

# AMI-Micro 200 Series

## BET Surface Area and Pore Size Analyzer

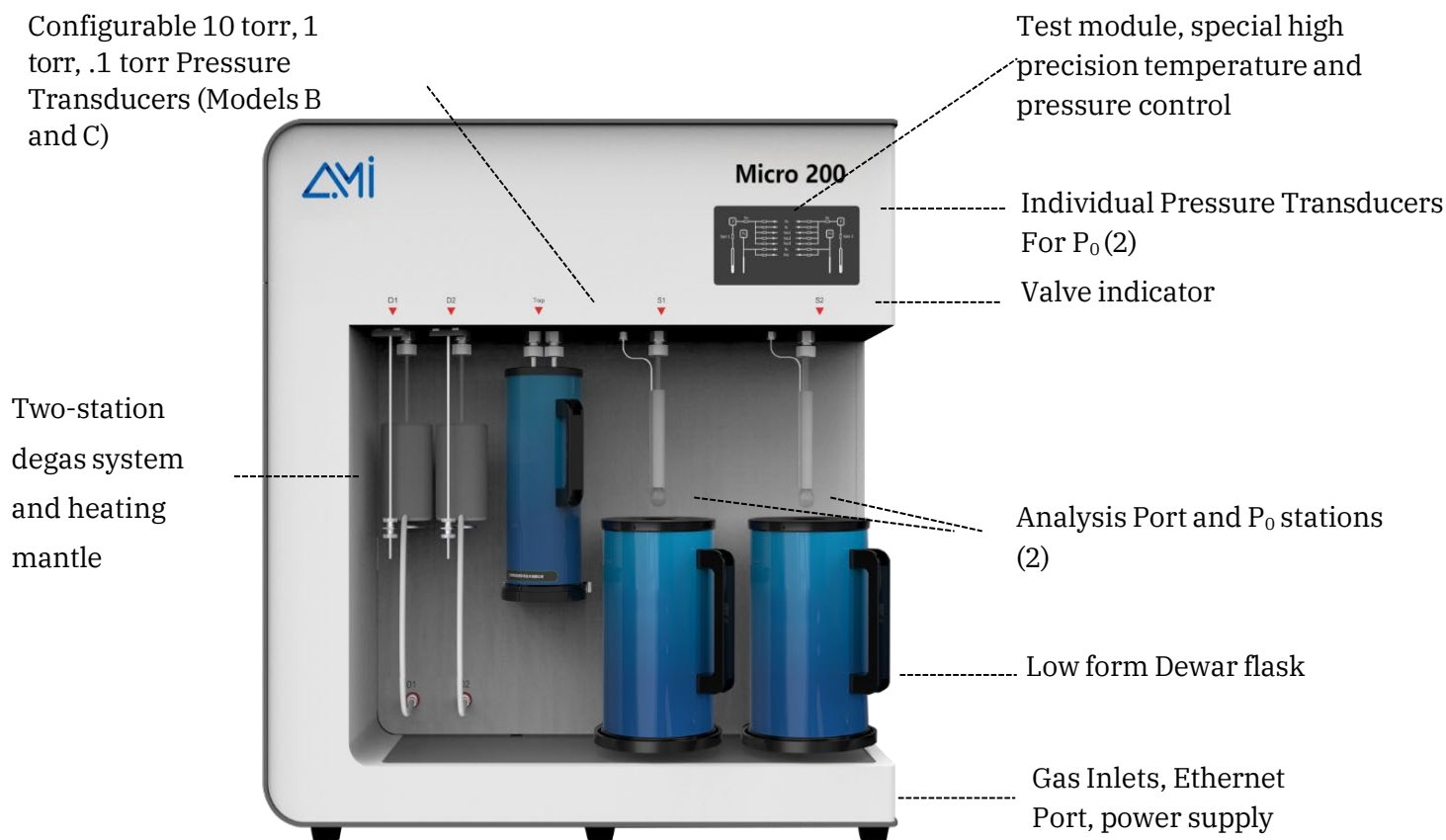
### INTRODUCTION

*"Accurate, Accessible, Advanced Gas Sorption"*

The **AMI-Micro 200 Series** is a high-precision physisorption instrument designed for the accurate determination of specific surface area and pore size distribution in a wide range of materials. The series is available in three distinct models—A, B, and C—each offering specialized capabilities to accommodate various analytical requirements (refer to the specification table for further details).

The Micro 200 B and C models can be equipped with high-sensitivity 10 torr or 1 torr pressure transducers (with an optional 0.1 torr configuration) and a turbo molecular pump achieving an ultimate pressure of  $10^{-8}$  Pa, ensuring exceptional accuracy in the characterization of microporous structures. Furthermore, all analysis stations incorporate in-situ sample preparation, effectively minimizing contamination and enhancing measurement reliability.

Engineered for advanced materials research, the **AMI-Micro 200 Series** is particularly well-suited for the characterization of microporous materials, including metal-organic frameworks (MOFs), molecular sieves, catalysts, activated carbon, and other porous substances, providing precise and reproducible gas adsorption analysis.



*Instrument Structural Layout of AMI-Micro 200 Series*

## FEATURES

### Module Design for Minimal Dead Volume

The internal gas path design of the instrument adopts a unique integrated metal module design, which not only reduces the internal dead volume space but also lowers the system leakage rate.

### Saturated Vapor Pressure $P_0$

An independent  $P_0$  pressure transducer is configured at 133 kPa for  $P_0$  value testing, enabling real-time  $P/P_0$  measurement for more accurate and reliable test data. Alternatively, an atmospheric pressure input method can be used to determine  $P_0$ .

p0 *	103.94	kPa	<input type="checkbox"/> Auto
p/p0 max *	0.99		

### Independent analysis ports

With independent analysis ports, the system employs a unique vacuum control logic that allows each station to operate without disruption, even when using a single mechanical pump or pump group. This enables simultaneous, independent experiments, meeting diverse adsorbent testing needs while ensuring high efficiency.

### High-Precision Micropore Distribution Analysis (Micro 200 B and C)

Utilizes advanced micropore models, including the Horvath-Kawazoe (HK) and Saito-Foley (SF) methods, to accurately determine pore size distribution. Ensures an aperture deviation of less than 0.02 nm, providing precise characterization of microporous materials in gas adsorption studies.

### Thermal Stabilization

A core rod in the sample tube reduces dead volume and stabilizes the cold free space coefficient, while an iso-thermal jacket maintains a constant thermal profile along the tube. Additionally, automatic helium correction ensures precise calibration for any powder or particulate material, minimizing temperature-related deviations during analysis.

### Customizable Selection of Pressure Transducers

Depending on the model, the **AMI-Micro 200 Series** offers various quantities and types of pressure transducers. Among them, the Micro 200 C, equipped with a 1 Torr transducer (selectable 0.1 Torr), enables a partial pressure ( $P/P_0$ ) of up to  $10^{-8}$  ( $N_2/77$  K) in physical adsorption analysis.



### Optimized Manifold Contamination Control

This system features a multi-channel, adjustable, and parallel vacuum design with segmented vacuum control. This setup effectively prevents samples from being drawn up into the analyzer therefore preventing manifold contamination.

### Turbo Molecular Pump

A Turbo Molecular pump is included on the Micro Micro 200C. Achieving ultimate pressures of  $10^{-8}$  Pa, this system ensures a solid foundation for precise micropore analysis at ultra-low pressures.

### Multiple Degassing Stations for Sample Preparation

Equipped with two (2) integrated degassing ports and two (2) in-situ degassing ports. Each port offers independent temperature control from ambient to 400°C (Optional: RT-500°C), ensuring precise sample preparation. In-situ degassing enhances microporous material analysis by providing superior efficiency over ex-situ methods.



## TYPICAL ANALYSIS RESULTS

- The specific surface area test results for iron ore powder are shown in the figure below. As a material with an inherently low specific surface area, the repeatability error in the measurements is only 0.0015 m<sup>2</sup>/g, demonstrating high testing precision.

ID	Pd	Pcd	P/Po	V	R	Time
2	10.57665	6.49165	0.06368	0.05149	1.32095	16:39:04
3	14.47043	10.49325	0.10300	0.05714	2.00944	16:40:34
4	20.49214	15.55271	0.15266	0.06328	2.84716	16:42:08
5	26.25142	20.97835	0.20608	0.06958	3.73044	16:43:45
6	31.09524	26.11512	0.25661	0.07540	4.57787	16:45:24
7	36.24625	31.26206	0.30719	0.08122	5.45905	16:47:06

Slope	Intercept	V <sub>m</sub>	C	C <sub>c</sub>
16.90313	0.25562	0.05828	67.12578	0.99997

Specific surface area (m<sup>2</sup>/g): 0.25410

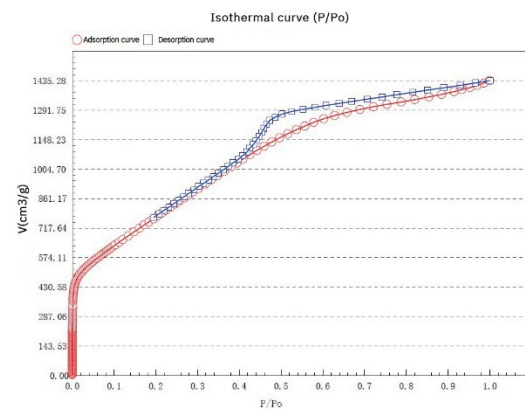
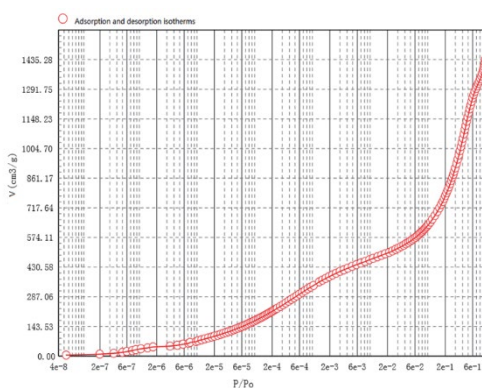
ID	Pd	Pcd	P/Po	V	R	Time
2	11.12797	7.02669	0.06872	0.05193	1.42099	14:21:24
3	15.08480	11.06897	0.10834	0.05767	2.10708	14:22:55
4	21.71276	16.45800	0.16109	0.06420	2.99078	14:24:29
5	27.29098	21.94468	0.21492	0.07083	3.86529	14:26:07
6	32.00053	27.05703	0.26512	0.07653	4.71376	14:27:46
7	37.32853	32.26907	0.31619	0.08262	5.59644	14:29:28

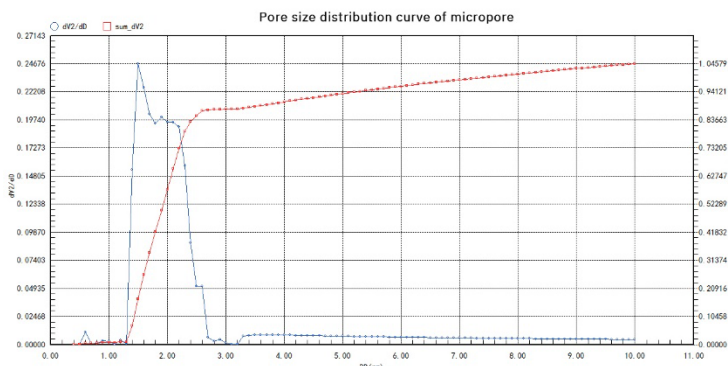
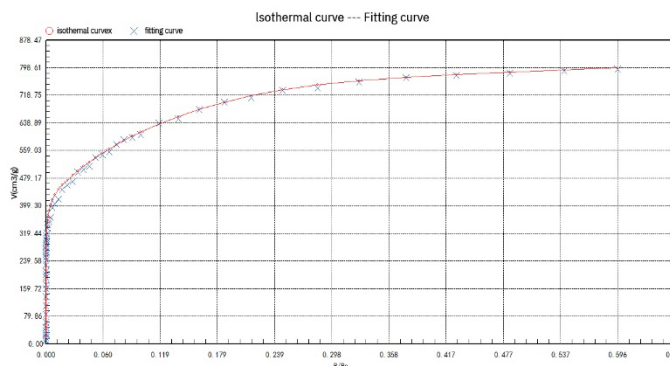
Slope	Intercept	V <sub>m</sub>	C	C <sub>c</sub>
16.78425	0.27576	0.05862	61.86487	0.99996

Specific surface area (m<sup>2</sup>/g): 0.25557

- Adsorption and Desorption Isotherms of typical macro/mesoporous materials - silica



- Analysis of pore size distribution of activated carbon materials by NLDFT.



## SPECIFICATIONS

Model		Micro 200		
Specific Model		200A	200B	200C
Analysis Ports		2	2	2
P <sub>0</sub> Transducer		2	2	2
Analysis Pressure Transducer		2	4	6
Pressure Transducers Configuration	Port 1	1000 torr	1000 torr, 10 torr	1000 torr, 10 torr, 1(0.1) torr
	Port 2	1000 torr	1000 torr; 1000 torr, 10 torr (Optional)	1000 torr, 10 torr, 1(0.1) torr
Pressure Transducer Accuracy and Resolution		Accuracy: 0.05% F.S., Resolution: 0.0005% F.S.	1000 torr - Accuracy: 0.05% F.S., Resolution: 0.0005% F.S. 10 torr/ 1 torr -Accuracy: 0.2% RDG, Resolution: 0.003% F.S. 0.1 torr -Accuracy: 0.5% RDG, Resolution: 0.003% F.S.	
Pump		2 mechanical pumps (ultimate vacuum 10 <sup>-1</sup> Pa; minimal 7.5 x 10 <sup>-4</sup> torr): 1 analysis, 1 degas	2 mechanical pumps (ultimate vacuum 10 <sup>-1</sup> Pa; minimal 7.5 x 10 <sup>-4</sup> torr): 1 analysis, 1 degas 1 turbo molecular pump (ultimate vacuum 10 <sup>-8</sup> Pa; minimal 7.5 x 10 <sup>-11</sup> torr )	
P/P <sub>0</sub> Range		10 <sup>-4</sup> - 0.998	10 <sup>-6</sup> - 0.998	10 <sup>-8</sup> - 0.998
Specific Surface Area		≥ 0.01 m²/g, test repeatability: RSD ≤ ±1.0%	N <sub>2</sub> : 0.01 m²/g to upper limit; Kr: 0.0005 m²/g to upper limit. Test repeatability: RSD ≤ ±1.0%	
Pore Size Range		.35*-500 nm, test repeatability: ≤ ±0.02 nm (*Achieved with CO2)	.35*-500 nm, test repeatability: ≤ ±0.02 nm (*Achieved with CO2) .7 -500 nm, test repeatability: ≤ ±0.02 nm , N <sub>2</sub> Adsorption	0.35-500 nm, test repeatability: ≤ ±0.02 nm
Pore Volume		≥ 0.0001 cm³/g		
Degassing Ports		2 in-situ; 2 ex-situ;		
Adsorbates		N <sub>2</sub> , CO <sub>2</sub> , Ar, H <sub>2</sub> , O <sub>2</sub> , CO, CH <sub>4</sub> , etc.	N <sub>2</sub> , CO <sub>2</sub> , Ar, Kr, H <sub>2</sub> , O <sub>2</sub> , CO, CH <sub>4</sub> , etc.	
Cold Trap		2		
Dimensions and Weight		L 36.0 in (915 mm) × W 22.4 in (570 mm) × H 36.0 in (915 mm), 261.8 lbs (119 kg)		
Power Requirements		110V or 200-240 VAC, 50/60 Hz, maximum power 300 W		



## ABOUT US

Advanced Measurement Instruments (AMI), consisting of Altamira Instruments, Rubolab, ISI, and JWGB, offers a comprehensive portfolio of solutions for all your material characterization needs. As a global and diversified company, we have many years of professional experience, and our mission is to empower scientists and researchers around the world in the field of materials science by providing cutting-edge analytical instruments. We are committed to providing high-quality, user-friendly, cost-effective products and services to ensure that customers get the best solutions in research and industrial applications.

## Innovation Within Reach



## MISSION

At AMI, our mission is to advance the world of materials characterization by providing cutting-edge analytical instruments that empower customers in commercial and research fields.