Implementation of the new requirements of the EN1948-1 to the construction and operation of the DioxinMonitoringSystem

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Introduction

Stack emission measurement of PCDD/F has improved the last years to a high quality level. The European standard EN1948-1 (1996/7) was reviewed and the submission of the new release is in preparation. The DioxinMonitoringSystem®, which was the first of the continuous sampling devices on the market, was released in an enhanced version to include latest developments of improvements to the device. Thus, the security of EN1948-1 compliance for the users will be kept also with the new release of this European standard, which is expected beginning 2005.

Installations until 2004

Fuel and plant type	location and year of installation	number of systems
mobile test system grate / fluidised bed	various locations 1991	1
hazardous waste rotary kiln	Austria 1993	1
wooden material fluidised bed	Germany 1994	1
hazardous waste rotary kiln	Austria 1995	2
sewage sludge fluidised bed	Austria 1995	1
wooden material fluidised bed	Germany 1996	1
municipal waste grate	Germany 1997	2
various fuels (trial plant) fluidised bed/rotary kiln	Austria 1999	1
hazardous waste rotary kiln	The Netherlands 2000	1
municipal waste grate	Austria 2001	1
oilbrick plant brick production	Belgium 2002	1
municipal waste grate	Belgium 2002	1
municipal waste grate	** 2002	2
wooden material fluidised bed	** 2002	1
factory waste grate	Belgium 2002	1
solid waste static	Belgium 2002	1
liquid waste spray	Belgium 2002	1
municipal waste grate	Italy 2003	1
municipal waste rotary kiln	Italy 2003	1
municipal waste grate	France 2003	1
municipal waste grate	Italy 2003	1
municipal waste grate	France 2004	4
municipal waste grate	** 2004	1
municipal waste grate	** 2004	1
municipal waste grate	France 2004	1
cement rotary kiln	** 2004	1

Methods and Materials

The review process of the European standard EN 1948-1 is now in progress for already ~3 years. The principal understanding of the sampling processes since the set up of the first version of this standard improved far, as well as the experience of the laboratories to handle respective samples.

The trend for including this experience to the standard is spitted in two main categories, where one of them does inclusions by setting up specific minimum requirements, where the other one does inclusions by the request of method step validations.

Some of the former requirements are on the way to be replaced by recommendations or by free selections with validation.

Especially limitations of temperature limits will be removed to include the opportunity of more selective particle filter and sorbent selection.

Minimum sampling requirements

Several requirements have been decided to be essential for a proper sampling, thus they were defined as minimum requirements. The following selection focuses to the constructional parts of a used method or device:

(A) Deposition of particles in the particle filter	> 99.5 % for 0.3 µm or > 99.9 % for 0.6 µm
(B) Location of the particle filter	Filter/cooler-method: first filter Dilution method: first filter Cooled probe method: before last absorption stage
(C) Solid adsorption stage	At least one with > 90 % efficiency
(D) Location of recovery standard application	Filter/cooler-method: filter and/or adsorbent Dilution method: filter Cooled probe method: liquid phase collecting flask
(E) Leak test	Before and after each sampling
(F) Isocinetical sampling	According EN 13284-1:2001
(G) Sampling location	Representative selection of min. 2 sampling points

The adsorption efficiency of >90 % (Requirement C) is also met by the use of the polyurethane filters of the original filter sets, where these filters are known to absorb >99 % for dioxins as well as for PCB's.

The location of the recovers standard application (Requirement D) can be ensured by involving the respective laboratory. A selective training for new laboratories and a manual for the laboratory are provided.

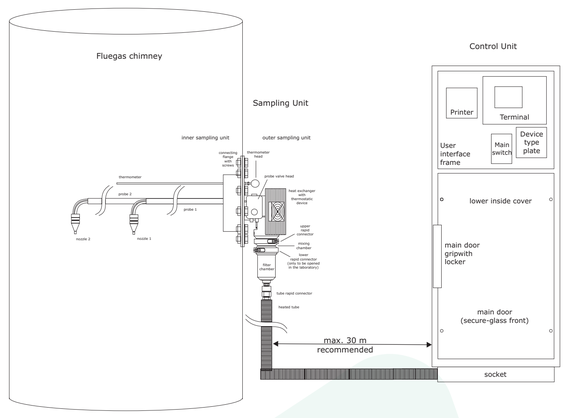
The leak test (Requirement E) is an already known procedure of the device operation and performed automatically at the beginning and the end of a sampling period.

The isocinetic sampling (Requirement F) of the DioxinMonitoringSystem® is performed by the null-pressure-nozzle design. The nozzle construction enables a selective pressure comparison of the sampling flow and the gas flow, and in case of achieving the same pressure, an equal velocity is ensured. Calibrated nozzles have to be used for this design.

Also the multi-point sampling (Requirement G) using 2 separate probes is already a known and unique part of the device construction.

Several of the different other requirements of the EN1948-1 are steps of the laboratory or preparation procedure and independently for a device design.

Overall, at the moment the DioxinMonitoringSystem® remains the only device for long term sampling meeting the requirements of the European Standard for dioxin measurement.

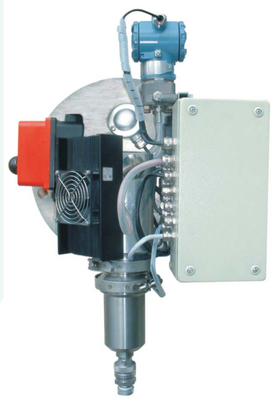


Picture 1: DioxinMonitoringSystem® schema

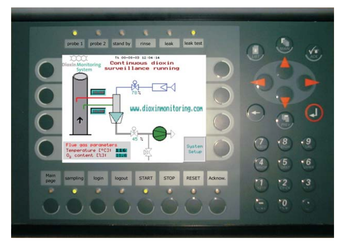
Results and Discussion

The integration of the requirements to the designs of the DioxinMonitoringSystem® took place mainly already with the basic design of the former release, and experimental as well as operational experience was submitted to the standardisation group.

The basic design using two heated probes with separate nozzles and is a well tested and approved construction. The efficiency of dust precipitation (Requirement A) is met by using the particle filter as provided for the product. The correct location of the filter is ensured by the construction of the sampling cartridge (Requirement B).



Picture 2: sampling unit with integrated thermostating System and control unit



Picture 3:control panel

References

1 preEN 1948-1: 2004/5

2 MonitoringSystems GmbH: DioxinMonitoringSystem® operation manual (2003)

3 MonitoringSystems GmbH: DioxinMonitoringSystem® laboratory work manual (2002)

Contacts

Please visit our exhibition booth for further information.

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