



INTEGRITY ELECTRON BEAM DEPOSITION

FOR PRECISION OPTICS AND OPHTHALMIC COATINGS



Denton Vacuum Enables Innovation And Has For Over 50 Years

With thousands of thin film deposition tools installed globally — including a large base of precision optical deposition systems — engineers and researchers rely on Denton's thin film innovations to drive higher throughputs, better yields and low cost of ownership (COO) while benefiting from comprehensive service and support, and a dedicated R&D program that delivers enabling technologies.

Whether investigating or manufacturing — from small, dedicated research groups to large, multi-user fabrication facilities — the Integrity electron beam deposition system delivers consistent, repeatable, enabling results through wide process capability, ease-of-use, and superior reliability and support.

For a direct path to enabling your innovation, the Integrity electron beam deposition system accommodates a broad and deep spectrum of features that can increase both your capacity and capability.

Denton's Integrity Electron Beam Deposition System for Precision Optical and Ophthalmic Coatings

- Anti-reflectance and High-reflectance Coatings
- Laser Facets
- Optical Sensors and Filters
- Band Pass Filters
- Infrared Filters and Coatings
- Neutral Density Filters
- Metallization
- Beam Splitters

PERFORMANCE AND VALUE

Process Stability

- Shorter Calibration Time
- Higher Yield

Adhesion & Stress Control

- Pre-clean Capability
- Low-Damage Deposition

Thin Film Process Control

- Deposition Rate Control
- Optical Monitoring
- Planetary Fixtures

Throughput & Productivity

- Flip Fixtures
- RF and DC Ion Sources for IAD and Pre-clean



Denton Integrity-class systems enable high-rate, uniform deposition in a development or production environment.

- Easily serviced/maintainable design
- High reliability, proven sub-components



Multi-planetary Wafer Handling Fixture for High Uniformity,
Multi-source Evaporation



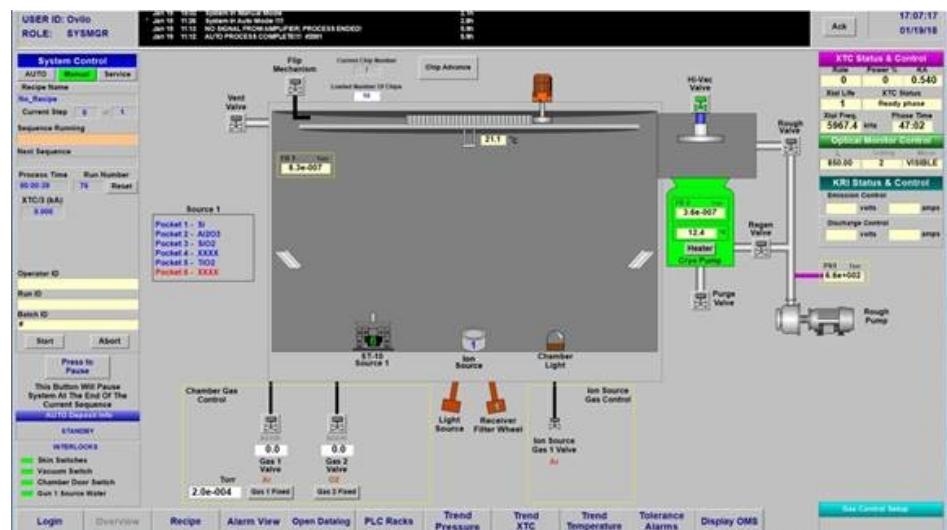
In-situ Flip Fixture

System Control

Integrity Deposition Control

System Features

- Visual system configuration and status
- Password-protected access levels
- Comprehensive data logging
- Remote diagnostics
- Windows 10 operating environment
- Developed on the GE Fanuc Cimplicity® HMI



Denton Vacuum Integrity Precision Optics Innovation

Designed for high-quality optical coatings with low absorption and scattering, the Denton Vacuum Integrity precision optics system provides an array of precision-designed and configured electron beam and ion-assisted electron beam deposition technologies to help you precisely leverage and control the reflectance, transmittance, absorbance and resistance in your optical applications, including:

Optical Coating Innovation

- Unique fixturing options
 - Knudson cells
 - Planetary fixtures in a variety of configurations
 - Domes
 - Flip fixtures
 - Heating and cooling options



Figure 1: Denton Vacuum proprietary filament-free ion beam source.

Ion Beam Assistance

Proprietary filament-free Endeavor ion beam source that enables wider process windows, better performance and lower maintenance cost of ownership. High, independent current density and ion energy provides for optimal film performance, including:

- Dense, defect-free films
- Filament-free design eliminates contamination and need for frequent filament changes
- Superior control of film microstructures, stoichiometry, and stress
- Enhanced packing and low pin-hole density
- Stable deposition rates and uniformities
- Low ion energy operation mode for pre-clean and plasma treatment without plasma damage

Optical Monitoring System

Denton Vacuum's LambdaPro® optical monitoring system delivers both fast and accurate process development and production for thin film monitoring:

- Optical ranges for UV, VIS or IR spectral, among others
- Integration of all required steps to generate a complete recipe with monitoring strategies for each layer

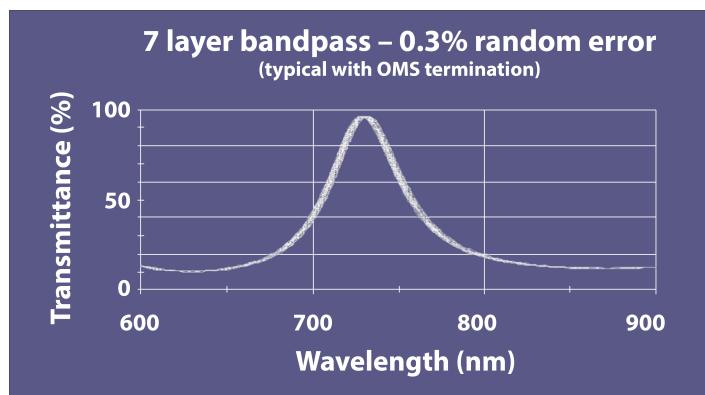


Figure 2: Band Pass Filter Repeatability using Optical Monitoring System.

Integrated Deposition Rate Controller

- Equipped with a Programmable Rate Controller optimized for low-power use
- Rate controller integrated to tool's control system

SPECIFICATIONS

Chamber

- Standard chamber sizes include 22, 26, 36, 39, 44, 50, 60, and 64 inches
- 304 stainless steel construction, water-cooled via exterior welded 304 stainless steel u-channel
- Optional chamber temperature control includes re-circulating water chiller/heater; +15°C - +50°C integrated to system controls for power and automatic temperature setpoint operation
- Full-width opening door, two internally-shuttered 100 mm viewports with welding glass holders
- Two complete sets of removable, stainless steel, evaporant shields (multi-piece construction to facilitate removal and reinstallation, with integral handles)
- Ports for crystal monitoring and optical monitoring

Pumping system

- Cryogenic or turbo-molecular pump
- Oil-free system roughing pump
- High-vacuum regeneration and roughing valves
- Two full-range gauge transmitters; one Pirani gauge transmitter
- Multi-pocket electron beam source
- Power supply interfaced to the deposition rate controller
- Multiple source options available

Shutters

- Electro-pneumatic source shutter assembly dedicated to the low-voltage sources

Deposition controller

- One quartz crystal rate controller interfaced to system computer for automatic source control
- Optional LambdaPro® optical monitoring system (OMS) or spectroscopic ellipsometer

Substrate fixturing

- Single rotation (flat or variable angle rotating dome)
- Planetary
- Flip (laser diodes)
- Custom-engineered and fabricated fixturing available through option

ProcessPro control system

OPTIONS

- CE Certification
- Secondary source
- Alternative substrate size adaptors
- Plasma cleaning
- Rate stabilization control
- SECS/GEM interface automation standards

Service and Support

All Denton Vacuum systems include pre-shipment startup and training, as well as onsite installation, startup and training at no additional cost.

All Denton Vacuum Integrity systems are backed by an 18-month warranty on parts and labor, over 50 years of process knowledge, an in-house process engineering group, worldwide representation and support, and a Global Factory Service Center.