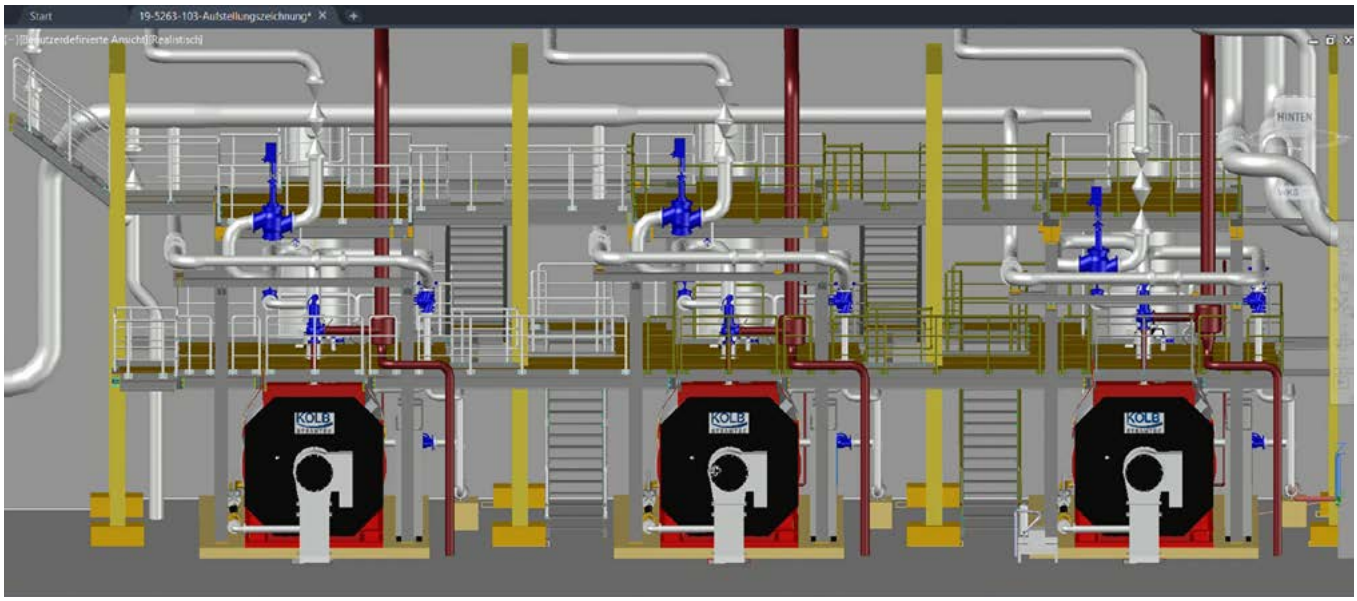
Reference Report Bosch Industrial

Paving the way to an energy-efficient campus

Powerful, dynamic and low in emissions: Those are the benefits of the new Bosch boilers at RWTH Aachen University – one of the leading universities of technology in Europe. Offering nearly 38 MW of power, the energy-efficient heat generators of the UT-M type series heat around 50 RWTH buildings.

“Thinking the Future.” That is one of the guiding principles of RWTH Aachen, which currently counts approximately 45,000 students in 150 degrees, making it one of the largest universities of technology in Germany. When it comes to heat production, RWTH Aachen is a self-sufficient energy supplier and operates a heating plant at the Melaten campus. The underground heat grid spans an area of roughly 500,000 m². The grid is supplied by three new state-of-the-art hot water boilers from Bosch, which guarantee a reliable, economic and ecological heat supply now and in future.

The heating plant of RWTH Aachen employed two water-tube boilers and a shell boiler for more than four decades. The new construction of the system within the existing infrastructure proved to be a particular challenge. “The documentation for the old construction plans was quite sparse. We used 3D laser scanners to record the entire piping network and steel construction,” explained Philipp Schiffer, Managing Director of Kolb Anlagenbau GmbH. The plant construction company had been tasked with the on-site works, that is dismantling, installing and connecting the system, by RWTH Aachen. This process



The new boiler house as a 3D visualisation. The Kolb Anlagenbau team was able to exactly represent the real conditions based on 3D laser scans and integrate the new system into the existing steel construction.

was completed step by step. Each time an old boiler was removed, a new Bosch boiler took its place. The compact design of the new heat generators was a very important factor here. It made it possible for the integration of the new system – which often required precision work – to be completed without costly external measures such as installation via the roof. Kolb installed roughly 250 metres of new piping in the heating plant for connecting the boilers.

Compact design, quick heating-up

Despite their compact design, the new boilers of the Unimat UT-M type series are powerful heat suppliers which generate nearly 38 MW in total. The proven Bosch construction also has a positive effect on the rapid availability of heat. The boilers reach their operating temperature very quickly and are able to supply heat for dynamic demands. This is an important factor since around 50 large buildings of RWTH Aachen with varying demands are connected to the network, spanning an area of 70 football fields. In addition to the Melaten campus, the heat generators currently also supply the Uniklinikum Aachen hospital, which will soon operates its own steam and hot water supply with boilers from Bosch. Safety and energy efficiency are a major point of focus for

Andreas Heinicke, Sales Engineer at Bosch Industriekessel, together with Philipp Schiffer, Managing Director of Kolb Anlagenbau.

projects of this magnitude for systemically important consumers.

The expansive network system at the university's campus requires distances to be overcome efficiently. Hot water is generally the most economic heat transfer medium solution today due to the lower temperature level in district heating grids. It can store large quantities of heat and transport it to the relevant consumer with a high level of efficiency. The heat for the different heating and process heat applications leaves the hot water boilers with a flow temperature level of 150 °C and returns from the network with around 83 °C. An installed temperature maintenance system at this point ensures that the permitted temperature difference between flow and return is not exceeded.

RWTH Aachen
University

45,000
students

Melaten
campus

500,000 m²

Supply of
50 buildings

Melaten (North) heating plant of RWTH Aachen.

Positive environmental impact

But RWTH is not just seeking to reliably heat its buildings with the new boilers. Instead, the university is considering ecological aspects as well, including a desire to prevent or meaningfully use any waste heat where possible. The Bosch boilers all come with an integrated flue gas heat exchanger which preheats the water from the return flow. This means that the boilers need to use less fuel to reach the supply flow temperature again. That saves money – and significantly reduces emissions. In addition, an oxygen probe in the flue gas flow measures the combustion quality to achieve a precise fuel-to-air ratio. This is an effective solution that further reduces the fuel demand and CO_2 emissions and also pays off very quickly.

Another important aspect for future-proof heat production is the reduction of NO_x emissions from combustion. The design of the combustion chambers in the Bosch boilers, combined with the burner technology used, makes it possible to achieve NO_x emissions that are approximately 30 mg/Nm³ below the limit specified in the 44th German Ordinance on Immission Control (44. BImschV). Flue gas from the flue gas heat exchanger is utilised and mixed into the combustion air by means of internal flue gas recirculation. This lowers the median flame temperature – and simultaneously reduces the amount of nitrogen oxide created. The duoblock burners used are integrated by Bosch ex works. With this type of burner, it was possible to install the variable speed combustion air fan separately in the heating plant's basement, thereby reducing the space required by the boiler. One of the burners is designed for dual-fuel operation to ensure additional supply reliability. The modulating operation of the combustion systems also has a positive effect on dynamic heat consumption. Energy-intensive switch-on and shutdown events including pre-ventilation losses are a thing of the past.

Reliable.
Low in emissions.
Efficient.

Summary.

With a combination of energy efficiency and flexibility, the Bosch boiler system is supporting RWTH Aachen University in its endeavour to heat its buildings economically and reduce emissions to positively impact the climate. The quality of the technology used ensures a particularly reliably heat supply at the Melaten campus. The entire system is now operating after around 14 months of on-site implementation work. The expertise and excellent cooperation between Kolb Anlagenbau and Bosch Industriekessel was a key factor in the successful realisation of a project of this magnitude. “With Kolb, we had an experienced partner at our side to implement our boiler technology according to customer requirements. RWTH Aachen is benefiting from a high level of quality, efficiency and reliability thanks to the new system,” summarised Andreas Heinicke, the responsible Bosch Sales Engineer.

RWTH Aachen project

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Bosch UT-M hot water boiler

- Efficient heat for reduced running costs and emissions
- Compact design for easy installation and quick heating-up
- Flexible use with temperatures up to 190 °C
- Boiler system form a single source
- Low-emission customer specific operation possible
- Proven and maintenance-friendly construction for a long service life and reliability

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