

# Smallest measuring ranges: Waste-to-energy plant in Ulm successfully installs two ACF5000 emission monitoring systems from ABB



Following a detailed supplier assessment, FUG Fernwärme (district heating) plant in Ulm decided to equip its waste incineration plant with the ACF5000 from ABB for continuous emission monitoring. The challenge: The emission limits are significantly below the current legal requirements.

## Measurement made easy

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01 FUG Fernwärme GmbH in Ulm, Germany. Zweckverband-Thermische Abfallverwertung Donautal/ Müllheizkraftwerk Ulm (Fernwärme Ulm GmbH).

### Introduction and background

Fernwärme Ulm GmbH (FUG), operator of the Zweckverband Thermische Abfallverwertung Donautal (TAD) since 1997 and employing a staff of 200, is the district heating supplier for the city of Ulm. The core competencies of FUG include the operation, maintenance and optimization of production and distribution systems. About half of the population of the city of Ulm is supplied with heat from FUG's broad district heating network.

Two years ago, the company invested in the renewal of its emission measuring equipment.

The project tender placed strict requirements on all participating bidders. The goal was to replace the outdated equipment with new high-performance and future-proof technology which would fulfill the requirements for approved emission measurement devices in all aspects.

Key criteria in the assessment process for the renewal of a measurement system which was over twenty years old included the following:

- Fast delivery of spare parts if needed: the current system of spare parts delivery did not fulfill the listed requirements.

- Minimization of operating and maintenance costs: the old devices were generating exceedingly high costs.
- Maintenance of a high availability of >97% during annual operation to meet the legal requirements for quality assurance.
- Improved measured value stability with reduced pollutant limit values.
- Increased operational efficiency.
- Long maintenance interval to minimize maintenance cost.

Having assessed all the aspects of the supplier evaluation, FUG GmbH decided to select ABB. Thanks to the investment in the stable and reliably operating ACF5000 CEM System, pollutant emission monitoring is state of the art, while operating costs are decreased at the same time.

ABB had introduced the first FTIR spectrometer for emission measurement 25 years ago. The ACF5000 is the fourth generation of the successful FTIR spectrometer. The system can measure up to 15 gas components simultaneously, while providing clearly improved measurement characteristics, such as the measurement of HCl, CO<sub>2</sub>, NH<sub>3</sub>, NO<sub>x</sub>, SO<sub>2</sub>, CO and O<sub>2</sub>.





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01 Grab crane at  
FUG, Ulm, Germany.  
Max capacity 4 tons.

02 ACF5000 installation.

03 Hubert Vogel,  
FUG, Ulm Germany  
and Henrik Noss,  
ABB Germany.

04 The interior of the  
waste incineration  
system, about 1,000  
degrees Celsius.

### What are the main advantages of ABB and the ACF5000 CEM System?

We ask Hubert Vogel, deputy manager MHKW Müllheizkraftwerk, Ulm, Germany:

“We convert 160,000 tons of household waste per year into energy. All the waste comes from Ulm and the bordering municipalities along the Danube valley with a population of around one million. From that we can guarantee the supply of heating for around 50% of the residents of the city of Ulm. For the emission measurement associated with that we need reliable low-maintenance emission measurement equipment.”

“The ACF5000 CEM System was installed in 2018. The measurements are very stable and run flawlessly. For the legally required QAL3 monitoring in accordance with EN 14181, internal validation cells are used, so no maintenance times or downtimes occur as a result.”

“I even think that the ACF5000 is working much better than expected.”



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“The FTIR spectroscopy helps us reliably survey measured values; we benefit from ABB’s 25-year experience with this technology”

Hubert Vogel, deputy manager MHKW Müllheizkraftwerk, Ulm, Germany

**Hubert Vogel sums it up:**

“Since the waste incineration plant in Ulm has been demonstrating the lowest emission limit values in all of Germany, special procedures were required when implementing this project. And it was a risky move for FUG GmbH to place our bets on the newly developed ACF5000. Yet ABB was absolutely confident from the very start that it would meet the requirements.”

“As in any project, there were issues, but there was never an issue that we could not solve with ABB. Therefore, we see no other alternative than the ACF5000 to monitor emissions in a stable and reliable manner.”

“In that regard, cooperation with ABB is very good and that is one of the most important success factors. ‘As a result of this outstanding cooperation, FUG GmbH receives as a customer professional competence and service in the best possible way.’”

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01 Operator room  
at FUG Fernwärme,  
Ulm, Germany.

02 Frank Schneider,  
ABB Germany, Martin  
Ottosson, ABB Sweden,  
and Hubert Vogel,  
FUG, Ulm Germany.

03 CEM System  
ACF5000.

ABB is a global market leader in continuous emission monitoring systems (CEMS). This also includes the solution that has been installed at Fernwärme GmbH in Ulm.

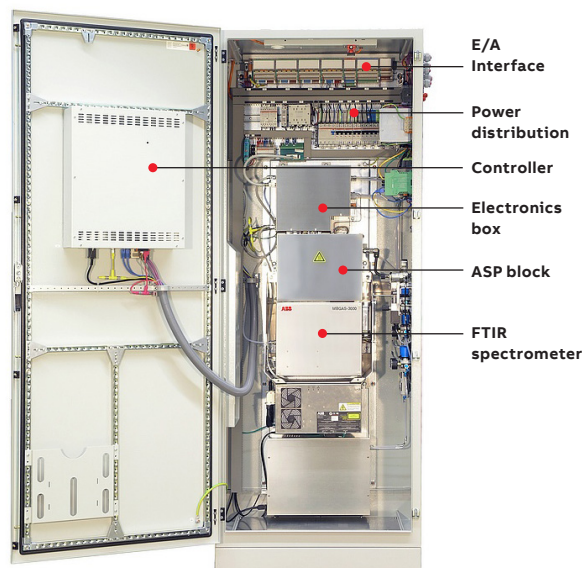
The ACF5000 uses the FTIR technology developed at the ABB Québec plant and Frankfurt plant in continuous gas analysis, which also includes in-house system construction. Therefore, ABB has all the core competences which are needed for system solutions like the ACF5000 available in-house.

#### ACF5000 – The standard in FTIR CEMS

- Complete turnkey system, from sampling to measured value.
- Approval in accordance with DIN EN 15267 and DIN EN 14181.
- Certified maintenance interval:  
6 months by TÜV-Rheinland  
12 months (MCERTS) by CSA/SIRA in England
- The ACF5000 is the first multi-component emission device which has obtained a certified 12-month maintenance interval.
- Remote maintenance and diagnosis possible.
- Lowest operating and maintenance costs.
- Availability of > 97% per year.



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