

## SAA 8100

### A Micromeritics' Selective Adsorption Analyzer



The Selective Adsorption Analyzer (SAA - 8100) is a dynamic adsorption analyzer based upon the vapor-solid equilibrium for reversible systems. The SAA 8100 is a device for collecting both transient and equilibrium adsorption data for multi component systems. A dynamic experimental system is preferred over a static adsorption analyzer for evaluating new adsorptive materials in a multi-component gas stream. A variety of detector systems can be utilized which allow for monitoring the transient behavior (mass transfer profile) of a multi component adsorption application. The SAA 8100 performs "Breakthrough" experiments for determining critical performance parameters for adsorptive materials including adsorption equilibrium, rate, selectivity, and capacity.

### PRINCIPLE OF OPERATION

The SAA 8100 is a gas delivery and control system based upon the technology and engineering of **PID Engineering & Technology**, a Micromeritics company. The system includes mass flow controllers, blending valves, vapor sources, temperature control and a sample column for evaluating adsorbents. After activation (degassing) of the adsorbent, a mixture of gases (or vapors) are flowed through the column and the composition of the eluting gases is monitored. Mass balance calculations are used to determine the quantities adsorbed from the inlet and outlet flows and concentrations.

The selectivity of the adsorbent material is readily calculated and is a critical parameter in comparing performance of candidate adsorbent materials.

### KEY FEATURES & BENEFITS

- Fully automated Breakthrough platform with integrated touch screen and PC software control based on proven PID technology in numerous laboratories worldwide and supported by Micromeritics.
- MicroActive™ software platform uniquely gives users the ability to enter their own data reduction algorithms via a Python interface.
- Proprietary blending valves on each MFC gas line allow exceptional control of gas mixing and minimizes the flow path "dead volume" over the full measurement range.
- Scalable sample masses may be studied from 50mg to multigram analyses in one system.
- Sample column and associated hardware are housed within a temperature controlled 'hot-box' to ensure temperature control of the entire experimental assembly. This eliminates cold spots, avoids condensation, and ensures that the gas concentration(s) are consistent. (Note: Many applications are performed at relatively low temperatures, as a result a furnace is not always required).
- The column furnace facilitates *in-situ* preparation and activation of materials at temperatures up to 1050°C.
- Back pressure control and optional sub-ambient temperature control of the sample column allow the user to perform experiments at commercially relevant conditions.
- Vapor source option is available in addition to the 6 or 12 flowing gas lines.
- The SAA 8100 is flexible, precision gas delivery system which is field upgradable allowing capabilities to be expanded over time. Its ability to provide high quality separation and excellent flow rate data ensures high quality selectivity values.

# PRODUCT DATA SHEET

## OPTIONAL ACCESSORIES

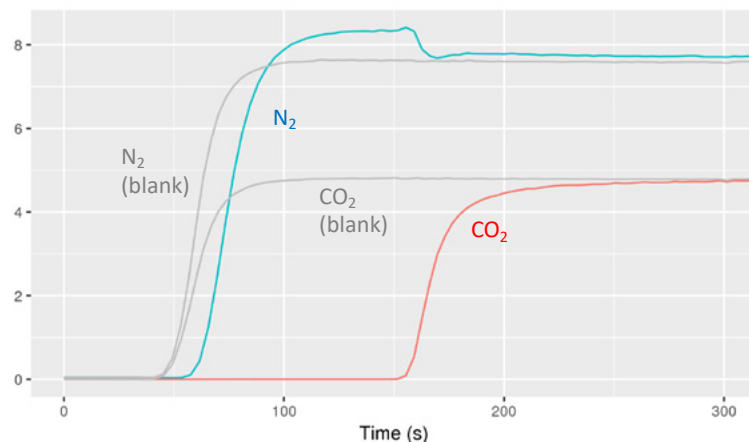
- Mass Spectrometer (Provided by customer, if not sourced from Micromeritics)
- IR Spectrometer (Provided by customer)
- GC/MS
- Additional blending components
- Furnace
- Vapor generator (water & other vapors)
- Sub-ambient temperature control

## APPLICATIONS FOR THE SAA 8100

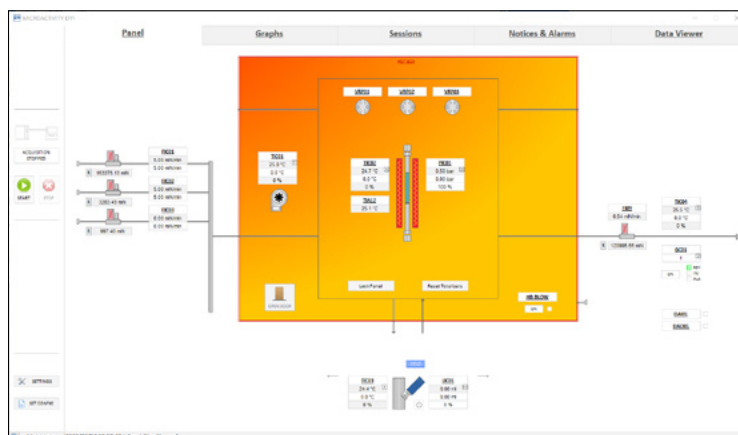
- Gas separation, storage & purification
- Breakthrough analysis
- CO<sub>2</sub> capture
- Sorption selectivity
- Evaluation of next generation adsorbent materials such as MOFs, COFs, ZIFs, zeolites, activated carbons, silica gels, activated alumina, carbon molecular sieve, porous polymers, and resins
- Energy storage
- Selectivity investigations
- Material research
- Chemical Engineering

## TYPES OF TESTS THAT CAN BE PERFORMED

- Multi component adsorption
- Mixed gas adsorption
- Breakthrough curve analysis
- Adsorption of gas and vapor mixtures
- Selectivity and adsorption capacity
- Dynamic adsorption and desorption measurements
- Competitive adsorption
- High pressure isotherms
- Pure component data isotherms



Carbon dioxide breakthrough curve using Basolite C300 (Cu-btc)



Continuous Monitoring and Interactive Control of Selective Adsorption Analyzer Operating Conditions

# PRODUCT DATA SHEET

## SPECIFICATIONS

<b>Gas Inlets:</b>	Up to 6 on standard system, expandable to 12 max.
<b>Gas Compatibility:</b>	Carriers and most analyte and reactive gases, inquire about corrosive gases.
<b>Mass flow Controllers:</b>	Selectable from 1 to 6 MFCs (expandable to 12).
<b>Vapour Source:</b>	Optional.
<b>Gas flow rates:</b>	Typical flow rates 1, 10, 100 ml/min (other configurations available upon request)
<b>Column capacity:</b>	From typical 50mg to 5 grams on standard columns; expandable.
<b>Columns:</b>	Typically, 1/4" standard columns, SS (other configurations available upon request)
<b>Column Temperature:</b>	Ambient temperature to 1050°C +/- 1°C for separations or preparation. Other temperature ranges available upon request.
<b>Pressure Range:</b>	Atmospheric to 30 bar.
<b>System Temperatures:</b>	All blend valves and flow tubing located inside a temperature controlled zone at up to 200°C, Stability +/- 1°C.
<b>Detectors:</b>	Column outlets can be conveniently sampled by a Mass Spectrometer, Infra-Red or other detectors. MKS Mass. Spec. options available with delivery.
<b>Base unit physical:</b>	79cm (H) 75cm (W) 58cm (D) and 120kg weight, or 31in (H) 30in (W) 23cm (D) and 265lbs weight
<b>Electrics:</b>	220 VAC standard, frequency 50/60 Hz.
<b>Environmental:</b>	Operates at 0°C to 40°C and up to 60% Humidity.
<b>Operation:</b>	PC control of all functions, touch screen.
<b>Data analysis:</b>	MicroActive software is included for reviewing the breakthrough curves and calculating quantities adsorbed. This platform also gives users the ability to enter their own data reduction routines via a Python interface.
<b>Compatibility:</b>	Works with MKS software, PID Effi software and Micromeritics MicroActive software on Windows 10 platforms and similar.



## Micromeritics Instrument Corporation

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To request a quote or additional product information, visit

[www.micromeritics.com](http://www.micromeritics.com)

Contact your local Micromeritics sales representative  
or our Customer Service Department at

**770-662-3636**