

GEMStar Quantum PEALD/Thermal ALD System



Molecular Innovation™

The GEMStar Quantum is the latest generation of Atomic Layer Deposition (ALD) Systems targeting demanding applications requiring more precise control while maintaining a benchtop footprint.

GEMStar Quantum produces best in class ALD films from high aspect ratio particles through 200mm substrates both in single substrate and batch modes of operation

The GEMStar Quantum Plasma Enhanced Atomic Layer Deposition (PEALD) system extends the capabilities of the GEMStar XT-DP™ Plasma Enhanced Atomic Layer Deposition and GEMStar XT™ Thermal systems to include best in class plasma processing through the full range of substrates.

Configured with a 300 Watt air cooled direct Inductively Coupled Plasma (ICP) RF system with four mass flow controlled plasma gas inputs, three mass flow controlled auxiliary gas inputs, one mass flow controlled pulsed vapor push port for low vapor pressure precursors, eight high speed material ALD valve ports (one with vapor push technology), two locatable 200°C material temperature zones, the GEMStar Quantum system is a powerful plasma enabled tool to extend your research and processing requirements to the next level.

Some key features of the system include:

- ◆ 300-Watt Air Cooled Direct ICP Head with four metal sealed mass flow controlled plasma gas inputs
- ◆ Adjustable reactor temperature up to 300°C
- ◆ Up to 200°C uniform gas distribution delivery
- ◆ Mass flow controlled Pulsed Vapor Push (PVP™) to handle very low-pressure material
- ◆ Substrate configurable end effectors up to 200 mm diameter substrates, as well as a 500°C heated platen option
- ◆ Glovebox Interface for the ability to maintain substrates in a clean glovebox environment
- ◆ User selectable carrier gas MFC controlled input up to 200 SCCM
- ◆ Field proven GEMFlow™ Control System



Ease of Operation

The Arradance GEMFlow™ Software provides complete user control over all key operating parameters such as temperature, gas flow rate, high-speed ALD valves, RF Power and vacuum isolation.

- ◆ Preloaded on business level Windows® Laptop

User created processes can be saved enabling substrate to substrate and batch to batch consistency without sacrificing flexibility

- ◆ Diagnostic system and logging creates traceable data of all system parameters during operation
- ◆ Internal GEMStar USB control module

Safety

GEMStar Quantum Systems are designed to be SEMI S2 Compliant where applicable without sacrificing the needs of material research and development needs

- ◆ CE Compliant, CSA Optional
- ◆ Watchdog protection and EMO interface
- ◆ Operator touch safe exterior
- ◆ RGIP™ Reactor Gas Injection Protocol avoids accidental, unwanted, or unsafe chemical material reaction for all gas injection ports for simple and complex nanolaminate processes

Serviceability

Modular ergonomic design with top panel access to all critical components

- ◆ Fast precursor changes and reconfiguration
- ◆ Easy access power, vacuum and gas connections
- ◆ Perfectly suited for glove box configuration

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Specifications	
System Dimensions	Main - 25" H x 32" W x 24" D designed to fit on desktop, lab bench or glovebox Half Rack - 11"H x 12"W x 21"D for RF Power Supply
Door Mounted Substrate End Effector	Specify end effector diameter at time of order (200 mm default, 150 mm, 100 mm) Other sizes or batch cassettes available on request
Reactor/Door Thermal Zones	Two controllable zones up to 300 °C ± 1 °C Optional 450 °C Processing available on request
RF Plasma Source	300 W ICP Air Cooled Power adjustable head with automatic tuning Four mass flow controlled (MFC) plasma gas inputs with automatic pneumatic safety normally closed valves
Material Manifold	Dual controllable manifold zones up to 200 °C Eight High Speed ALD Valve Controlled Material Ports Single Pulsed Vapor Push (PVP™) Zone controlled by Mass Flow Controller and High Speed ALD Valve
Material Bottle Heated Zones	Up to four movable zones up to 200 °C
Material Bottles	Up to four or six (2 STD) DOT certified 150 ML Bottles with bellows sealed valves
External Gas Input	Main System - Up to 4 (3 STD) Inputs for external user selectable gasses RF System – 4 inputs, 3 are user selectable for Plasma gas inputs
Inert Carrier Gas	Mass Flow Controlled up to 200 SCCM
Control System	GEMFlow™ Control Software Windows® Professional 64-bit Laptop GEMStar USB control module
RF Power Supply	11"H x 12"W x 21"D Half Rack
Metrology Port	Spare NF-40 In Line metrology port for QCM or other customer needs
Vacuum Gauge	Convection Vacuum Gauge Optional ALD Insensitive Capacitive Monometer Gauge
Equipment Safety	
Emergency Off	Standard DB9 port to support EMO or other safety shut down requirements
Touch Safe	All Exterior Components thermal and electrical
Watchdog	System shuts down to Safe mode if communication is lost with computer
Normally Closed Vales	All internal valves close when power removed
Certification	CE Marked Designed to comply with applicable SEMI S2 guidelines CSA optional on request
Facilities Requirements	
Carrier Gas	Ar 10-20 psig regulated VCR-4 Type Connection
Plasma Gases	Four 10-20 psig regulated VCR-4 Type Connection Note: System comes with above carrier gas also connected to PEALD MFC port 1
CDA (Clean Dry Air)	80 psig ± 5 psi regulated
AC Power	Main System – Dedicated 110-120 VAC 50/60 Hz 20A RF System – Separate Dedicated 110-120 VAC 50/60 Hz 20A
System Weight	< 275lbs including plasma system components
Vacuum Pump (optional)	KF 50 Vacuum Connection ≥ 35 cfm Dry Pump