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ACCEPTED MANUSCRIPT

Dynamic properties of fast gas concentration meter with nondispersive infrared detector

Abbreviated title: Dynamic properties of fast NDIR meter

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Highlights

- The construction of the fast concentration meter was presented
- The impact of the sampling flow rate and the sampling tube length on the dynamic properties was determined
- A dynamic correction method was proposed and verified

Abstract

Dynamic properties of fast gas concentration meters were analyzed. The impact of the sampling flow rate, the sampling tube length and the sensor chamber volume on the dynamic properties of the measurement system was tested. The correlation between the sampling flow rate, the sampling tube length and the time constant was confirmed. The dynamic properties of the meter were determined using step up and step down tests.

A dynamic correction method was proposed. The aim of this method was to restore the waveform of the gas concentration changes at the sampling input of the meter on the basis of the recorded measurement results, having taken into account the pre-defined dynamic properties of the meter. The correction method was based on the Fourier transformation and was tested during the sinusoidal test.

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