Malvern Panalytical

# AccuSorp HP

## Performance under pressure

# More high-pressure adsorption data. Less pressure on your operators.

Traditional high-pressure adsorption analysis stifles productivity. Manual operation, long run times, and complex workflows slow your progress and introduce variability into your results. Researchers wait longer for publishable data. QC teams struggle to meet throughput targets. Operators remain tied to instruments instead of focusing on actionable insight.

## Unlock automated accuracy for high-pressure performance.

### AccuSorp™ HP delivers:

- **Process-relevant analysis** at pressures up to 200 bar
- **Publishable accuracy,** with ±0.04% full scale transducer accuracy and ±0.1% error at 100 bar
- **High-resolution results,** with kinetic data captured every 0.1 seconds
- **Maximum throughput** with parallel analysis and a separate degas unit
- **True walk-away automation,** even for long analyses
- Publication-ready excess and absolute isotherms generated automatically in **MicroActive software**
- **Certified safety** thanks to dual gas detectors and third-party verification

### AccuSorp HP is different.

Combining industry-leading accuracy with true unattended operation, dual-sample parallel analysis, and engineered-in safety, AccuSorp HP enables your lab to characterize materials at process-relevant pressures up to 200 bar - so you can analyze more, worry less, and trust every data point.


## Static gas adsorption analysis delivering publication-grade data.

## Process-relevant measurement.

## Walk-away automation.

## Total confidence in your results.



### $CO_2$ Capture

Measuring a material's $CO_2$ uptake is essential for carbon capture.

AccuSorp HP delivers high pressure adsorption/desorption isotherms, enabling sorbent comparison and cycle optimization.

### Coalbed methane and shale gas

AccuSorp HP measures methane capacity of porous geological samples at high pressure, capturing adsorption/desorption behavior and kinetics for reservoir modeling and resource estimation.

### Gas separation

Understanding gas separations, like alkenes from alkanes, $O_2$ from $N_2$, or $CO_2$ from a mixed gas stream, via porous materials requires adsorption data across gases and pressures.

AccuSorp HP collects single component isotherms, and MicroActive applies IAST to predict mixture behavior and selectivity.

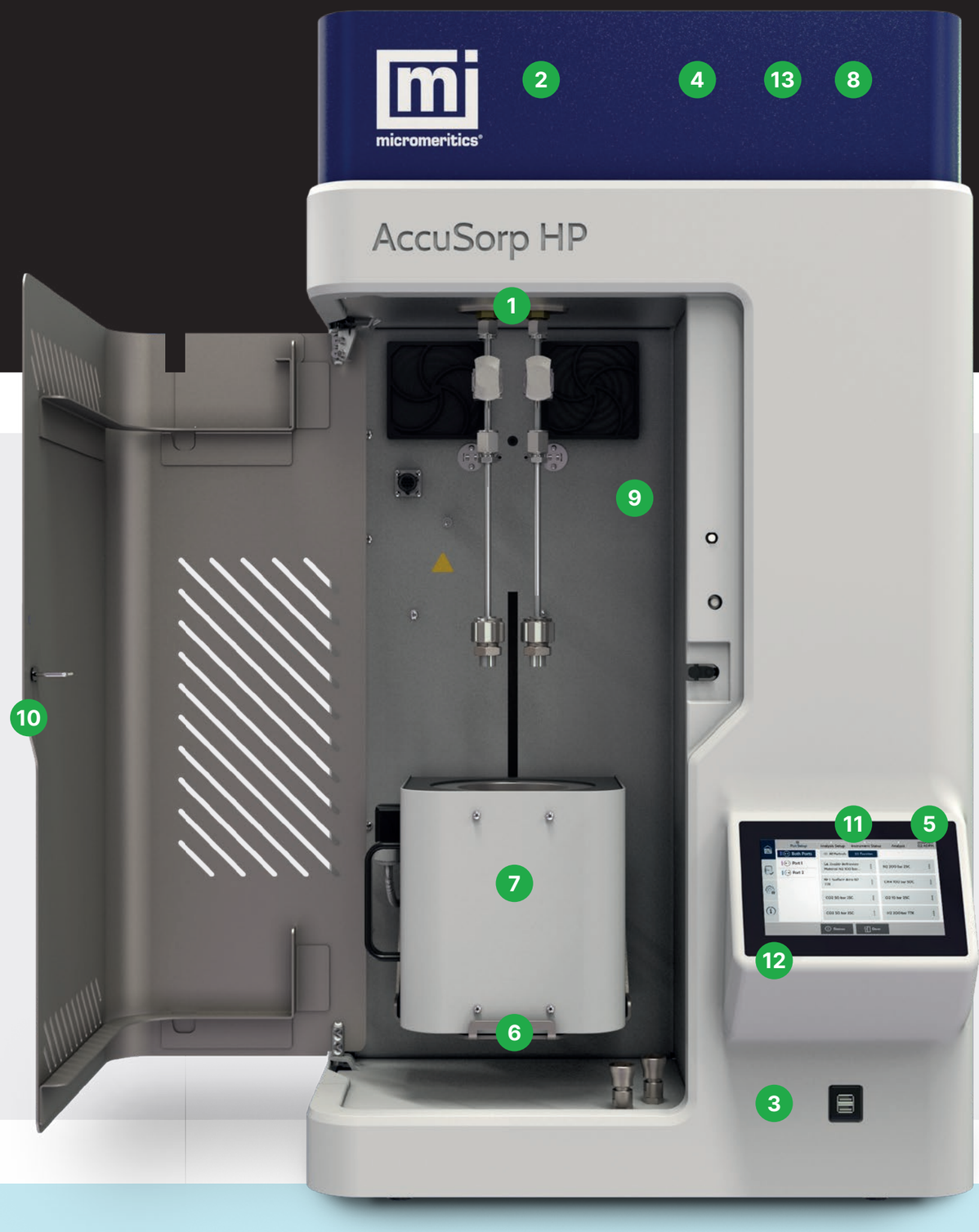
### Energy storage: Hydrogen, Natural gas, & Ammonia

Determining gas storage capacity of porous materials (MOFs, carbons, zeolites) is critical for energy systems.

AccuSorp HP analyzes these materials with $H_2$, $CH_4$, and $NH_3$, providing uptake plots and isotherms for performance evaluation.

# Engineered for **confidence** at every step

**Inside high-throughput, automated analysis on AccuSorp™ HP:**




1. Dual analysis ports for true parallel sample runs
2. High-accuracy transducers with ±0.04% full scale precision
3. Restrictor plates to prevent pressure overshoot, saving time and analysis gas
4. Precision manifold with ±0.02 °C temperature stability
5. Integrated touchscreen interface with stored methods
6. Automated elevator for dual free-space measurement
7. Interchangeable temperature control devices
8. Dual flammable gas detectors for continuous safety monitoring
9. Redundant mechanical relief valves for overpressure protection
10. Locking safety enclosure to prevent access during operation
11. Network connectivity for remote monitoring and control
12. Seamless integration with MicroActive software for data analysis
13. Servo-controlled valves for stable, repeatable pressure delivery

# High-pressure adsorption analysis for clean tech.

- Understanding how gases interact with porous materials is critical to developing the next generation of clean energy and industrial processes. From $CO_2$ capture sorbents to hydrogen storage materials and gas separation membranes, the performance of these materials depends on their adsorption behavior.
- Static volumetric gas adsorption measures how much gas a material adsorbs under controlled pressure and temperature conditions. By generating adsorption isotherms across a wide pressure range, researchers can evaluate storage capacity, adsorption kinetics, and gas selectivity.
- However, for many emerging clean technologies, low-pressure measurements are no longer enough.
- Materials must now be characterized at the pressures they will experience in real deployment, without the inaccuracies that often arise from high-pressure measurements.
- AccuSorp HP is designed for high-pressure adsorption applications where accuracy, reliability, and throughput are critical.

# AccuSorp™ HP

## Next-generation static gas adsorption analysis

### Accuracy you can publish

- ±0.04% full scale transducer accuracy
- Blank tube tests confirm ±0.1% error at 100 bar
- Manifold temperature stable within ±0.02 °C
- Kinetic data captured every 0.1 seconds

### Throughput that keeps you on target

- Dual analysis ports for parallel sample runs
- Separate degas preparation to reduce downtime and contamination risk
- Automated steps that eliminate mid-run interruptions - helping labs meet throughput targets with confidence

### True walk-away automation

- Automated elevator for dual free-space measurement
- Dual servo valves achieve target manifold pressures within <1%
- Touchscreen-driven stored methods that keep analyses running reliably
- Restrictor plates prevent pressure overshoot, saving time and analysis gas
- From start to finish without the need for operator supervision



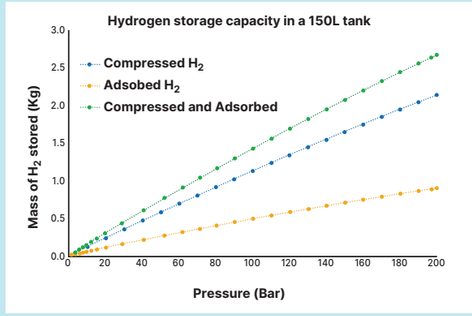

# Applications

## $CO_2$ capture

Evaluating how much carbon dioxide a material can adsorb and release is key to developing efficient carbon capture systems. AccuSorp HP generates high-pressure $CO_2$ adsorption and desorption isotherms at process-relevant conditions, providing the data needed to compare sorbent candidates and optimize cycle design.

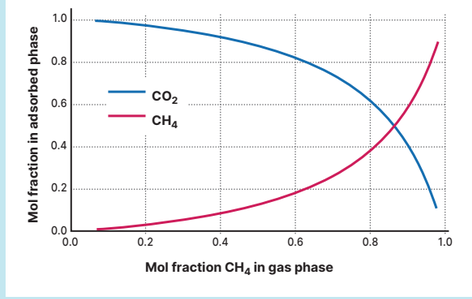

## Energy storage: hydrogen, natural gas, & ammonia

Determining the gas storage capacity of porous materials, including metal-organic frameworks (MOFs), activated carbons, and zeolites, is essential for next-generation energy storage system design. AccuSorp HP characterizes hydrogen, methane, and ammonia adsorption at elevated pressures, generating the weight-percent uptake plots and full isotherms for evaluating storage performance.



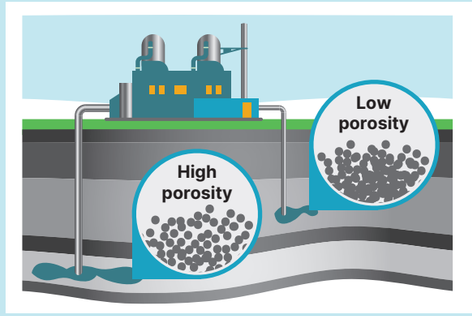

## Gas separation

Understanding how selectively a porous material separates one gas from another, such as alkenes from alkanes, $O_2$ from $N_2$, or $CO_2$ from a mixed gas stream, requires adsorption data across a range of pressures and gases. AccuSorp HP high-pressure gas adsorption measurements enable the collection of single-component isotherms independently for each gas. These isotherms are then used to calculate separation selectivity using IAST (Ideal Adsorbed Solution Theory). MicroActive software has this calculation and reporting workflow built in, predicting mixture adsorption behavior.




## Coalbed methane and shale gas

Porous geological samples can be analyzed with AccuSorp HP to determine their methane capacity at high pressures, characterizing the adsorption and desorption behavior of underground formations. Kinetic data from these experiments reveal the rate of methane adsorption and desorption at specific pressures and temperatures, which is directly relevant to reservoir modelling and resource estimation.



# Process-relevant performance

AccuSorp™ HP characterizes your materials at operating pressures up to 200 bar, so your lab data can help predict real process performance. Make data-backed decisions to optimize processes across applications such as gas storage, separation, carbon capture, and more. Make decisions based on real-world behavior, from R&D to QC.

## Flexible temperature control

AccuSorp HP supports multiple interchangeable temperature-control configurations, enabling adsorption measurements across a wide range of experimental conditions

### Iso controller

Precise isothermal control (±0.1°C) for demanding adsorption experiments between -5°C and 105°C, without an external liquid bath.

### Furnace

Perform high-temperature adsorption measurements up to 500°C with a stability of ±0.1°C.

### Refrigerated/heated recirculating vessel

Stable temperature control for sub-ambient and elevated-temperature adsorption studies.

### Dewar for liquid cryogens

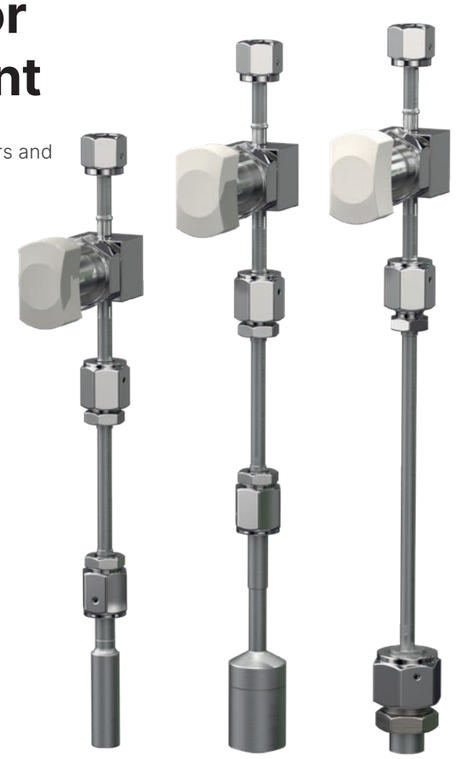
Supports cryogenic analyses using liquid nitrogen or other cryogens.



# Risk-free operation for worry-free deployment

Stringent safety features ensure peace of mind for operators and procurement professionals, even when operating remotely.

**Designed for safety. Trusted for performance.**



## Designed for safety. Trusted for performance.

### Dual flammable gas detectors

Automatically shut down the system and vent to safe pressure when 10k ppm is detected, well below the LEL of $H_2$ and light hydrocarbons

### Locking mechanical door

Prevents operator from touching hot or cold temperature control devices

### Two mechanical relief valves

Protects the high pressure and low pressure manifolds from overpressurization

### Certified safe for global deployment

Third-party CE declaration and ETL Mark (NRTL) conforms to Pressure Equipment Directive (PED) 61010-1

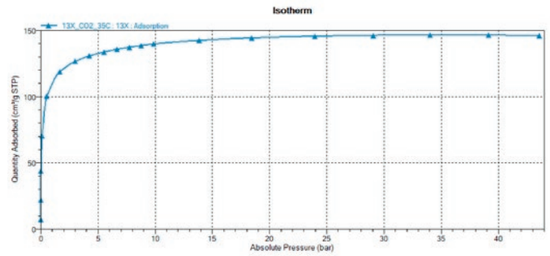
## Smart software. Seamless decision-making.

Our intuitive MicroActive software generates publication-grade excess and absolute isotherms without manual post-processing. Spend less time reducing data and more time acting on it.

Advanced visualization and reporting tools simplify interpretation and accelerate decision-making across both R&D and QC workflows.

MicroActive generates a comprehensive selection of outputs:

- Excess and absolute isotherms
- Rate of adsorption and desorption kinetics
- Weight percentage uptake
- Isosteric heats of adsorption
- IAST selectivity calculations
- Customizable reports and data exporting



# Application support

As a Malvern Panalytical company, Micromeritics provides the global training, service, and support you need to continuously drive your analytical processes at the highest level. We help you increase the return on your investment, and ensure that as your analytical requirements grow, we're there to support you. Our worldwide team of specialists adds value to your business processes by ensuring applications expertise, rapid response, and maximum instrument uptime.

- Expert, lifetime applications support for Micromeritics customers.
- Free training courses, application notes, and how-to videos available on www.micromeritics.com
- Application-specific, hands-on training available in Micromeritics USA, Germany, Korea, and China facilities
- Collaborations with industrial and academic partners to continually improve the quality of measurements and interpretation of material characterization data

# Service support

**Customer service is at the heart of what we do, with over 10,000 installations during the past 60 years.**

## ISO-9001 certified services

- 1 year parts and labor warranty
- Maximized uptime
- Well-trained users
- Preventative maintenance
- Reduced cost of ownership
- Predictable, easy-to-budget-for expenses with protection from unexpected operating costs

Micromeritics offers a full range of instrument installation, preventive maintenance, and repair services to support instruments through their full life cycle. On-site and factory services are provided through our global network of factory-trained and certified service engineers.



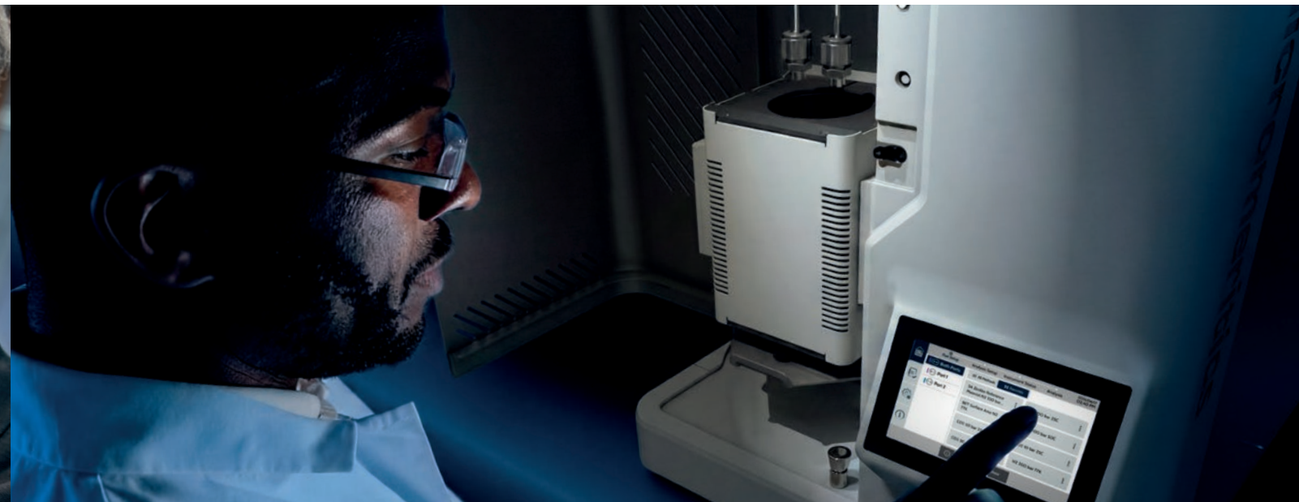
# Specifications

| | |
|---|---|
| **Analysis range** | 0.00013 to 200 bar |
| **Transducer accuracy** | 200 bar ±0.04% FS<br>1 bar ±0.1% FS |
| **Sample ports** | 2 |
| **Gas inlets** | 3 |
| **Pressure Relief Valves** | 2, set at 2.5 bar & 207 bar |
| **Hydrogen Sensors** | 2, triggered at 1% concentration |
| **Dosing and evacuation control** | Two Servo Valves within <1% of target |
| **Compatible gases** | $H_2$, $CO_2$, $CH_4$, $N_2$, He, Ar, $C_2H_6$, $C_2H_4$, $C_3H_8$, $C_3H_6$, $NH_3$, and $O_2$* |
| **Manifold temperature** | 30-50 °C ±0.02 °C |
| **Sample temperature** | 80-500 °C ±0.1 °C Furnace<br>-5-105 °C ±0.1 °C Iso Controller |
| **Regulatory** | RoHS and REACH Compliant<br>EMC compliance to FCC, CISPR 11, ICES, IEC 61326-1, UL and EN standards<br>CSA C22.2#61010-1-12<br>IEC 61010-1; IEC 61010-2 |

*For safety $O_2$ is limited to 10 Bar and requires dry pump

| | |
|---|---|
| **Dimensions** | 104 cm Height<br>60 cm Width<br>70 cm Depth |
| **Weight** | 60 Kg |
| **Power requirements** | 100-240VAC, 50/60Hz, 500VA |
| **Sample chambers** | 10cc 1/4" Opening<br>2cc 1/4" Opening<br>2cc 1/2" Opening |

**Get more from your lab with the powerful combination of Micromeritics and Malvern Panalytical.**



# About Malvern Panalytical

Malvern Panalytical, Micromeritics and SciAps; a powerful and highly complementary combination of market leading technologies.

We are the toolmakers for the world's most innovative companies, academic institutions, and government laboratories. Customers see the difference when they use our instruments and feel the difference when they deal with our people.

Malvern Panalytical instruments analyze the chemical, physical and structural nature of materials, from proteins to polymers and semiconductors to minerals. Our leading technologies measure particle size, shape, concentration and zeta potential, biomolecular interactions and stability, elemental concentrations and crystallographic structure.

As a powerful combination our customers have access to technology leadership and an unwavering commitment to customer support with a 1:1 ratio of sales to applications engineers, our customers' analysis is our priority – global expertise with local support tailored to their needs and access to an extended product portfolio.

With Micromeritics, customers can also measure surface area, porosity, density, adsorption and particle activity. With SciAps, our Center of Excellence for handheld instruments, customers can also access portable X-ray fluorescence (XRF), laser-based (LIBS), and near-infrared (NIR) analyzers to measure any element in any environment.

We have a global footprint with R&D and manufacturing sites in North America, Europe, and Asia. We are more than 2,500 employees in a customer-focused organization with sales and service offices in 20 countries, all committed to delivering expert and responsive customer support.

# Service & Support

Malvern Panalytical provides the global training, service and support you need to continuously drive your analytical processes at the highest level. We help you increase the return on your investment, and ensure that as your analytical requirements grow, we're there to support you.

Our worldwide team of specialists adds value to your business processes by ensuring applications expertise, rapid response, and maximum instrument uptime.

- Proactive local and remote support
- Full and flexible range of service agreements
- Compliance and validation support
- Onsite or classroom-based training courses
- e-Learning training courses and web seminars
- Digital services, including MyStore and My Customer Support Portal
- Sample analysis, method development, and applications consultancy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