# Investment adviser – this is the key!

## So you are planning investment in a new microbiological air sampling system?

We believe the following points will help you make the right decision for the upcoming investment.

**Components of an air sampling system:**
Active microbiological air sampling systems consist of an air feed device and at least one collecting head, in which the particles contained in the sample air are separated onto the collection medium.

**Collection heads:**
The particles in the sample air should be separated as soon as possible after entering the collecting head in order to avoid deposits and possible contamination as a result. Prior to separation, synthetics may build up electrostatic charges, which deflect particles (electrostatic precipitator) and should thus be avoided. The collecting head should be made of metal, have flat surfaces and be easy to clean.

For **air samplers**, in accordance with the impaction principle (fluidic separation) the separation rate, also known as the “cut off” value, reveals the separating performance of the collector. The unit is the aerodynamic diameter of the smallest particles, which are separated onto the collection medium with a separation potential of 50% (dae50). The smaller this number, the better the separation performance. Here, care must be taken to ensure that the aerodynamic diameter differs from the actual diameter of the fungal spores.
To enable sampling of cavities, it should be possible to attach a hose to the sampling air intake.

For the purpose of evaluation, the process of air sampling always requires a cultivation time (incubation period). After successful cultivation, the only visible elements are the fungal / bacterial colonies which were also germinable.
However, this means that after the use of fungicidal agents, air sampling to clarify whether spores are present may still reveal a false negative result. Here, the benefit of the **particle collection** process becomes clear. The evaluation can be performed immediately after the sampling and all spores are visible, regardless of the germination capacity of the biological particles.

During the particle collection process, the mould fungi Stachybotrys chartarum, difficult to recultivate but mycotoxin-forming, can be very effectively detected due to its characteristic spore.
In particular, for “clearance measurements” conducted after clean-up operations, in accordance with the German VDI Guideline 4300 part 10, particle collection is the preferred method since it saves the time required for cultivation and the building site concerned can be given clearance or even remedied far earlier.

Air samplers operating in accordance with the impaction principle can achieve an effective level of sensitivity, to the extent that even individual spores can

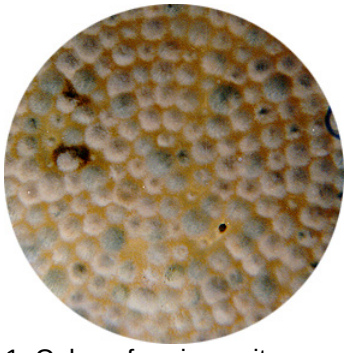

Image 1: Colony-forming units

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be seen, even after cultivation to form units of colonies (Image 1). When round jet impactors are used, however, high bacterial counts mean the areas underneath the jets are repeatedly covered in particles. To ensure statistically safe results can still be obtained, even with increased bacterial counts, **there should be at least 300 round jets**.

For very high bacterial counts, e.g. in biological workplaces, the use of (gelatine) filters as a collection medium has proven its worth. The cultivation of dilution series of the filter suspended in the solution can be attributed to high bacterial concentrations. The evaluation is described in detail in the BGIA folder Measurement of hazardous substances no. 9420.

Combo systems offering all the above-mentioned sampling methods (air sampling, particle collection and filtration) and operated using an air feed device, can therefore offer considerable investment savings.

**Air feed device:**
The choice of air feed device can be a pump or a fan. Of course, the ideal option are battery-powered conveying devices. Whereas pumps can indeed generate high vacuums, for volume flows from around 10 l/min, they tend to require a mains power supply. Effective options include high-performance fans, which can be battery-powered and generate a high volume flow and such a high vacuum that even close-meshed gelatine filters can be loaded.

A flow sensor should be installed, in order to control and monitor the volume flow.

A logical expansion, especially for accredited laboratories, is a second, redundant flow sensor. During the sampling operation, monitoring is performed by both sensors, meaning any deviations can be swiftly detected.

A backlit LCD display allows secure operation in dark environments and cannot be considered a luxury.

For the purpose of adjustment in line with the respective collection method used, a swift and no-fuss volume preselection is required for the conveying device.

Image 2 Battery-operated microbiological air sampling system with 3 different collection heads for filtration, airborne bacterial collection and particle collection (from left to right)