



# Model PSA-1000 Pressure Swing Adsorption R&D Testing System

The NEW Model PSA-1000 from L&C is the only commercially available dual-bed R&D testing apparatus for materials and process evaluations for gas separation studies. This Testing System is fully automated and provides innovative hardware and software for handling the most complex PSA studies with ease of operation, flexibility and safety.

The Model PSA-1000 is customizable to broad ranges of gas flow rate and adsorbate bed size to meet your specific requirements, comes with expert installation/training support and carries a one-year warranty.

This R&D Testing System offers L&C's unique hardware configuration and proprietary software which simplify all levels of gas separation evaluations. Automated testing is provided over wide ranges of gas flow, temperature, pressure and vacuum, enabling the researcher to effectively and efficiently explore the complex "experimental matrix" of PSA and VSA studies.

System design and materials of construction permit the evaluation of all types of gases and adsorbate materials for chemical, petrochemical, gas purification and energy-related applications in academic, industrial and government R&D laboratory settings.

## Features of the PSA-1000...

- Dual-bed configuration with bed dimensions up to 2" ID and 72" high... Based on application, adsorbate bed volume can range from 200cc to 3500cc
- Gas flow rates from 1liter/min to 800 liters/min depending on application
- Pressure range up to 1200psia (83 bars) with controlled vacuum testing down to .1 Torrs and general vacuum functions for desorbing of materials
- Experimental temperature range from 5°C to 60°C with fully automated drying cycles to 375°C
- Precision temperature and pressure/vacuum control provided by system's software
- Complete computer system provides all needed proprietary L&C software for broad range of PSA/VSA gas separation protocols
- Optional custom monitoring systems include gas chromatograph, mass spectrometer, etc



**PSA-1000 Bench-Top Testing Panel**  
with footprint 25-1/2" wide by 24" deep.

**Separate Bench-Top Control Cabinet**  
with 26-1/4" wide by 16-1/2" deep footprint

## Designed for all current PSA gas separation studies...

- Materials evaluations for activated carbons, zeolites, metal organic frameworks (MOFs), molecular sieve materials and more... especially effective for mixed-bed testing applications. Study the effects of adsorbate poisoning and simplify critical time-cycling studies
- The PSA-1000 is a complete, automated testing system for use in industrial, academic and government research facilities... delivering the highest levels of flexibility and ease of operation, while meeting the highest standards for pressure safety
- Because of its hardware design and computer software capabilities, the PSA-1000 is an excellent teaching and research tool within the university environment, such as in "unit operations laboratories"
- Provides an effective means for demonstrating and verifying computer models of PSA applications in the laboratory

## System/Components/Software Descriptions, Specifications and Schematic

### PSA-1000 System

- The PSA-1000 is a fully automated testing system providing dual-bed PSA configuration with complete temperature, pressure/vacuum and flow measurement/control. Bed vessels, manifolds, control valves, piping and connections are packaged within the system's bench-top testing panel with separate bench-top cabinet for controls.
- Vacuum system, re-circulating constant temperature bath and desk top computer are all provided as standard.
- Optional gas booster and other custom gas preparation components are available. Optional flow detection instruments, such as gas chromatograph, are also available.
- Up to 5 days of installation/training support are provided at no extra charge.

### Dual Beds

- High-pressure bed vessels up to 2" (5 cm) ID and up to 6' (1.5 m) length and bed volumes from 200 to 3500 cc. Vessels are rated for service at 1200psia (83 bars) and 300°C, are ASME stamped and meet applicable ASME Pressure Vessel Codes.
- Gas manifolds connect to beds via ½" VCO fittings. All tubing connections are VCO or Swagelock compression fittings. Material of construction is 316 s.s. throughout. Bed vessels are designed for easy changing of bed materials.

### Pressure/Vacuum

- Three absolute pressure transducers are provided with range of 1200psia (83 bars) and 0.04%FS accuracy.
- Bed pressure is controlled by system's computer via a PID controller-driven back-pressure regulator. Appropriate software and hardware-based pressure safety alarms and relief valves are included. For VSA work down to .1 Torr, vacuum system consists of a 5cfm rotary vane pump with Pirani gauge and digital display.

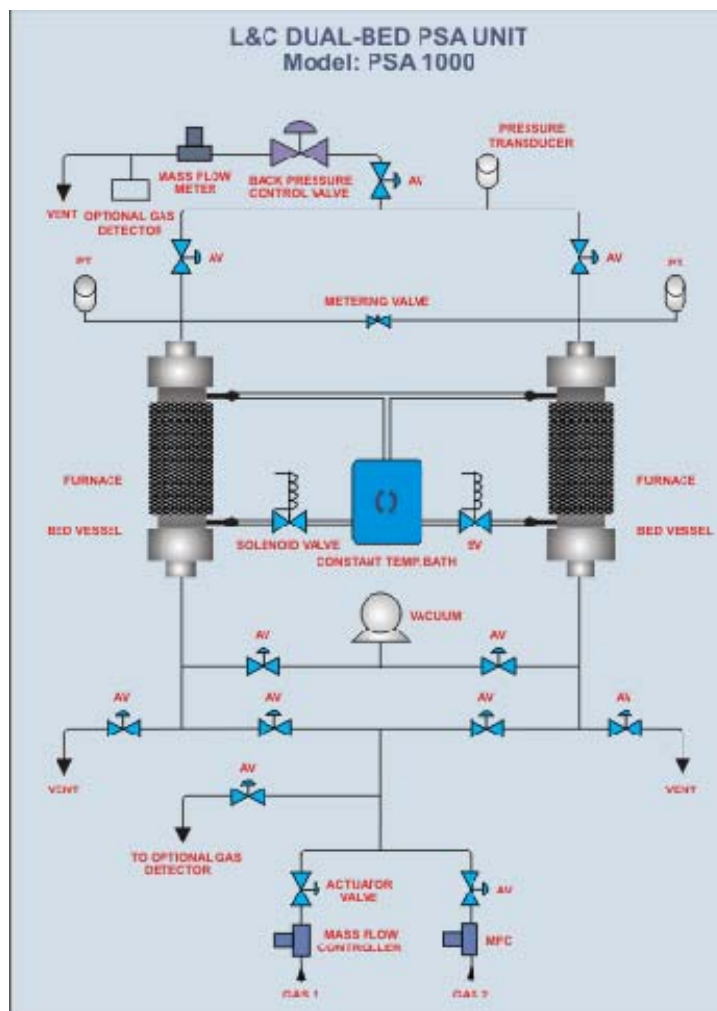
### Temperature

- Beds are heated/cooled by a re-circulating constant temperature bath for experimental temperatures of 5°C to typically 60°C and heated to 375°C for drying purposes.
- Bed temperature is controlled by system's computer via PID controllers. Appropriate software and hardware-based over-temp safety alarms are included.
- Bed temperature is measured via 5 Type K thermocouples mounted at equal intervals from feed gas entrance.

### Software

PSA-1000 System is fully computerized using National Instruments Lab View software. 16-bit USB data acquisition boards are provided for data acquisition and control. Primary software features are:

- Flexibility in defining pressurization, purge, pressure equalization and blow-down cycles.
- Control of temperature, pressure/vacuum and feed/purge flows within the adsorption beds.
- Data collection in Excel format at time intervals selected by user.
- On-line graphics for all experimental parameters with ability to change test parameters "on the fly".



For additional technical information, please email [sales@landcscience.com](mailto:sales@landcscience.com) or visit [www.landcscience.com](http://www.landcscience.com)  
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