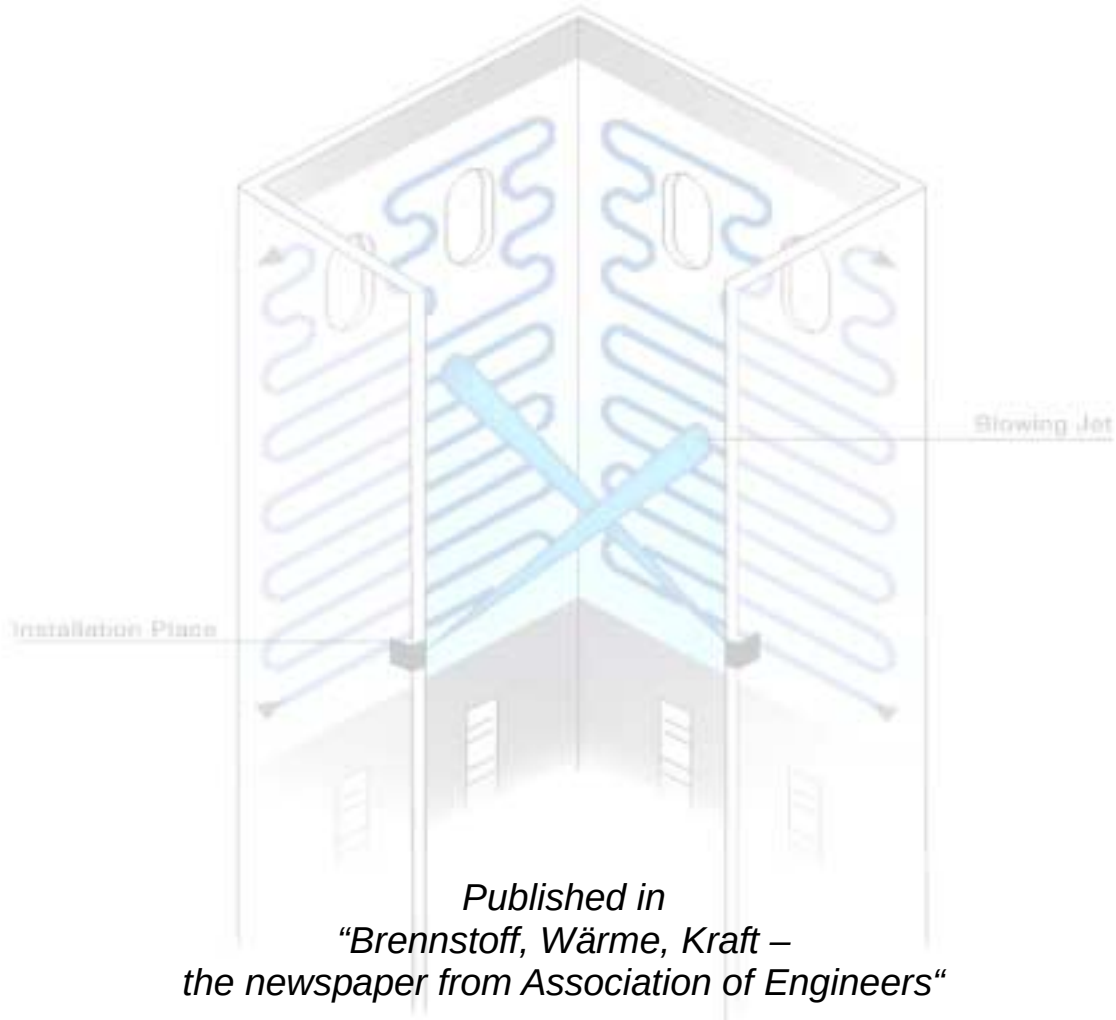
Installation of Water Cannon in Waste Incineration Plants



Published in
"Brennstoff, Wärme, Kraft –
the newspaper from Association of Engineers"

Edition October 1999

© Clyde Bergemann GmbH, Schillwiese 20, 46485 Wesel, *Germany*
Phone: ++281 815 120, Fax: ++281 815 176, http://www.cbw.de

To achieve the desired operating periods for refuse incineration plants, it is indispensable to use cleaning facilities. Sootblowers have frequently demonstrated their usefulness for cleaning the convection heating surfaces of vertical pass boilers, and pneumatic rappers for the cleaning of horizontal pass boilers.

But there was still the problem of cleaning the radiation passes. An expensive installation is required to achieve an efficient cleaning effect by means of the so far usual systems (e.g. wall-mounted blowers). The situation is clearly improved when using water cannon.

This blower type has already been successful in lignite-based boilers of any output capacity. First-time installation at MKVA Krefeld shows that the water cannon is also suited for utilization in refuse incineration plants.

Installation of water cannon in waste incineration plants

Walter Schäfers, Wolfgang Fey, Stephan Simon, Frank-Dietmar Kahle

In MKVA Krefeld one of the incineration lines which have been running for a long time had to be replaced. The firing concept for the new boiler (new K1) provided for a parallel-flow system with roller grate. The contract for the construction of the plant was awarded to L. & C. Steinmüller as general contractor.

The new K1 line **(Fig. 1)** is designed for a refuse throughput at 100 % of 18.4 Mg/h with a calorific value (NCV) of 9,500 kJ/kg. The live steam parameters are 410 °C and 42 bar. Municipal solid waste, similar industrial refuse and up to 15 % of sewage sludge (90 % DS) are combusted in the plant.

After commissioning the K1 line has been run in 100 % continuous operation since the beginning of April 1997. Due to the increase of the temperature up-stream of the superheater it soon became obvious that the radiation passes were fouled very much. This behavior first was attributed to the commissioning and optimization stage for compared with similar plants the boiler is equipped with a fairly large radiant heating surface.

The temperature pattern resulting after thorough cleaning, confirmed the extremely unfavorable fouling behavior. After some thousand hours there were already deposits of 140 mm thickness in the 1st pass, 80 to 90 mm in the 2nd pass and some 40 mm in the 3rd pass. Under these conditions it was impossible to comply with the guaranteed operating period.

Possible causes discussed for the quick build-up of fouling were:

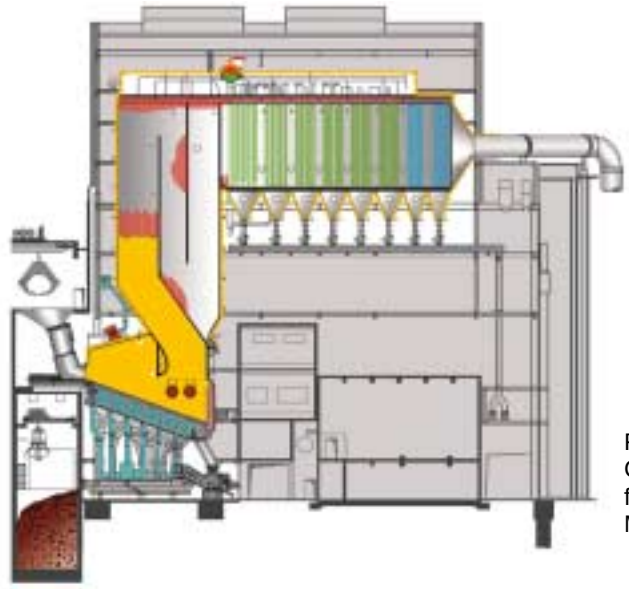


Fig. 1| Conception of firing of MKVA Krefeld

- temporary high calorific values of refuse
- non-homogeneous refuse
- high furnace temperatures due to parallel-flow combustion
- additional combustion of sewage sludge.

To clarify the formation of deposits, a number of samples were withdrawn from the various boiler passes and analyzed chemically and by radiography. Additional information was received from the accompanying recalculation of the calorific value.

Dr.-Ing. ***Walter Schäfers,*** Year 1948, studies of the method and energy technology, doctorate at the RWTH Aachen. Since 1985 employee of L.&C. Steinmüller GmbH, Gummersbach, now Babcock-Steinmüller GmbH, Gummersbach. First job in the area of the denitrification plants, from 1991 responsible for projects in the business field waste technology.

Dr.-Ing. ***Wolfgang Fey,*** Year 1954, studies of the chemistry, doctorate at the TU Darmstadt. Since 1992 employee for R&D at L.&C. Steinmüller GmbH, Gummersbach meanly for flue gas cleaning. Since 1995 responsible for for the analytics of the chemical laboratory of L.&C. Steinmüller GmbH, Gummersbach, now Babcock-Steinmüller GmbH, Gummersbach.

Dipl.-Ing. ***Stephan Simon,*** Year 1964, studies of mechanical engineering at FH Aachen. Since 1990 employee of Clyde Bergemann GmbH, Wesel. First responsible for the R&D department, since 1996 responsible for the department technology and order handling.

Dipl.-Ing. ***Frank-Dietmar Kahle,*** Year 1948, studies of mechanical engineering at TU Dresden. Since 1991 employee of Clyde Bergemann GmbH, Wesel. Working in the sales and orderhandling department and responsible for the Water cannon method technology .