



The NEW Model PSA-1000 bench-top Series

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

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**PSA-1000 Series
Pressure Swing
Adsorption
R&D Testing Systems**

PSA-1000 Series are customizable

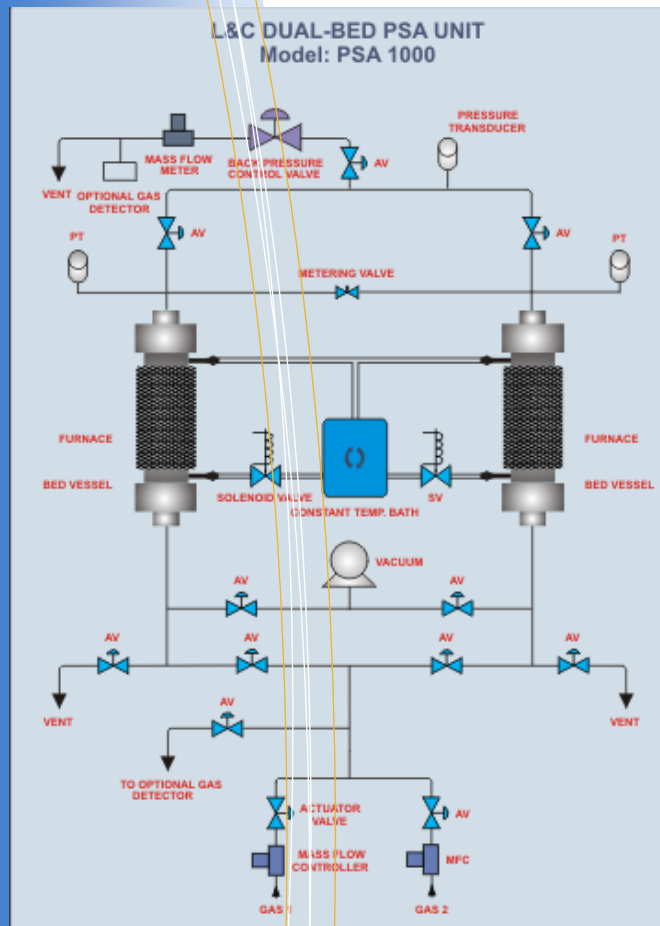
Within the PSA-1000 Series, systems are customizable to broad ranges of gas flow rate and adsorbate bed size to meet your specific requirements, come with expert installation/training support and carry a one-year warranty.

These R&D Testing Systems offer 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.

Customizable Design Features of the PSA-1000 Series

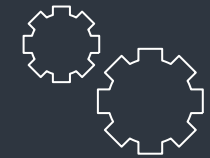
- Based on application, bed diameters are available. Bed diameter can range from 1" to 2" dia. to provide gas flow rate ranges down to 1 - 25 liters/min and up to 5 - 700 liters/min
- Based on application, various bed heights are available to provide required bed volume. Examples: Bed height as low 18" for a 1" diameter system provides approx. bed volume down to 150cc...while bed height of 72" for a 2" diameter provides approx. bed volume up to 3500cc



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
- Each PSA-1000 System is completely automated 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 Model 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

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CUSTOM SOLUTIONS
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PSA-1000

Dual Beds

- Based on application, the PSA-1000's high-pressure bed vessels can range in size from 1" diameter by 18" high for low bed volume applications up to 2" diameter by 72" high for higher volume requirements. 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 Torrs, 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 along bed center starting 1" from feed gas entrance



PSA-1000 CONTROL CABINET

- Each 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 detection instruments, such as gas chromatograph, are also available

- Up to 5 days of installation/training support are provided at no extra charge

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SOFTWARE

PSA-1000 Systems are 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 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"