Anton Paar

Surface Area and Pore Size Analyzers

Nova Series

Nova.
Experience Velocity.

NEXT GENERATION

Specific surface area and pore characteristics greatly influence a material's suitability and performance in real-world applications.

For far too long, analysts have had to make a choice between speed of analysis and precision. Not anymore.

With Nova, speed of analysis and precision are no longer an either-or choice.

Experience velocity the Nova way: speed vectored at precision.

→ 5-Point BET analysis on four samples in as little as 20 minutes with <2 % reproducibility

→ 4 x 40 point mesopore runs in under eight hours

→ Simultaneous degassing of four samples during analysis

Completely redesigned from the inside out, the Nova series sets the new benchmark in surface area and pore characterization.

Behind the familiar touchscreen lies a new, more robust design, which includes a vacuum brazed manifold and stainless steel tubing throughout. Combined with the new valves and electronic components, this enhances the vacuum and measurement performance.

The Nova truly represents the next generation of surface area and pore analyzers.

Next generation.
Familiar yet new.

Operational simplicity.
From start to finish.

Velocity. Speed and precision.
Have both.

Adaptability. Perform today.
Prepare for tomorrow.

Nova 600 BET

Nova 800 BET

Nova 600

Nova 800

Simplicity.
From Start to Finish.

OPERATIONAL SIMPLICITY

Degas your samples
Four integrated degassing stations and configurable software-controlled heating routines enable simple, “select and go” sample preparation while ensuring full traceability of sample preparation.

Choose your method
Take the guesswork out of conformance to recognized standards (such as ASTM, ISO, and USP) by utilizing Nova’s extensive library of built-in analysis profiles developed by our in-house application experts, or rely on intelligent dosing algorithms to create your own custom analysis profiles.

Analyze with velocity
See the status of your analysis at a glance with the updated, high-definition 10-inch graphical touchscreen, which broadcasts progress step by step in real time. The integrated touchscreen lets you easily access displays of the full isotherm, the BET plot, and the calculated surface area.

Report with ease
Avoid complicated data processing – go from result to report in no time. For more detailed reporting, tap into Nova’s rich library of report templates and extensive data reduction capabilities.

- ✓ Vacuum and flow degassing capabilities at temperatures up to 425 °C
- ✓ 20 built-in analysis profiles developed to facilitate compliance with recognized standards (ASTM, ISO, USP)
- ✓ PowderProtect: Intelligent sample cell evacuation reduces risk of fine powder elutriation during degassing and analysis
- ✓ Service dashboard tracks instrument and key component usage enabling predictive maintenance
- ✓ Eliminate the clutter, cost, and complexity of external degassing devices
- ✓ Intelligent dosing algorithms simplify creation of analysis profiles
- ✓ Four instruments can be controlled remotely from a single computer using either version of Kaomi for Nova software
- ✓ Backed by a 3-year warranty and extensive Anton Paar global support network

Speed and Precision.
Have Both.

VELOCITY

Maximize your throughput
Analyze four samples for 5-point BET surface area analysis in as little as 20 minutes and four complete isotherms in under eight hours.

The Power of 4 + 4
The Nova 800 is equipped with four degas and four analysis stations that operate at the same time. Analyze up to four samples while simultaneously preparing the next batch of four samples – efficiency, the Nova way.

Speed up with NOVA mode
Reduce analysis time significantly using NOVA mode. This patented feature saves time at the start of every analysis by using stored sample cell void volumes instead of void volume measurement. In addition, NOVA mode enables helium-free operation.

Optimize analyses with dosing algorithmus
Take advantage of Nova's unique DoseWizard and VectorDose intelligent dosing algorithms to increase the velocity of your measurements.

Best-in-class precision
Even with an absolute surface area as low as 2 m^2 in the cell, obtain reproducibility better than 2 %.

TruZone – Active coolant level control
Increase analysis sensitivity with the exclusive TruZone active coolant level system. This unique feature constantly maintains the cryogen level to encompass only the portion of the cell containing the sample. The smaller "cold zone" minimizes non-adsorbed gas molecules in the void space of the sample cell, allowing the instrument to more easily detect those molecules that are adsorbed.

Exceptional pressure measurement accuracy
Nova uses high accuracy transducers combined with state-of-the-art electronics and vacuum systems to deliver exceptional pressure measurement accuracy of better than 0.1 % (of full scale).

Dedicated P_0 cell and transducer
Each Nova instrument incorporates a dedicated P_0 cell and transducer, eliminating the need to allocate an analysis station to measure the P_0. The instrument can constantly monitor the saturation pressure over the course of a measurement to provide more accurate relative pressure readings, yielding precise and reproducible isotherms.

Perform Today. Prepare for Tomorrow.

ADAPTABILITY

	Nova 600 BET	Nova 800 BET	Nova 600	Nova 800
	↓	↓	↓	↓
Results	Surface area (BET, NSA, STSA, and Langmuir)	Surface area (BET, NSA, STSA, and Langmuir)	Surface area (BET, NSA, STSA, and Langmuir) Pore size (BJH, DFT) Pore volume	Surface area (BET, NSA, STSA, and Langmuir) Pore size (BJH, DFT) Pore volume
Analysis stations	2	4	2	4
Degas stations	4	4	4	4
Design features	- Hardware optimized for rapid analyses - Software further simplified by removing pore size data collection and reduction options	- Same analysis capabilities as the Nova 600 - Highest sample throughput	- Traditional long cells and large, 2-liter dewar allow for detailed pore size analyses - Flexible software and advanced data reduction models for both basic and comprehensive analyses - Moderate sample throughput	- Same analysis capabilities as the Nova 600 - Highest sample throughput

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Satisfy your analysis demands now and in the future
Whether used for quality control or research, in industry or by academics, for quick BET analysis or comprehensive isotherms, there's a Nova model fit for your needs – and ready for tomorrow.

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Conserve helium
The patented NOVA mode – a unique, sustainable analysis method to determine the sample cell's void volume – eliminates the need to use this scarce, non-renewable resource.

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Nova evolves with you
Upgrade your Nova's materials characterization capabilities if your needs change. The Anton Paar global support network makes it simple to go from BET-only to more in-depth exploration capabilities for pore size and volume.

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Micro and mesopore size distribution for carbon-based materials
The recirculating dewar kit, combined with a recirculating bath, extends the analysis temperature range from -20 °C to +150 °C. This kit allows for CO_2 adsorption studies at 0 °C, which provides a full micropore characterization for carbonaceous materials at a fraction of the cost of a dedicated micropore analyzer.

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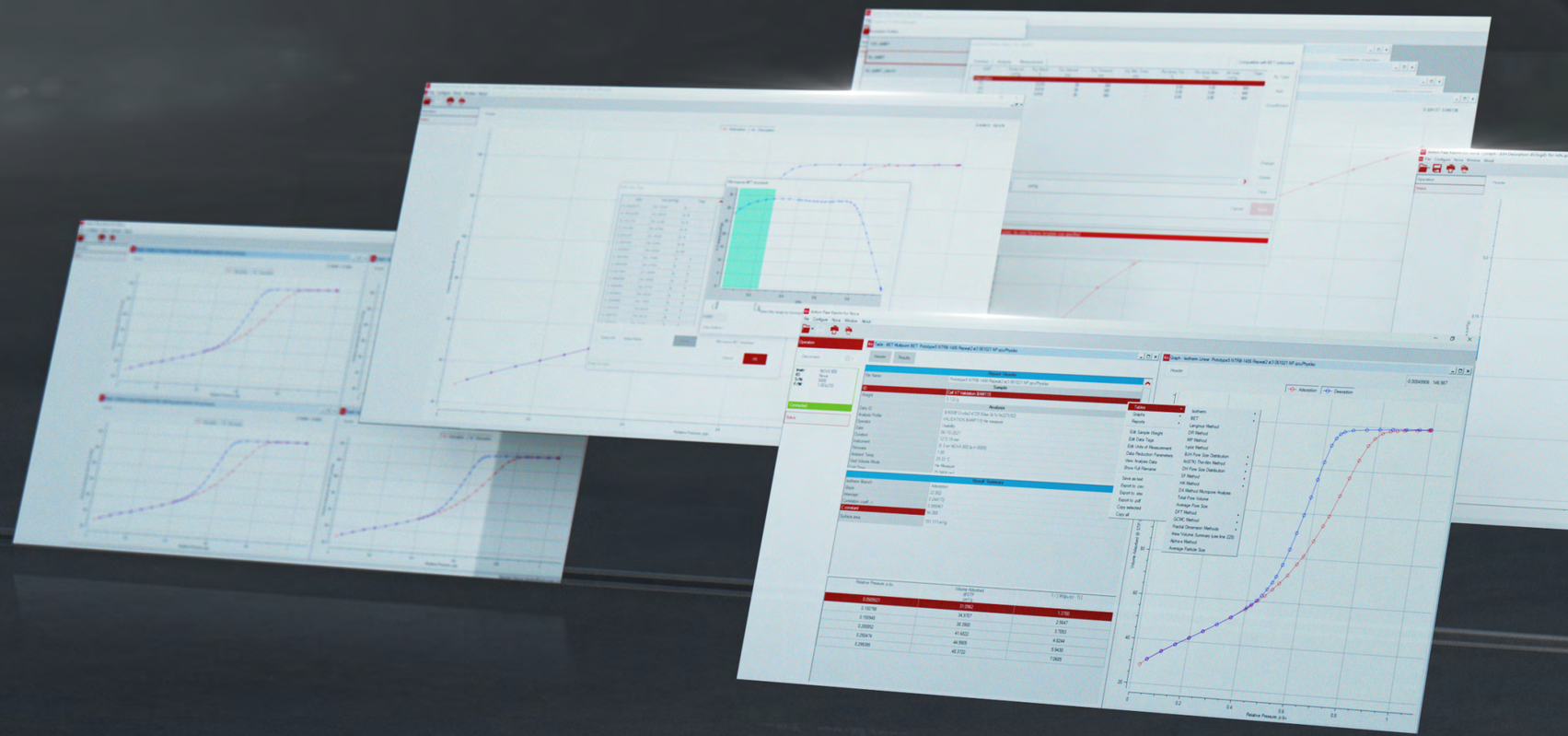
Get ready for high throughput
With up to four analysis and four integrated degassing stations, enhance your sample throughput – whether it's cathode or anode materials.

Kaomi for Nova.
Seamless Software.

The all-in-one package



Kaomi for Nova is a powerful, multifaceted software that combines instrument control and data processing capabilities and is ideal for both QC and R&D.
The intuitive software works in concert with the touchscreen interface, letting you set up and perform analyses as well as easily process, report, and store experimental data.

Also available in a 21 CFR Part 11-compliant version with user management, audit trail, customizable reporting, and electronic signature capabilities for enhanced data integrity.

Built-in standardized methods and reports
20+ included, consisting of ASTM, ISO, DIN, and USP standards as well as methods specific for properties of interest.

Multiple dosing methods
Traditional targeted pressure ensures data points are collected as per user required definitions.

→ VectorDose provides control over dose volumes to ensure resolution in pore filling regions (can be used in combination with traditional targeted pressure methods).

→ DoseWizard delivers exceptional analysis speeds when similar samples are analyzed repeatedly.

Comprehensive pore analysis
Ability to merge carbon dioxide and nitrogen pore size data for complete pore spectra on carbonaceous samples. Classical methods such as BJH, DH, MP & DA. Simulation methods based in density functional theory such as NLDFT & QSDFT.

Micropore BET Assistant
Quickly and easily identifies and applies the appropriate relative pressure points for microporous samples based on IUPAC recommendations.

With this versatile software, you can:

- ✓ Connect to and control up to four Nova instruments
- ✓ Develop, save, and reuse degassing and analysis profiles customized to your materials and processes
- ✓ Check the status of the connected instruments and see analysis progress in real time
- ✓ Display program information in any of six languages
- ✓ Set up reports with tabular or graphical data, or both – print, save as .pdf, or export via common file formats such as .csv or .xlsx
- ✓ Import legacy data files from any Quantachrome gas sorption instrument
- ✓ Qualify your instrument 3x faster with pharma qualification packages (PQP)
- ✓ Comply fully with the US FDA's 21 CFR Part 11 with a comprehensive pharma qualification package (PQP)

Versatility across Industries

1 Carbon
Various types of carbon, from carbon black to activated carbon and graphite, are increasingly used in batteries, catalysts, sorbents, rubber, and pigments. Carbons exhibit a wide range of surface areas and pores, which alter their behavior and suitability in diverse applications, and require monitoring to ensure optimal performance.

2 Pharmaceuticals
Analyzing surface area and pore size of all types of pharmaceutical powders – from active ingredients (APIs) to excipients – is imperative for quality and regulatory purposes and for development of new solid dose forms. Enhance data integrity with Kaomi for Nova 21 CFR Part 11 software.

3 Minerals
Processing of mined minerals, such as those used in manufacturing clay, requires multiple steps, each of which has an impact on the physical properties of the mineral. Monitoring surface area and pore size provides a rapid means to ensure product consistency.

4 Catalysts
Surface area and pore size impact quality and reaction efficiency in catalysts. Characterize these properties for raw materials (support or active materials) and finished product (heterogeneous or homogenous catalysts) in a variety of forms (powders, chunks, or small monoliths).

5 Batteries
Investigating the surface area of anode materials like graphite, cathodes such as lithium, and other metal oxides and separator membranes lets researchers and producers model, improve, and control the performance of raw material quality.

6 Metal powders
Researchers and producers of metal powders – used in processes like additive manufacturing, batteries, and catalysts – rely on surface area analysis to predict and validate how the powder will behave in diverse applications.

7 Metal oxides
Industrial chemicals, such as alumina, titania, silica, and zirconia, are classified based on their physical characteristics, including surface area and pore size, because these properties have a major influence on the performance of the chemicals in different applications.

8 Ceramics
Measuring surface area and pore characteristics of both the raw materials and the resulting ceramic material boosts product strength, texture, and appearance.

	Nova 600 BET	Nova 800 BET	Nova 600	Nova 800
ANALYSIS SPECIFICATIONS				
Measurement principle	Vacuum volumetric			
Analysis gases	N_2 only		N_2, Ar, CO_2, and other non-corrosive gases	
Analysis stations	2	4	2	4
Independent P_0 station	Yes			
Relative pressure range (P/P_0)	10^{-4} to 0.5		10^{-4} to 0.999	
Pressure measurement accuracy	0.1 % (of full scale)*			
Pressure resolution	Absolute : 1.2 x 10^{-4} Torr Relative : 1.5 x 10^{-7} P/P_0			
Lower specific surface area limit	From 0.01 m^2/g			
Lower absolute surface area limit	From 0.5 m^2			
Surface area reproducibility	2 %			
Pore size range	N/A		0.35 nm to 500 nm (diameter) 0.35 nm to 1.1 nm with CO_2 1.1 nm to 500 nm with N_2	
Minimum pore volume	N/A		1.2 x 10^{-8} cm^3	
TruZone	Yes			
PowderProtect	Yes			
DoseWizard	Yes			
Vectordose	Yes			
Analysis Dewar	Volume: 1 L Duration: up to 7 hours		Volume: 2 L Duration: up to 40 hours	
Sample preparation	Integrated degassing stations: 4 Temperature control: 2 heating zones, ambient to 425 °C Available methods: flow and vacuum, programable multistep heating profiles			
PHYSICAL SPECIFICATIONS				
Dimensions (D x W x H)	44 cm x 63 cm x 84 cm			
Weight	63 kg			
Operating environment	Temperature: 15 °C to 35 °C Humidity: 20 % RH to 80 % RH, non-condensing			
Wetted parts	Stainless steel, Viton elastomers			
Gas	Ports: 5 (3 analysis, 1 helium, 1 degas/backfill) Purity: 99.999 % (He, N_2); input pressure: 8 PSIG to 10 PSIG			
Vacuum connection	Rotary pump exhaust port, KF 16			
Vacuum requirements	Ultimate vacuum of 2.3 x 10^{-3} Torr			
Electrical	Supply: AC 100~240 V AC , 50 Hz / 60 Hz Consumption: 345 VA (maximum)			

	Nova 600 BET	Nova 800 BET	Nova 600	Nova 800
ADDITIONAL SPECIFICATIONS				
Display	10” touchscreen			
PC connection	Ethernet			
Kaomi for Nova software	Instrument control: up to 4 Instruments 6 Languages: Chinese, English, French, German, Japanese, Spanish			
Kaomi for Nova 21 CFR Part 11 software	Features user management, audit trail, customizable reporting, and electronic signature to enhance data integrity for use in the pharmaceutical industry			
Pharma qualification package	Yes			
Preloaded analysis profiles	20+ (ASTM, USP, DIN, ISO)			
RoHS 3 compliant	Yes			
CE certified	Yes			

*Includes precision, linearity, and hysteresis of the complete pressure measurement system.
All performance specifications in the document have been validated with the certificated reference material BAM P115 or BAM P102.

Reliable. Compliant. **Qualified.**

Our well-trained and certified technicians are ready to keep your instrument running smoothly.

FIND OUT MORE

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Maximum uptime | **Warranty program** | **Short response times** | **A global service network**

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