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CONTINUOUS MONITORING OF THE DIOXIN-/FURAN-EMISSION OF ALL WASTE INCINERATORS IN BELGIUM

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Introduction

The continuous monitoring of the emission of dioxins and furans of waste incinerators is a topic which is in discussions since several years. Some years ago it was shown, that the continuous control of the dioxin emission leads to higher values in comparison to the mostly used 6-hour measurement¹. Due to the results of these measurements the governments in Belgium decided that all waste incinerators in Belgium has to be equipped with a continuous dioxin monitoring system. In 1999 in all Flemish waste incinerator plants such systems were installed and for the moment in all waste incinerator plants in Walloon such systems will be installed. After the installation is completed Belgium will be the first country on the world, in which a complete dioxin emission control of waste incinerators is realised. In this report the function of the continuous dioxin-/furan-monitoring system AMESA² will be explained and results in comparison to other measuring methods will be shown.

Material and Methods

The measurement principle which is used in the described system is known since several years as a possibility for long-term sampling of dioxins and furans³. The system was approved in 1998 by TÜV Rheinland⁴. Contrary to the usual three single measurements every year, by means of continuous sampling over a period between 6 hours and 30 days, the AMESA ensures continuous

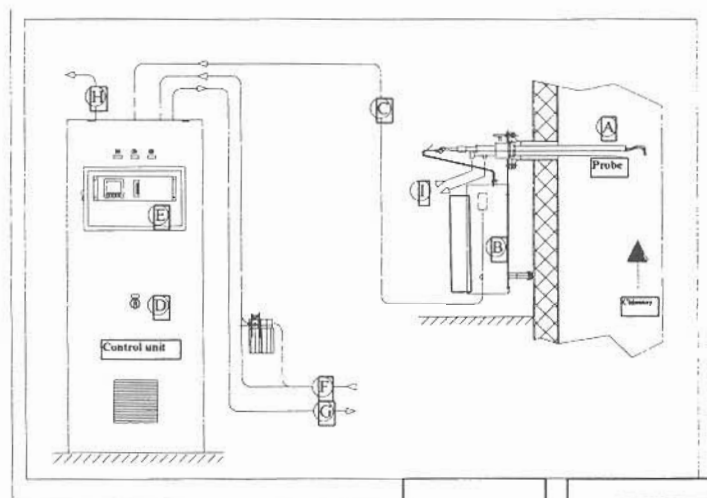


Fig.1 Measuring arrangement

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documentation of dioxin/furan emission for each single sample. This ensures that fluctuations in system operation and in the composition of fuels etc. are also recorded. With the AMESA, the recommendation given in 17. BImSchV to monitor the mass concentrations of dioxins and furans continuously and without interruption can be realised within a cost framework that is acceptable to the plant owner.

In the water-cooled sampling probe (A) (see fig. 1), the exhaust gas is cooled swiftly to ensure reproducible adsorption conditions for the analysed substances.

Dioxins and furans are separated (B) in a cartridge, filled with a collected phase of XAD-II adsorber resin. At the same time, dioxins and furans are registered completely, both from the exhaust gas and also from the accumulated condensate.

After adsorption of dioxins and furans, the measured gas is pumped through a tube (C) to the control unit (D). In the control unit the gas is cooled to 5°C to completely remove the condensate. The dried measured gas flow is determined by means of a mass flow meter. With the aid of a frequency-controlled pump, the process control (E) sets isokinetic extraction conditions as a function of the exhaust gas speed, temperature and pressure.

Additional signals of the flue gas velocity, -temperature and -pressure can be used as input for the process control (F). The condensate is pumped away (G) and status signals can be transmitted to a control room (H).

Besides the log printout, all recorded and calculated data is archived on a data medium over the entire sampling time.

The cartridge containing the adsorbed dioxins and furans is evaluated together with the data medium in an accredited laboratory. By means of this process, dioxins and furans are separated from dust, the gas phase and the condensate in one adsorption step. This process not only registers dioxins and furans, but also further organic substances with a similar volatility and polarity.

Results and Discussion

As mentioned above the results of former tests have shown that by a continuous dioxin emission control the measured values can be several times higher as by a compared 6-hour measurement¹.

Figure 2 illustrates the comparison of the emission measurement according to the European

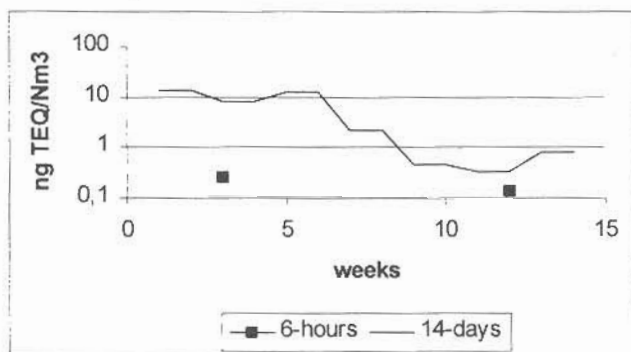


Fig. 2 Comparison of 6 hour and 14-days continuous control

standard method EN 1948 during a period of 6 hours to the 14-days average value in the same period.

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Due to this results all waste incinerator plants in Flanders are equipped with AMESA and all incinerator plants in the Walloon will be equipped with AMESA in a few months. In Fig 3 the locations of all 15 incinerator plants with in total 28 lines are showed. This continuous control leads to a reduction of the total dioxin emissions because the plants got newer technologies. Fig.3. Locations of all incinerator plants equipped with continuous dioxin emission control



For the moment in other countries like France, Great Britain or Germany several incinerator plants will be equipped with AMESA, too. It seems that AMESA get the status of a standard measurement equipment, for continuous dioxin control, because it is the only satisfying controlling unit on the market.

But the aim must be to control other dioxin emission sources like wooden incinerators or hazardous waste incinerators, too.

References

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Supplemental Abstracts

Analysis

Environmental Levels



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