

Mass Spectrometry (MS) and Gas Chromatography (GC) are excellent methods to analyze or monitor the composition of gases. The presence of small quantities of dust, even after conditioning of the gas, can result in clogging of the capillaries in mass spectrometers or gas chromatographs. This makes it necessary to replace or rinse the capillaries, or may preclude the use of MS and/or GC. Faced with this problem at a pilot scale biomass gasification plant, ECN's engineers developed a smart solution to overcome this problem. This technology was successfully demonstrated at pilot scale and later at a full scale biomass gasification plant.

Key words: process gas analysis, mass spectrometry, gas chromatography, dust protection; dust removal; clogging; non-clogging

Description

- ECN has developed a simple and reliable conditioning system for removal of residual dust from process gas prior to analysis by a mass spectrometer. The gas conditioning system has been designed to have low maintenance requirements and can be used for other types of gas analysis as well.

New and innovative aspects

- The gas conditioning system is designed to intrinsically reduce the dust content of the gas to be analyzed and protect equipment for dust.
- Due to its simple and robust design, maintenance requirements are low.
- No moving parts or filters used.
- Design can be tailored for specific applications.
- Allows for heating.

Main advantages of its use

- Enables analysis of process gas containing dust.
- Allows for control of process performance in processes with dust load.
- Protects equipment from dust.
- Reduces downtime and increase operational reliability of gas analysis systems.
- Reduces use of consumables.
- Allows for heating to prevent condensation and hence analysis of components with a higher molecular weight.
- Simple and reliable concept.
- Easy to install and to replace.

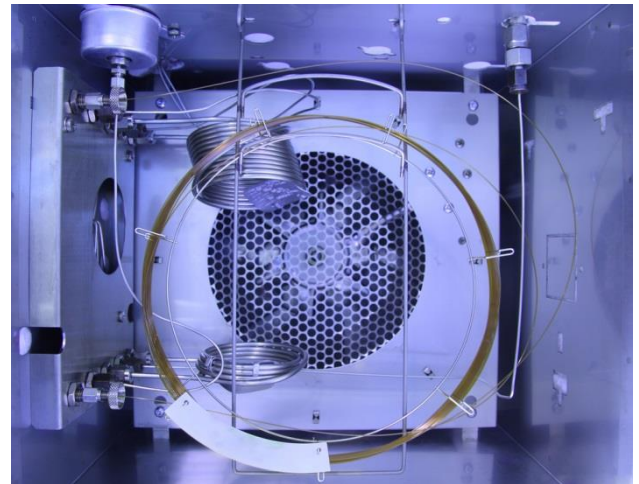
Specifications

- Simple connection via existing components to a mass spectrometer. Further details available after signing of non-disclosure agreement.

Potential applications

All applications of MS or GC in processes with dust load in gas, e.g.:

- Calciners
- Coke furnaces
- Blast furnaces
- Mineral industry
- Combustion, gasification and pyrolysis



▲ Fig. 1: Picture of the inside of a Gas Chromatography Analyzer. The capillary column (yellow) can become clogged by dust present in the gas stream.

State of development

- The system has been tested for several hours in biomass gasification processes both at pilot and demonstration scale. The first tests have proven the principle.
- Long term validation of the performance and reliability of the system is still required.

Transaction type and partner profile

- ECN is looking for a partner to further develop, test and commercialize this product
- Transaction type: license to manufacturers of MS or GC equipment.
- We are also interested to get in touch with potential end-users of MS, GC or other gas analysis equipment who have encountered problems with dust clogging.

IP status

- Confidential know-how, potentially patentable.