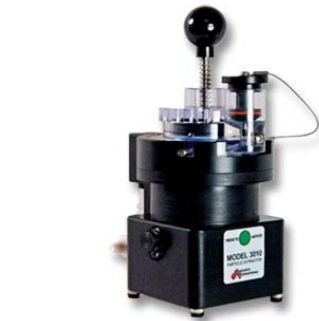


# SASS® 3100 Plus

Dry Air Sampling + Particle Extraction System



SASS 3100  
Dry Air Sampler



SASS 3010  
Particle Extractor

## INTRODUCTION

A complete solution for your dry air sampling challenges. Combines the high-efficiency of our SASS 3100 dry filter sampler with our SASS 3010 Particle Extractor. This combination provides you with the ability to collect airborne particulates, pathogenic bacteria and spores and then extract and collect the sample into a liquid form for analysis.

## 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. 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.

Particles with diameters in the range of 0.3 to 0.5 µm are captured with almost 50% efficiency by the disc, while particles of 1.0 µm 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 150 to 320 liters/minute, which provides filter face velocities ranging from about 160 cm/sec to 380 cm/sec. These filter face velocities are comparatively slow compared to typical sieve-type impacting samplers and organism desiccation and damage is minimized.

## Fan Unit

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.

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



Figure 1: Snap on electret filter.

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.

### SASS 3010 Particle Extractor Features

The SASS® 3010 (patent pending) is used to extract and transfer to a small fluid volume, aerosols captured by Research International's electret filters. Captured particulates can be difficult to remove: induced dipole fields create a strong holding force and must be neutralized. Once particulates have been released, they must then be removed from within the fibrous filter matrix and collected in a small amount of sample fluid. These processes are efficiently performed in a matter of 1 to 2 minutes using the SASS 3010 manual extractor.

Extraction efficiencies are typically in the range of 70 to 80%. To test extraction efficiency, a SASS 3100 and several electret filters were used to collect airborne fluorescent polystyrene beads of 1.8 microns diameter. Each filter was operated for a period of 10 minutes. After the collection phase was completed, the filters were mounted in a SASS 3010 and captured beads transferred to 5 ml of extraction buffer using the protocol outlined below. Extraction efficiencies were then determined using fluorometric assay methods.

It was found that an average recovery of 77% was achieved. A second extraction with an additional 5 ml of extraction fluid resulted in recovery of another 17% of the embedded beads, while two more 5 ml extractions resulted in small 4.5% and 1.5% additions to the total number of beads recovered, respectively.

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SASS 3100 Specifications	
Characteristic	Description
<b>Operating Principle</b>	Electret dry filter media with high efficiency centrifugal fan (in excess of 30,000 operating hours).
<b>Air Collection Rate</b>	300 LPM typ. User adjustable 150 LPM to 320 LPM
<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>	<ul style="list-style-type: none"> <li>• Filter Media: 4.4 cm diameter active filter in 6.0 cm diameter holder.</li> <li>• Overall case: 15 cm W x 17 cm L x 20 cm H.</li> </ul>
<b>Weight</b>	1.80 kg; add 1 kg for battery
<b>Power Source</b>	<ul style="list-style-type: none"> <li>• Primary battery; Extended life battery; Rechargeable battery;</li> <li>• AC/DC wall supply: 82-265 Volt (47-63 Hz).</li> </ul>
<b>Power Consumption</b>	8.4 W (>24 hrs with primary battery;>20 hrs with rechargeable battery).
<b>Connectors</b>	Standard: DB-9. Optional: Military CCSI (additional cost)
<b>System Controls</b>	Microprocessor controlled.
<b>Communications</b>	RS-232 or optional BioLink for remote operation.
<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.
SASS 3010 Specifications	
<b>Filter compatibility</b>	For use with SASS 3100 and SASS 4100 electret filters
<b>Extraction method</b>	Acoustic vibration of the fluid-saturated filter is followed by pneumatic and mechanical counter flow-driven discharge of the suspended aerosol particles.
<b>Extraction efficiency</b>	60-80% typical
<b>Residue, run-to-run</b>	1.1% with dry wiping, and 0.01% to 0.1% with a 5 ml flush
<b>Extraction time</b>	1 to 2 minutes, typical, with a flush cycle.
<b>Extraction fluid</b>	Pre-filled dropper bottle with buffered extraction fluid for a 4-10 ml sample (user specified).
<b>Sample fluid storage</b>	Extraction fluid bottle also used for fluid sample storage after extraction.
<b>Physical size/Weight</b>	15 cm W x 17 cm L x 20 cm H / 1.25 Kg
<b>Electrical power</b>	Two size "D" primary batteries.
<b>Operating temp. range</b>	0° C to 70° C