SYSTEM 6300
High Performance Amino Acid Analyzer

BECKMAN
The System 6300: Designed for Optimum Performance

THE SYSTEM 6300 IS A DEDICATED LIQUID COLUMN CHROMATOGRAPH THAT PERFORMS AUTOMATED ION-EXCHANGE CHROMATOGRAPHY WITH NINHYDRIN DETECTION TO PROVIDE THE PRECISION ANALYSES YOU REQUIRE FOR HIGH-SPEED, HIGH-RESOLUTION SEPARATIONS OF HYDROLYZATE AND PHYSIOLOGICAL SAMPLES.

KEY TO THE REPEATABILITY ACHIEVED IS THE ON-STREAM POST-COLUMN NINHYDRIN DERIVATIZATION, WHICH ELIMINATES A SAMPLE PREPARATION STEP AND ALLOWS MORE ACCURATE QUANTITATION.

DESIGN FEATURES SUCH AS THE MICROVOLUME REACTOR AND MICROBORE TUBING PROVIDE THE RESOLUTION REQUIRED FOR TODAY’S HIGH SENSITIVITY RESEARCH.

WITH BECKMAN YOU’RE AFFORDED A “TOTAL SYSTEM”—WITH STRICTLY TESTED CHEMICALS, APPLICATIONS CHEMISTS A PHONE CALL AWAY, RELIABLE SERVICE SUPPORT, IN-DEPTH IN-LAB TRAINING, AND ONGOING RESEARCH.

A glance at the control panel gives you real-time data as the run is in progress. The process begins with the automatic transfer of sample from an easily loaded sample coil to a fixed-volume metering loop. It travels through this loop to a conductivity sensor, which ensures the metering loop is filled with sample. Sample is then injected onto the column for ion-exchange separation, flows through the tubular reactor for ninhydrin derivatization, then through the colorimeter for quantitation.
For Physiological Samples...
The System 6300 provides the high-resolution separation that is essential for the analysis of complex physiological samples such as plasma, urine, and cerebrospinal fluids. The intended clinical use of the 6300 is to aid in the detection, confirmation, and management of inherited disorders of metabolism, when used in conjunction with other clinical diagnostic tests and patient evaluations, where reliable and accurate quantitation of complex physiological fluids is required.

And Hydrolyzates
In research and development and QC labs, the System 6300 offers unique advantages. Using methods developed by Beckman scientists, optimum separations of amino acids are achieved for simple and complex hydrolyzate mixtures from purified proteins such as glycoproteins, connective tissue proteins, cell wall proteins, enzymes, and peptide hormones. In addition, special methods have been developed for the analysis of collagen and the rapid screening of hexosamines and lysine.

Designed exclusively for the analysis of amino acids, this dedicated system allows accurate, repeatable analysis of hydrolyzate samples for amino acid composition and quantitation—without the constant adjustment and recalibration often necessary with nondedicated systems.
**High Resolution**

The design of this ion-exchange system allows sharp peak separation. Amino acids are derivatized with ninhydrin in a micro-volume tubular reactor set at 135°C, the ideal temperature for this reaction.

This patented 100-μL reactor is packed with diamond dust to optimize the reaction. The small volume ensures greater quantitative accuracy than can be achieved with larger capacity reactors in which diffusion and consequent loss of resolution may occur.

**Repeatability and Precision**

Sample flows through a metering loop with a nominal volume of 20, 50, or 100 μL. Complete filling of the metering loop is assured by an in-line, patent-pending conductivity sensor. This delivery system design allows reliable and precise sample delivery to the column, run after run.

To further contribute to repeatable results, amino acids are derivatized with ninhydrin following separation. Reproducibility is achieved due to the specificity and stability of the ninhydrin reaction, which allows analysis of even complex mixtures, including samples with salts, sugars, and fats.
Sensitivity...
A single, low-volume flow cell in the colorimeter minimizes sample diffusion. Samples containing as little as 50 pmol of each component can be quantitated, and components in concentrations as low as 10 pmol can be identified. The coefficient of variation for 50 pmol samples is guaranteed to be no greater than 2% for the common amino acids found in hydrolyzate and physiological samples.

A dual-channel colorimeter detects primary as well as secondary amino acids. Its patented design features three wavelengths. A 690-nm reference wavelength provides stable baselines at high-sensitivity operation. Both 440-nm and 570-nm signals are recorded, individually or summed at 2.0, 1.0, 0.5, 0.2, or 0.1 absorbance units full scale.

An optional fluorometer accessory extends identification of the primary amines to the femtomole range when used with Beckman Fluo-R (OPA) reagent.

Minimal Reagent Consumption...
Due to the microbore column design and optimized flow rate, buffer consumption is only 20 mL/h and reagent consumption 10 mL/h, which results in considerable cost savings on your amino acid analysis supplies.

Methods Flexibility...
The flexibility of the System 6300 has allowed development of methods that provide separation of the greatest number of compounds with minimum analysis time. To accommodate your work, up to three column temperatures and six buffer changes can be incorporated into a single run. Temperatures can be set from 4°C to 95°C, and control of the rate of temperature change is provided.

For Hydrolyzate Analyses...
Two Beckman methods using a new three-buffer system allow separation of simple as well as complex hydrolyzate mixtures from purified proteins such as glycoproteins, connective tissue proteins, enzymes, and peptide hormones. In addition, special methods have been developed for the screening of hexosamines, lysine and collagen.

With the System 6300, a standard separation of 30 amino acids can be completed in just 50 minutes, 60 minutes injection-to-injection. (See Figure 1.)

For Physiological Analyses...
Beckman-developed protocols allow separation of even complex mixtures. Ideal for complex samples such as urines, a four-buffer method provides accurate quantitation of up to 52 ninhydrin-positive compounds in slightly more than two hours. (See Figure 2.) The standard three-buffer technique provides fast analysis of up to 44 compounds in less than two hours.

Easy to Use...
The System 6300 is a turn-key instrument requiring minimal operator intervention. To operate, simply select your preprogrammed method, or enter the parameters for a new method by touching the keys on the System 6300 panel. Up to four methods can be stored by the system; additional methods can be saved on Memory-Pak™ cassettes.

A real-time visual display shows flow sequence, operating temperatures and pressures. With a touch of the control panel you can direct the system to measure flow rate and provide real-time readings in mL/h.
Advanced Data Handling...
For optimum performance, couple the System 6300 with the System Gold™ Data System. Gold is an easy-to-use, PC-based data system that allows you to simultaneously collect data from your instrument while you're reanalyzing previously collected data.

Gold provides peak name identification and dual channel data on the chromatogram, and allows baseline subtraction and auto-zeroing. It provides advanced capabilities for postrun manipulation of data and calibration tables, and allows data to be formatted so that it can be downloaded into other software programs such as Lotus 1-2-3® for further data manipulation.

For a total system approach, use the Gold Data System to collect data from two instruments simultaneously. Gold can collect data from a System 6300 and reverse-phase HPLC system in a protein characterization lab, or from two System 6300's in a high-volume QA/QC lab.

Sample and Reagent Safety...
A built-in self-defrosting refrigeration system maintains the stability of buffers, reagents and samples, including glutamine and asparagine.

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The column is housed in the Quick-Response Thermoelectric Controller. The patented design of this controller allows extremely rapid temperature cycling for shortened run times. Temperature is constantly monitored by electronic feedback mechanisms (thermister probes) located along the length of the column. This minimizes temperature fluctuations to provide the precise control needed for maximum resolution.

Packaging - Processing
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1-847-683-7720
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Ensure Peak Performance with the Total System

Key to the repeatability and minimum operator intervention required for the System 6300 are the columns, buffers, reagents and standards specially formulated for use in this instrument.

They are manufactured and tested with strict adherence to rigid Good Manufacturing Practices (GMP) standards. This process results in high lot-to-lot reproducibility, since each analytical column and batch of buffer or reagent is tested for conformity. The adherence to these standards provides verifiable high quality and makes the system suitable for diagnostic, QA/QC, bioresearch and biotechnology applications.

The Heart of the System: the 6300 Column

The stainless steel analytical columns are prepacked with proprietary spherical ion-exchange resin; a lithium buffer form for physiological analyses, and a sodium buffer form for hydrolyzate analyses. The microbore column has been designed for optimum flow rates and minimal reagent consumption.

Pretested on a System 6300, each High Performance Column is shipped with a test chromatogram to verify performance.

Strictly Tested Buffer and Reagent System

Each analytical chemical receives final quality control analysis on a System 6300 at the instrument's highest sensitivity to verify compliance to stable baseline specifications. For operator convenience and to eliminate contamination, the chemical containers attach directly to the instrument. The high-performance buffers are packaged in the correct concentrations and are ready for immediate use. Easy-to-read, color-coded labels provide instant identification.

Quantitation reagents Nin-Rx™ and Fluo-R™ are formulated in the same buffer-to-reagent ratio so they can be used without any changes to the pump flow rate. They are formulated, filtered and bottled under inert conditions to prevent oxidation. Both are tested for peak height and baseline stability to ensure maximum color development. To maintain stability of Nin-Rx during storage and transit, a premeasured vial containing ninhydrin and hydrindantin is added just before use.

High Quality Calibration Standards

The calibration standards upon which you base your calculations are an important part of the Total System. Beckman high-quality standards have been used reliably for decades.

With Beckman standards the purity of each amino acid component is verified before its acceptance for manufacturing. Each step of manufacturing is carefully monitored according to GMP procedures. Finally, each batch is instrument-tested to verify the concentration of the combined amino acids that make up the finished product.

To make your calibrations fast and easy, these standards can be used alone or in combination. The STD Hydrolyzate Standard contains 18 amino acids. For physiological methodologies, add the Acidic and Neutral Amino Acid Supplement AN+™ (13 amino acids) and the Basic Amino Acid Supplement B+™ (9 amino acids).

A cysteic acid standard, CD* Column Diagnostic Reagent/Standard, is also available, and is shipped with each column. This standard can be used to test column efficiency and to help diagnose resin contamination, hydraulic system disorders, and voids in the column bed.

These standards are ideal for analysis-to-analysis comparisons within your laboratory, and quantitative comparison with work performed in other laboratories.
Sample Injection System. Up to 48 samples can be precisely metered and injected automatically. Samples are placed in easy-to-load coils. Built-in refrigeration protects heat-labile samples.

Microprocessor Control Panel. Provides continuous visual feedback of flow sequence, operating temperatures and pressures. At any time operating parameters can be interrogated. Tactile control switches are protected by easy-to-clean, one-piece membrane.

Frequency-Controlled Direct Drive Pumps. Provide constant, uniform delivery of buffer and reagent. Pumps are calibrated to automatically deliver buffer and reagent in the required 1:2 ratio.

Phototransistor Flowmeter. Gives automatic flow rate measurement and data readout.

Advanced Colorimeter. Single, low-volume flow cell greatly reduces sample diffusion for maximum resolution. Simultaneous, 3-channel monitoring with reference wavelength at 690 nm provides greater baseline stability.

Tubular Reactor. Operates at 135°C for more complete color development with small sample concentrations.

Automatic Program Linking. Precisely executes completely different, nonsequential methodologies. Up to four-program capability.

Easy-to-program Memory-Pak Modules. For permanent storage and fail-safe recall of additional programs.

The System Gold Data System allows you to simultaneously collect data from your instrument while reanalyzing previously collected data.

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Overflow Monitor. Prevents overflow of waste solutions. Before spillage occurs, the System 6300 gives you visual warning. If unheeded, the run in progress will be completed and no subsequent run initiated.

Dual Channel Recorder. Records two signals simultaneously: 440 nm, 570 nm, or "summed" (440+570). Two chart speeds are available: 6 inches per hour and 6 inches per minute.

Key-Controlled Lock. Prevents unauthorized alteration or interruption of program.

Refrigeration Compartment. Holds buffers and reagents in easy-access, circular trays. Additional space available for calibration mixture or other chemicals that require refrigeration.

Quick-Response Thermoelectric Controller. Allows rapid and programmable column temperature changes over a wide 4°C to 95°C range.

Stainless Steel Column. Prepacked with exclusive Beckman resin for either hydrolyzate or physiological analyses. High pressure operation (up to 3000 psi) permits fast analysis with accuracy.

406 Analog Interface. Used to convert analog signals to digital output to allow use of System Gold data handling software.
System 6300 Specifications

- Height: 63 in. (1600 mm)
- Width: 42 in. (1070 mm)
- Depth: 30 in. (760 mm)
- Height of work surface: 36 in. (915 mm)

Ordering Information

System 6300 High Performance Amino Acid Analyzer

- 341163 for 208V, 60 Hz operation
- 344465 for 240V, 60 Hz operation

System 6300 High Performance Amino Acid Analyzer with System Gold Data System

- 357534 for 208V, 60 Hz operation
- 357535 for 240V, 60 Hz operation

System 6300 High Performance Amino Acid Analyzer with System Gold Data System, IBM PS/2 Computer*

- 357536 for 208V, 60 Hz operation
- 357537 for 240V, 60 Hz operation

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