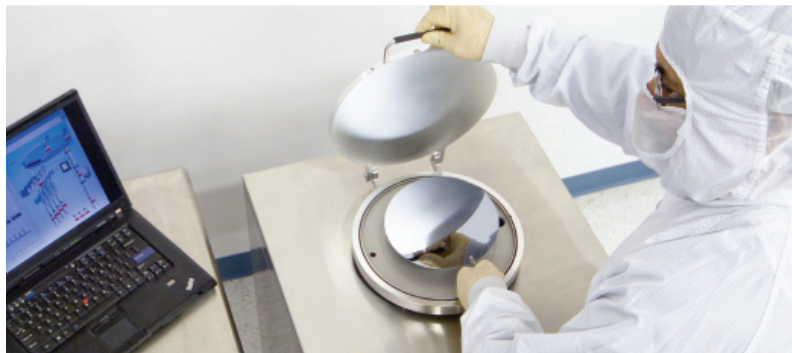


Cambridge NanoTech is the leading provider of atomic layer deposition (ALD) solutions for research and industry worldwide, delivering expert services and versatile, turnkey systems that are accessible, affordable, and accurate to the atomic scale. All Savannah™ ALD systems exemplify these core competencies, making it the platform of choice for those doing ALD research and development.



### Accessible

With more than 200 systems shipped worldwide, the Savannah makes ALD accessible to everyone, from experts to those just entering the field. The Savannah system is a flexible and simple system to configure and to operate. It comes with numerous standard recipes and expert support from our team of highly experienced ALD scientists and technologists.

- Each Savannah is designed for maximum experimental flexibility with configurations of up to 6 precursor lines, compact ozone generator, and optional ALD Booster™ low vapor pressure precursor delivery system.
- Savannah systems are in stock and typically ship within seven days. Average time from uncrating to depositing perfect films is just a few short hours.
- Our easy to understand and flexible user interface, combined with readily available recipes and pre-packaged precursors from our partner, Sigma-Aldrich, gets you up and running quickly.



Savannah S100

### Affordable

The low cost of entry and reduced operating expense combined with expert advice when you need it, makes the Savannah the best value for those doing serious ALD research, development and production.

- Low Cost of Ownership. Our ALD Shield™ protects expensive pumps and pump lines from deposits, greatly extending the lifetime of your pump.

- Lowest consumption of precursors saves you money compared to similar systems.
- Smallest footprint saves you valuable lab and cleanroom space.
- Cambridge NanoTech's expert team provides first-year system and process support at no additional charge. We are your ALD resource center.



Savannah S200

### Accurate

ALD offers precise control of depositions down to the atomic scale. Savannah ALD systems are recognized for superior film quality. Such precise control is the result of meticulous design and experience that can only come from knowledgeable ALD experts.

- Savannah systems provide digital control of your thin films which grow one layer at a time and can be controlled to accurate thicknesses.
- Two deposition modes allow precise control of your films from the nano scale to the micro scale. Our unique Exposure Mode™, combined with our proprietary precursor delivery system and precise temperature control, enables conformal film growth on ultra-high aspect ratio features (greater than 2000:1), found in materials such as porous foams, fibers and nanogels.
- Our Continuous Mode enables the rapid growth of perfectly dense, uniform, and conformal films.
- Individually precise control of precursor line temperature gives the flexibility to use solid, liquid, or gaseous precursors.



Savannah S300

System Specifications	
Substrate size	Savannah S100: up to 100 mm Savannah S200: up to 200 mm Savannah S300: up to 300 mm
Dimensions (w x d x h)	Savannah S100: 485 x 560 x 965 mm Savannah S200: 585 x 560 x 965 mm Savannah S300: 686 x 560 x 965mm
Cabinet	Stainless steel, built in cooling, removable panels, adjustable feet
Deposition Modes	High speed or ultra-high aspect ratio
Operational Modes	Continuous Mode™ (high speed) or Exposure Mode™ (ultra-high aspect ratio)
Power	115 VAC or 220 VAC, 1200 W (excluding pump)
Control	LabVIEW™, USB, Windows™ PC
Substrate Temperature	S100: RT - 450 °C; ±1 °C (heat zone optionally higher) S200: RT - 400 °C; ±1 °C (heat zone optionally higher) S300: RT - 400 °C; ±1 °C (heat zone optionally higher)
Deposition Uniformity (Al <sub>2</sub> O <sub>3</sub> )	<1% (1σ)
Vacuum Pump	Integrated, minimum 3.5 CFM required
Compatibility	Cleanroom class 100 compatible
Compliance	CE, CSA
Options	Dome lid with wafer cassette, custom reactors, glovebox interface, in-situ ellipsometry, ALD Shield™ vapor trap
Precursor Specifications	
Precursor Delivery System	2 lines standard, up to 6 lines available. Each line accommodates solid, liquid and gas precursors and is independently heated up to 200 °C (higher temperature optionally available.) Metal VCR seals.
Valves	Industry standard high speed ALD valves with 10 msec response time
Precursor Cylinders	Individually heated 50 ml stainless steel cylinders (up to 315 °C), optional larger cylinders available
Carrier/Venting Gas	N <sub>2</sub> or Ar mass flow controlled, 100 SCCM
Options	ALD Booster™ for low vapor pressure precursors, ozone generator, liquid injection, higher-temperature ALD valves (>200 °C), up to 3 gas MFCs

## ALD Films

At the forefront of ALD precursor and ALD thin film research, Cambridge NanoTech scientists continuously add to the list of standard ALD recipes:

- Oxides: Al<sub>2</sub>O<sub>3</sub>, HfO<sub>2</sub>, La<sub>2</sub>O<sub>3</sub>, SiO<sub>2</sub>, TiO<sub>2</sub>, ZnO, ZrO<sub>2</sub>, Ta<sub>2</sub>O<sub>5</sub>, In<sub>2</sub>O<sub>3</sub>, SnO<sub>2</sub>, ITO, Fe<sub>2</sub>O<sub>3</sub>, MnO<sub>x</sub>, Nb<sub>2</sub>O<sub>5</sub>, MgO, Er<sub>2</sub>O<sub>3</sub>
- Nitrides: WN, Hf<sub>3</sub>N<sub>4</sub>, Zr<sub>3</sub>N<sub>4</sub>, AlN, TiN, NbN<sub>x</sub>
- Metals: Ru, Pt, W, Ni, Fe, Co

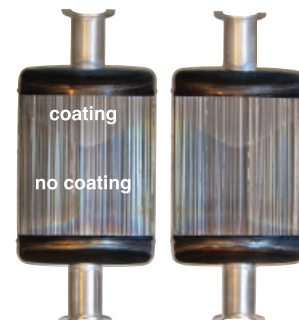
These films, their nanolaminates, and many more materials and their recipes are available from Cambridge NanoTech's own staff, its partnerships, and its 200+ customer base.

Cambridge NanoTech, Savannah, ALD Booster, ALD Shield, and Exposure Mode are trademarks of Cambridge NanoTech, Inc. LabVIEW is a trademark of National Instruments Corporation. Strem Chemicals, Sigma-Aldrich, and MBraun are trademarks of their respective holders. Savannah is the subject of patents pending.

1006-SV

## ALD Shield™

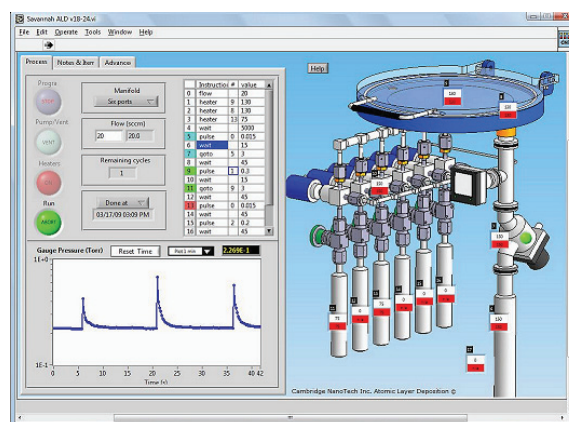
Cambridge NanoTech's ALD Shield allows excess reactive vapors to form a film before they reach the pumping system, thus preventing build-up of deposits on the plumbing and in the pump. This saves money in maintenance costs and prevents excess gases from being exhausted to the environment.



The ALD Shield's high conductance, hot foil design causes gases to deposit until depleted. The vapor shield is easily removable for periodic cleaning.

## Complete Control

Complete control of all key system parameters is easily achievable through our intuitive Graphical User Interface (GUI). Precise films come from precise control. The Savannah system allows you to control all key system parameters programmatically from substrate temperature to precursor dose with a simple LabVIEW™-based GUI that is powerful, yet simple to use. The LabVIEW program is easily expandable and Cambridge NanoTech provides the LabVIEW source code for complete programmatic flexibility.



## Glovebox Integration

The Savannah is readily integrated with MBraun™ gloveboxes for handling thin film samples in an advanced inert atmosphere system that is free of oxygen and moisture.

**Cambridge**  
**NanoTech**  
*Simply ALD*

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