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## **Basamatikum - Aerosol Spectrometer for Wilde Size Range Indoor/Outdoor Measurements**

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**BASAMATIKUM – AEROSOL SPECTROMETER FOR WIDE SIZE RANGE INDOOR/ OUTDOOR MEASUREMENTS****J. Ondráček, L. Mašková and J. Smolík***Laboratory of Aerosol Chemistry and Physics, Institute of Chemical Process Fundamentals, v.v.i., Academy of Sciences of the Czech Republic, Prague, 165 02, Czech Republic**Presenting author email: ondracek@icpf.cas.cz**Keywords: UFPM, APS, indoor/outdoor, switching valve*

Many of the research studies in the field of aerosol science are focused on the measurements of indoor environment. The main reason for this is due to the fact, that people spend every day most of their time indoors [1]. The indoor aerosol particles are studied mainly because of their inverse health effects [2], but also because of the negative effects on indoor environment itself and eventually also on cultural heritage [3]. Indoor air is generally affected by both indoor and outdoor sources [4]. The outdoor aerosol concentration depends on numerous factors like source emissions, ambient weather conditions, various removal processes, etc. [5, 6]. On the other hand, the indoor aerosol concentration is affected by outdoor concentration, factors influencing the indoor-to-outdoor relationship (such as ventilation rate, penetration factor, etc.), indoor emissions and removal processes (deposition of particles on inner surfaces) [7].

Therefore, there is an increasing need to measure the aerosol concentration both indoors and outdoors at once (or at least with reasonable time gap between indoor and outdoor measurement). The other demand, especially when such an instrument is placed indoors, where the inhabitants or employees reside, is often a limitation for the instrument to not bring any additional discomfort to indoor air (alcohol odors, radioactive source, etc.). At the same time we usually need to obtain information in quite a wide range of particle sizes. All these circumstances brought us to idea to combine the two commercially available aerosol spectrometers and a switching valve to form one measurement instrument allowing easy measurements of indoor/outdoor environments.

Combined wide size range aerosol spectrometer Basamatikum allows to measure particle number size distribution in a range between 20 nm – 20 µm. The instrument separates the measured aerosol particles into 58 size bins. The instrument can automatically switch the scanning between two sampling points (e.g. indoors and outdoors). It consists basically from two aerosol spectrometers (UFPM and APS, both TSI), electrically actuated ball valve, sampling tubing with isokinetic subsampling to both of the two spectrometers and two sampling lines. The overall control, data logging and saving to file, the switching between sampling lines and the user interface is provided by the means of the LACP-made (Laboratory of Aerosol Chemistry and Physics) software in LabVIEW programming environment.

The instrument was thoroughly tested during several intensive campaigns (almost one year of continuous measurement in Zlatá koruna, 4 two-week campaigns in Teplice and 4 two-week campaigns in Prague). Detailed presentation of the obtained results can be seen for example in [8]. Small issue connected with the charging in the UFPM spectrometers can be easily neglected, when we take into account that the primary purpose of the combined instrument is to evaluate the ratio between the two measurement places. Generally, the overall performance of the instrument was satisfactory and the whole instrument is suitable for deployment for a long term unattended operation.

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