

# SASS® 3100

Dry Air Sampler System



## INTRODUCTION

The Smart Air Sampler System 3100 (SASS® 3100) is a high efficiency dry filter sampler developed for the collection of airborne particulates, especially pathogenic bacteria and spores. It is digitally smart, remotely controllable, and supports applications requiring a small, rugged low-power device equally comfortable in the arctic or desert. The system is fully portable and accepts both primary and rechargeable batteries.

The capture element is a 44 mm diameter felt-like polymer disc. Each fiber in the disc has an electric field frozen into it. These fields induce a charge in aerosols passing through the filter and provide a capture mechanism much more effective than impaction; up to 50X more efficient than conventional glass or cellulosic filters. This 'electret' media is stable to 70°C, is virtually inert, has a shelf life of 10 years, and has high holding capacity due to a large internal surface-to-volume ratio.

A microprocessor controls blower speed and provides diagnostics through fully dimmable LED indicators that warn when battery power is low, and when the fan is not rotating. The unit may be controlled remotely via an RS-232 communications link, or with an optional RF link.

## SASS 3100 FEATURES

### Disposable Filter Element

A key component is the disposable snap-on filter element (Figure 1). At the center of the element's 60 mm diameter injection-molded frame is an acoustically-welded 44 mm diameter micro-fibrous capture disc. Particles with diameters in the range of 0.3 to 0.5  $\mu\text{m}$  are captured with almost 50% efficiency by the disc, while particles of 1.0  $\mu\text{m}$  diameter or larger are captured at 80% or better efficiency.

The filter element can provide a liquid sample suitable for a wet bioassay after being processed in the SASS 3010 Manual Extractor, or the capture disc portion may be placed directly in a 50 mm petri dish for a culture-based assay.

Since the electret material is virtually inert and the internal fields are electrostatic in nature, particulates are not likely to suffer a change in viability or morphology while trapped in the filter, allowing long-term dormant state storage, as compared to the possible effects of water storage.

The initial filter void volume is in excess of 95%. Since the media is active through its entire cross-section, collection efficiency changes little over long collecting periods. Charge induction effects also help maintain filtration effectiveness when fibers become coated with captured particles.

The blower can be set to operate over an air flow range of 50 to 320 liters/minute, which provides filter face velocities ranging from about 160 cm/sec to 456 cm/sec. These filter face velocities are comparatively slow compared to typical sieve-type impacting samplers and organism desiccation and damage is minimized.



Figure 1: Snap on electret filter.

### Fan Unit

The centrifugal fan is driven by a brushless DC motor with an expected lifetime of about 30,000 hours. Fan power consumption is nominally 8 W and noise levels are 45–61 dB (A) at 1 m.

## Electronics

Electronic subsystems are under the control of an embedded microprocessor, and many operating characteristics such as fan speed and sampling behavior, can be permanently or temporarily changed using Windows® software provided with the system. The unit may be operated manually, by the Windows software, or by other serial port-connected equipment.

An RS-232 serial port is provided. Options include an RS-232 to USB adaptor and a modular RF link that mounts to the RS-232 connector. The standard connector is a commercial DB-9, but a military CCSI style is available.

Field operation may be powered by either a BA5590B/U or BA5390/U primary battery, or by the UBI 2590 rechargeable battery. The primary batteries provide over 24 hours of operation, while the rechargeable battery will power the device for about 20 hours. In standby, the primary batteries are expected to last over 10 days, while the rechargeable will support about 8 days of standby operation. A universal (IEC 320) wall-plug power supply accepts 100-240 V AC at 50-60 Hz power. Two external LEDs monitor battery end-of-life and fan rotation rate.

## Packaging

The electronics and battery are enclosed in a leak-tight extruded aluminum shell. The fan rotor projects from this main enclosure and is coaxially aligned with and protected by a filter mounting plate affixed to the enclosure face. A carrying handle is provided for transport, along with two ¼-20 camera-style female mounting bosses on the carrying handle and the enclosure bottom surface. Overall dimensions are 15 cm W x 17 cm L x 20 cm H, and weight is 1.8 kg.

## Decontamination

The system's pull-through fan minimizes test-to-test contamination. If the unit needs to be decontaminated, it is designed to be washed or sprayed with a 5% bleach solution or subjected to a gas-phase microbicide. Only the motor shaft and fan rotor are exposed. In the event that the motor shaft seal is corroded by repeated decontamination protocols, it is a comparatively simple process to mount a new motor and rotor.

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SASS 3100 Specifications	
Characteristic	Description
<b>Operating Principle</b>	Electret dry filter media with high efficiency centrifugal fan. Fan life is in excess of 30,000 operating hours.
<b>Air Collection Rate</b>	User adjustable 50 LPM to 320 LPM typical
<b>Collection Efficiency</b>	0.5 µm dia: 50% 1.0 µm dia: 75% 2.0 µm >dia: 90%
<b>Operating Temp. Range</b>	-40 to 70°C
<b>Storage Temp. Range</b>	-40 to 70°C
<b>Humidity Range</b>	All-weather. Optional rain shield prevents wetting of filter during rainy conditions.
<b>Decontamination</b>	Ethylene oxide, vapor phase hydrogen peroxide or 5% sodium hypochlorite solution.
<b>Physical Size</b>	
– Filter media	4.4 cm diameter active filter in 6.0 cm diameter holder.
– Overall Case	15 cm W x 17 cm L x 20 cm H
<b>Weight</b>	1.80 kg; add 1 kg for battery
<b>Power Source</b>	BA-5590A/U primary battery or BA-5390/U extended life battery; UBI-2590 rechargeable battery; Universal wall supply: 82-265 Volt (47-63 Hz).
<b>Power Consumption</b>	8.4 W (>24 hrs operation with primary batteries; >20 hrs with rechargeable battery).
<b>Connectors</b>	<ul style="list-style-type: none"> <li>• Standard: DB-9</li> <li>• Optional: Military CCSI (additional cost)</li> </ul>
<b>System Controls</b>	Microprocessor controlled. Dimmable LEDs monitor for battery end-of-life and fan rotation.
<b>PC Interface Requirements</b>	OS: Windows Server 2003/2008, Vista or XP. Processor: 400 MHz Pentium or equivalent (Min.). RAM: 96 MB (Min.), 256 MB (Recommended). Hard Disk: 1.2 MB available space. CD-ROM.
<b>Communications</b>	RS-232 or optional RF link for remote operation or reprogramming.
<b>Sound Level</b>	45-61 dB (A) at 1 meter; peak value at exhaust port
<b>Package</b>	EMI resistant, water-tight aluminum extrusion
<b>Mounting</b>	Standard ¼-20 camera thread on unit handle and base.
Research International reserves the right to change specifications without notice.	